ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 1

EO M420.01 – IDENTIFY THE ARMS AND TRADES OF THE CANADIAN ARMY

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-704/PG-001, *Gold 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.

Make three copies of each Arms and Trades of the Canadian Army Information Cards located at Attachments A–C.

Photocopy the Arms and Trades of the Canadian Army Bingo Card located at Attachment D for each cadet.

Photocopy the Arms and Trades of the Canadian Army Question Sheet located at Attachment E for each cadet.

Go to http://www.army.forces.gc.ca to confirm that the mission and vision statements of the Canadian Army have not changed.

Research and compile a list of examples of local units from each arm of the Canadian Army. Include the names of these units on the Arms of the Canadian Army Information Cards located at Attachments A–C.

Set up three learning stations around the perimeter of the classroom for the activity in TP 2, ensuring that each station is labelled A–C and there are three copies of the corresponding Arms and Trades of the Canadian Army Information Card at each station.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to introduce the cadet to the mission and vision statements of the Canadian Army.

An in-class activity was chosen for TP 2 as it is an interactive way to provoke thought and stimulate interest regarding the arms and trades of the Canadian Army.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall be able to identify the arms and trades of the Canadian Army.

IMPORTANCE

It is important for cadets to be able to identify the arms and trades of the Canadian Army. Part of the aim of the Cadet Program is to stimulate an interest in the Canadian Forces (CF) through education and interaction with their respective elemental communities. The knowledge and experiences gained through this education and the subsequent interactions are essential to the unique identity of the Royal Canadian Army Cadets (RCAC).

Teaching Point 1 **Identify the mission and vision statements of the Canadian Army.**

Time: 5 min Method: Interactive Lecture

Introduce cadets to the mission and vision statement of the Canadian Army. Explain that it in order to understand occupations within the Canadian Army it is important to understand the underlying role of the Canadian Army within the CF and throughout the world.

MISSION OF THE CANADIAN ARMY

The mission of the Canadian Army is to generate and maintain combat effective, multi-purpose land forces to meet Canada's defence objectives. These defence objectives include:

1. defending Canadian territory and maintaining Canada's sovereignty by providing land surveillance and combat-ready forces;
2. contributing to the collective defence of North America;
3. providing armed and unarmed assistance to civil authorities when needed to maintain public order and security or to assist in emergency relief; and
4. supporting Canadian interests abroad, by providing forces for the United Nations (UN), North Atlantic Treaty Organization (NATO), and other multilateral operations, peacekeeping, and humanitarian assistance missions.

VISION OF THE CANADIAN ARMY

The Canadian Army will provide a disciplined force that will successfully, across a broad spectrum of conflict(s):

1. engage in combat against the armies of failed or falling states;
2. conduct stabilization or peace support operations within these states; and
3. deliver humanitarian aid or assist others in the delivery of aid to the citizens of these states.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What is the mission of the Canadian Army?

Q2. How does the Canadian Army, through its defence objectives, support Canadian interests abroad?

Q3. Name one key concept which is addressed through the vision of the Canadian Army.

ANTICIPATED ANSWERS:

A1. The mission of the Canadian Army is to generate and maintain combat effective, multi-purpose land forces to meet Canada's defence objectives.

A2. The Canadian Army, through its defence objectives, supports Canadian interests abroad by providing forces for the UN, NATO, and other multilateral operations, peacekeeping, and humanitarian assistance missions.

A3. Through its vision statement, the Canadian Army states it will provide a disciplined force that will successfully:

- engage in combat against the armies of failed or falling states;
- conduct stabilization or peace support operations within these states; and
- deliver humanitarian aid or assist others in the delivery of aid to the citizens of these states.

Teaching Point 2 **Conduct an activity where the cadets will identify the arms and trades of the Canadian Army.**

Time: 20 min Method: In-Class Activity

BACKGROUND KNOWLEDGE

The Canadian Army (Land Force) maintains three regular mechanized brigade groups and 10 smaller Reserve Brigade Groups, located in more than 100 communities across Canada. Throughout Canada, the Army has eight support bases and two combat training centres.

The organization of the Canadian Army adheres to the following hierarchy:

Army. A group of corps.

Corps. A group of divisions.

Division. Two or more brigades.

Brigade. Three regiments (armoured and artillery) / three battalions (infantry).

Regiment / battalion. Four squadrons (armoured) / four batteries (artillery) / four companies (infantry).

In order to fulfill the established mission and vision statements, the Canadian Army is first divided into three separate arms:

- combat arms, to include:
  - infantry,
  - armoured,
  - artillery, and
  - combat engineers;
- combat support arms, to include:
  - communications and electronics (signals),
  - military police, and
  - intelligence; and

- service support arms, to include:
    - logistics,
    - health services,
    - electrical and mechanical engineers, and
    - chaplains.

Each arm is divided into a variety of trades specific to each arm, such as infantry soldier or infantry officer. The arms and trades do not exist in and of themselves, but work in conjunction with each other to achieve optimum efficiency and execution of tasks.

ACTIVITY

Time: 20 min

OBJECTIVE

The objective of this activity is to have the cadets identify the arms and trades of the Canadian Army.

RESOURCES

- Arms and Trades of the Canadian Army Information Cards located at Attachments A–C (three per station),
- Arms and Trades of the Canadian Army Bingo Card located at Attachment D (one per cadet),
- Arms and Trades of the Canadian Army Question Sheet located at Attachment E (one per cadet),
- Arms and Trades of the Canadian Army Answer Key located at Attachment F,
- Pen / pencil (one per cadet),
- Highlighter (one per cadet), and
- Whistle.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Brief the cadets on activity instructions, to include:
    a. time limit for each station (six minutes),
    b. direction of rotation between stations (clockwise),
    c. signal for rotation (whistle blast),
    d. an explanation of learning station information cards,
    e. an explanation of how to use the bingo card and question sheet, to include:
        (1) reading questions that correspond with the learning station;
        (2) finding the correct answer on the bingo card;

(3) highlighting the square; and

(4) placing the question number in the square;

f. the order of bingo configurations, to include;

(1) one line (first rotation),

(2) two diagonal lines (second rotation), and

(3) blackout (all squares covered) (last rotation); and

g. how to announce that a bingo has been achieved (yell BINGO and the instructor will check the card).

If a cadet calls BINGO, the remaining cadets will continue to answer questions, until they have all been answered or the six minute time limit has elapsed. Keep track of the cadet who calls BINGO in each rotation.

2. Distribute the Arms and Trades of the Canadian Army Bingo Card to each cadet.

3. Distribute the Arms and Trades of the Canadian Army Question Sheet to each cadet.

4. Divide the cadets into three groups assigning each group a letter from A–C.

5. Have groups move to the learning station that corresponds with their group letter.

6. Have the cadets complete the Arms and Trade of the Canadian Army Bingo Card while rotating from station to station every six minutes.

It is important to circulate around the room to facilitate the activities and help the cadets as required. If possible, assign other instructors to aid with the supervision and facilitation.

7. Once each group has been to each station, review the cadets' answers as a group.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' completion of the Arms of the Canadian Army Activity Sheet will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

As a member of the RCAC, it is important to be aware of the structure of the Canadian Army and the professions it encompasses. This knowledge will ensure that cadets are not only ambassadors of army cadets but also the Canadian Army.

INSTRUCTOR NOTES / REMARKS

Nil.

REFERENCES

A2-036 National Defence and the Canadian Forces. (2006). *Canada's Army*. Retrieved February 23, 2009, from http://www.army.forces.gc.ca/lf/English

A3-051 National Defence and the Canadian Forces. (2009). *Canadian Forces recruiting*. Retrieved April 15, 2009, from http://www.forces.ca

C2-241 Canadian Soldiers. (2008). *Canadian Army*. Copyright Canadian Soldiers 1999–2008. Retrieved February 23, 2009, from http://www.canadiansoldiers.com

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ARMS AND TRADES OF THE CANADIAN ARMY–INFORMATION CARD A

COMBAT ARMS

The combat arms, sometimes referred to as the 'combat arms team', include army trades that directly engage in combat. Trades within combat arms professions include both officer and non-commissioned member (NCM) positions.

Royal Canadian Infantry Corps

The infantry is the core of the combat arms team and is capable of operating anywhere in the world. The versatility of the infantry allows them to perform on all types of terrain, in any weather conditions.

It is the infantry's responsibility to close with and destroy the enemy. It does so by taking and holding favourable ground where it can use its personnel and supporting weaponry to greatest effect, thus forcing the enemy into battle at a disadvantage.

There are two types of infantry units—mechanized and light. Mechanized infantry units use armoured personnel carriers to transport their members to / from / around a combat zone, while a light infantry unit travel to / from / around the combat zone primarily on foot.

The infantry has the following trades:

- infantry soldier, and
- infantry officer.

The motto of the Infantry is "Ducimus" (We lead).

The following battalions make up the Canadian Army's regular force infantry units:

- The Royal Canadian Regiment (RCR):
  - 1st Battalion (1 RCR): Petawawa, Ont.,
  - 2nd Battalion (2 RCR): Gagetown, N.B., and
  - 3rd Battalion (3 RCR): Petawawa, Ont.;
- Princess Patricia's Canadian Light Infantry (PPCLI):
  - 1st Battalion (1 PPCLI): Edmonton, Alta.,
  - 2nd Battalion (2 PPCLI): Shilo, Man., and
  - 3rd Battalion (3 PPCLI): Edmonton, Alta; and
- Royal 22e Regiment (R22eR):
  - 1st Battalion (1 R22eR): Valcartier, Que.,
  - 2nd Battalion (2 R22eR): The Citadel, Quebec City, Que., and
  - 3rd Battalion (3 R22eR): The Citadel, Quebec City, Que.

There are 48 reserve infantry regiments across Canada.

Royal Canadian Armoured Corps

The role of the armoured corps is to defeat the enemy through aggressive use of firepower and battlefield mobility. During battle, armoured personnel must complete reconnaissance and provide direct fire support. This is done by crewing and fighting from armoured fighting vehicles (AFVs) such as the:

- leopard main battle tank,
- coyote surveillance vehicle, and
- reconnaissance variant of the light utility vehicle wheeled (LUVW).

Figure A-1 Armoured Fighting Vehicle (AFV)

Note. From *Combat Camera* by Canadian Forces Image Gallery. Retrieved April 22, 2009, from http://www.combatcamera.forces.gc.ca

Personnel in armoured units are responsible for:

- driving and maintaining AFVs;
- loading, operating and maintaining the AFVs weapons systems;
- maintaining and operating AFVs communication systems; and
- gathering and relaying information about the enemy and the terrain.

The armoured corps has the following trades:

- armoured soldier, and
- armoured officer.

The motto of the Royal Canadian Armoured Corps is "Through mud and the blood to the green fields beyond."

The following regiments make up the Canadian Army's regular force armour units:

- The Royal Canadian Dragoons, Petawawa, Ont.,
- Lord Strathcona's Horse, Edmonton, Alta., and
- 12^{e} Régiment blindé du Canada, Valcartier, Que.

There are 23 reserve armoured regiments across Canada.

Royal Regiment of Canadian Artillery

The artillery in Canada is part of the Royal Regiment of Canadian Artillery and is a member of the combat arms team. The artillery has three principle roles in battle—indirect fire support, air defence, and target acquisition. It is the responsibility of the artillery to destroy the enemy through direct and indirect fire. It does this in two ways:

Field defence. Field defence delivers indirect fire in support of the arms (eg, infantry and combat engineers) that directly engage the enemy.

Air defence. Air defence prevents enemy aircraft from interfering with general operations and defends airfields from enemy attacks.

To accomplish its mission, the artillery uses a variety of weapons systems including:

- mortars,
- field artillery,
- heavy artillery,
- missile artillery, and
- anti-aircraft guns and missiles.

Figure A-2 Field Artillery

Note. From *Combat Camera* by Canadian Forces Image Gallery.
Retrieved April 22, 2009, from http://www.combatcamera.forces.gc.ca

Artillery has the following trades:

- artillery soldier–field defence,
- artillery solder–air defence, and
- artillery officer.

The motto of the artillery is "Ubique" (Everywhere) and "Quo fas et gloria ducunt" (Whither right and glory lead).

The following units of the Royal Regiment of Canadian Artillery comprise the artillery's regular force:

- 1st Regiment, Royal Canadian Horse Artillery, Shilo, Man.,
- 2nd Regiment, Royal Canadian Horse Artillery, Petawawa, Ont.,
- 5e Régiment dàrtillerie légère du Canada, Valcartier, Que.,
- W Battery, Royal Canadian Artillery School, Gagetown, N.B.,
- 4th Air Defence Regiment, Moncton, N.B., and
- 4th Air Defence Regiment, Gagetown, N.B.

There are 22 reserve artillery regiments across Canada.

Canadian Military Engineers (Combat Engineers)

The Canadian Military Engineers include the Combat Engineers, Construction Engineers, Fire Fighters and Mapping and Charting Engineers. The Combat Engineers play an integral role in the combat arms team. In battle, the primary role of the engineers is to help the army live, move and fight while denying the same of the enemy. Their secondary role is to fight as infantry when required.

Personnel in combat engineer units have the following duties:

- construct and maintain roads, airfields, heliports, bridges, causeways, rafts, temporary and permanent buildings;
- construct field defences and obstacles;
- test, purify and filter local water and construct distribution systems;
- detect and dispose of mines and bulk explosives;
- demolish roads and bridges; and
- maintain and operate engineering equipment.

Engineering has the following trades:

- combat engineer, and
- engineer officer.

The motto of the engineers is “Ubique” (Everywhere).

The following engineer regiments comprise the regular force component:

- 1 Combat Engineer Regiment, Edmonton, Alta.,
- 2 Combat Engineer Regiment, Petawawa, Ont.,
- 4 Engineer Support Regiment, Gagetown, N.B., and
- 5 Regiment du genie de combat, Valcartier, Que.

There are numerous reserve combat engineer units across Canada.

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ARMS AND TRADES OF THE CANADIAN ARMY–INFORMATION CARD B

COMBAT SUPPORT ARMS

The combat support arms provide assistance and support to the trades of the combat arms. Combat support arms do not engage directly with the enemy, but may still be required to provide assistance close to the front lines. Combat support arms facilitate the battle. Trades within the combat support arms professions include both officer and non-commissioned member (NCM) positions.

Communications and Electronics Branch

The Communications and Electronics Branch provides support in communications, information systems and information operations for the CF. Members of the branch fall under the following trades:

Signals Operator. Responsible for providing the army with fast, reliable voice and data communications using top-of-the-line satellite, digitized, fixed, air-transportable, and mobile information and communications equipment.

Figure B-1 Signals Operator

Note. From *Combat Camera* by Canadian Forces Image Gallery. Retrieved April 22, 2009, from http://www.combatcamera.forces.gc.ca

Line Technician. Responsible for providing infrastructure for communication services between combat arms units in the field by designing, planning, and installing telecommunications networks and complex antenna systems. They are also trained as combat soldiers due to the close proximity their work takes them to the front line.

Land Communication and Information Systems Technician. Responsible for the repair and maintenance of all types of army communications and information systems such as communications equipment and radio systems, radio relay systems, radar systems, and ground surveillance and radiation detection equipment. They also maintain portable satellite communications systems, personal computers and ground telecommunication systems.

Communicator Research Operator. Responsible to intercept and analyze electronic transmissions and operate computer-assisted radio direction-finding equipment in support of search and rescue operations.

Signals Officer. Responsible to deliver telecommunication services to the CF and to command units that specialize in the command, control, computers and communications.

The motto of the Communications and Electronics Branch is "Velox Versutus Vigilans" (Swift, Skilled, Alter).

There are over 15 regular force and 30 reserve signal and communication units across Canada.

Military Police (MP) Branch

MPs contribute to the effectiveness and readiness of the CF and the Department of National Defence (DND) through the provision of professional police, security and operational support services worldwide.

MPs serve in all three elements on every base and station of the CF in Canada, as well as with reserve units. Military police also serve in support of deployed operations around the world.

The following trades fall under the military police:

- MP NCM, and
- MP Officer.

The motto of the Military Police Branch is "Securitas" (Securing).

Intelligence Branch

The role of the Intelligence Branch is to provide advice to battle commanders to enable them to make appropriate decisions. Intelligence professionals are tasked with a variety of challenging and rewarding positions, both in Canada and abroad.

Intelligence offers the following trades:

- intelligence operator, and
- intelligence officer.

The motto of the Intelligence Branch is "E Tenebris Lux" (From Darkness, Light).

In the regular force, intelligence is a 'purple' trade, meaning that members may serve in all three elements, regardless of their environmental distinction.

There are seven army reserve intelligence units in Canada. They are located in Edmonton, Alta., Vancouver, B.C., Winnipeg, Man., Toronto, Ont., Ottawa, Ont., Montreal, Que., and Halifax. N.S.

ARMS AND TRADES OF THE CANADIAN ARMY–INFORMATION CARD C

SERVICE SUPPORT ARMS

The service support arms support the combat arms and combat support arms by providing such services as postal workers, health care professionals, cooks and clerks. Service support arms do not engage in combat but sustain the ability of the combat arms to fight. Service support arms professions include both officer and non-commissioned member (NCM) positions.

Logistics Branch

Logistics provide a broad range of support functions including movement control, transport, postal services and the supply and delivery of equipment, ammunition, food and shelter to the CF both in Canada and on overseas operations. There are five main areas which fall under the Logistic umbrella and are organized as part of Service Battalions across Canada:

- supply chain management,
- transportation,
- human resource management,
- finance, and
- food services.

Logistics offer the following trades:

- postal clerk,
- mobile support equipment operator,
- ammunition technician,
- traffic technician,
- supply technician,
- resource management clerk,
- cook, and
- logistics officer.

The motto of the Logistics Branch is "Servitum Nulli Secundus" (Service Second to None).

Regular force members of the Logistic Branch are posted to one of three Service Battalions:

- 1 Service Battalion, Edmonton, Alta.,
- 2 Service Battalion, Petawawa, Ont., and
- 5 Service Battalion, Valcartier, Que.

There are 20 reserve Service Battalion units located across Canada.

CF Health Services Group

The CF Health Services Group is the designated health care provider for Canada's military personnel, delivering medical and dental services at military bases across Canada and overseas. Its mission is to provide full spectrum, high quality health services to Canada's fighting forces wherever they serve.

The CF Health Services is a reorganization of the Canadian Forces Medical Service. The CF Medical Service was established as a result of unification in 1968, by combining the Royal Canadian Army Medical Corps and the Royal Canadian Dental Corps with the similar services of the Royal Canadian Navy and the Royal Canadian Air Force.

Health services offer the following trades:

- bio-medical electronic technician,
- medical technician,
- medical laboratory technician,
- medical radiation technologist,
- dental technician,
- bioscience officer,
- dental officer,
- health care administrator,
- medical officer,
- social work officer,
- physiotherapy officer,
- pharmacy officer, and
- nursing officer.

Figure C-1 Transporting Injured Soldier to Medical Services

Note. From *Combat Camera* by Canadian Forces Image Gallery. Retrieved April 22, 2009, from http://www.combatcamera.forces.gc.ca

The motto of the CF Health Services Group is "Militi Succurrimus" (We hasten to aid the soldiers).

The CF Health Services Group is currently organized into three Field Ambulance units in the regular force and 14 Field Ambulance units in the reserves.

Electrical and Mechanical Engineering Branch

The Electrical and Mechanical Engineers are responsible for the maintenance of all electrical and mechanical equipment in use in the Canadian Army today. The Branch is broken down into five trades:

Vehicle Technician. Responsible for the repair and maintenance of anything that operates with an internal combustion engine, including heaters, chainsaws and outboard motors, as well as staff cars, jeeps, trucks and armoured vehicles.

Weapons Technician. Responsible for the maintenance of all weapons—from bayonets to advanced air defence artillery systems—employed in the Canadian Army.

Electronic-Optronic Technician. Responsible to maintain and repair electrical, electro-mechanical, electronic, electro-optical and mechanical equipment, optical instruments, and control systems for weapons and missiles.

Figure C-2 Engineers

Note. From *Combat Camera* by Canadian Forces Image Gallery.
Retrieved April 22, 2009, from http://www.combatcamera.forces.gc.ca

Materials Technician. Materials technicians have a very diverse job that includes tasks such as: welding, machining, sheet metal work, painting and textile / fiberglass / composite materials work.

Electrical and Mechanical Engineer Officer. Responsible for managing and leading workshops—in garrison and in the field—by making technical, administrative and tactical decisions that determine the unit's effectiveness and operational capacity.

Regular force members of the Electrical and Mechanical Engineers are typically posted to one of three Service Battalions:

- 1 Service Battalion, Edmonton, Alta.,
- 2 Service Battalion, Petawawa, Ont., and
- 5 Service Battalion, Valcartier, Que.

Additionally, members may also be integrated into combat arms units in order to provide mechanical and technical support in whichever theatre of operations they may be deployed.

Reserve force members are employed in Service Battalions across Canada.

Chaplain Branch

The Chaplain Branch ministers to the needs of all members of the CF and their families, whether or not they attend church or are of the same religion. Chaplains represent a range of faiths and denominations, including:

- Baptist,
- Anglican,

- Roman Catholic,
- United Church,
- Free Methodist,
- Pentecostal,
- Lutheran,
- Presbyterian,
- Salvation Army, and
- Muslim.

Figure C-3 Chaplain Presiding Over a Ramp Ceremony

Note. From *Combat Camera* by Canadian Forces Image Gallery.
Retrieved April 22, 2009, from http://www.combatcamera.forces.gc.ca

The Chaplain Branch is recognized in Canada and around the world for its leadership in interfaith approaches to chaplaincy and is committed to developing and expanding that expertise. The role of the military chaplain has evolved from working only during times of war, to providing a continual presence both on base and during operations. Chaplains make themselves available wherever military personnel may be found—meaning they deploy with the troops, regardless of the type of mission and the number of personnel involved.

As of March 31, 2007, there were 192 chaplains serving in the Regular Force, and another 156 serving in the Reserve Force.

The motto of the Chaplain Branch is "Vocatio ad servitium". Chaplains are first called to a "vocation of service"

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ARMS AND TRADES OF THE CANADIAN ARMY BINGO CARD

Royal Canadian Infantry Corps, Royal Canadian Armoured Corps, Royal Regiment of Canadian Artillery, and Canadian Military Engineers (combat engineers).	Infantry.	Mechanized infantry.	Armoured.	Royal Regiment of Canadian Artillery and the Canadian Military Engineers.
Vehicle technicians.	Edmonton, Alta., Vancouver, B.C., Winnipeg, Man., Toronto, Ont., Ottawa, Ont., Montreal, Que., and Halifax, N.S.	Service support arms.	The Royal Canadian Regiment, Princess Patricia's Canadian Light Infantry, and Royal 22^{e} Regiment.	Three regular force and 14 reserve force.
Combat support arms.	Signals operator, line technician, land communication and information systems technician, communicator research operator, and signals officer.		Swift, Skilled, Alter.	Communicator research operator.
Mortars, field artillery, heavy artillery, missile artillery, and anti-aircraft guns and missiles.	Five.	1 Service Battalion, Edmonton, Alta., 2 Service Battalion, Petawawa, Ont., or 5 Service Battalion, Valcartier, Que.	The Intelligence Branch.	Electrical and Mechanical Engineering Branch.
Combat engineers.	Combat arms.	Royal Canadian Army Medical Corps and Royal Canadian Dental Corps.	CF Chaplains.	Contribute to the effectiveness and readiness of the CF and the DND using police, security and operational support service worldwide.

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ARMS AND TRADES OF THE CANADIAN ARMY QUESTION SHEET

Combat Arms	
1.	It is their responsibility during battle to complete reconnaissance and provide direct fire support.
2.	Armoured personnel carriers are used to transport this type of infantry soldier to / from / around the combat zone.
3.	What battalions make up Canada's regular force infantry units?
4.	What four branches make up the combat arms team?
5.	How many units comprise the artillery's regular force?
6.	It is their responsibility to close with and destroy the enemy.
7.	These individuals test, purify and filter water and construct distribution systems.
8.	To accomplish its mission the artillery use what type of weapons systems?
9.	These two branches share the same motto “Ubique” (Everywhere).
Combat Support Arms	
10.	What is the english translation of the Communications and Electronics Branch motto "Velox Versutus Vigilans"?
11.	Whose motto reads "E Tenebris Lux"?
12.	This operator is responsible to intercept and analyze electronic transmissions and operate computer-assisted radio direction-finding equipment.
13.	In what cities are reserve intelligence units located?
14.	This arm provides assistance and support to the trades of the combat arms.
15.	What is the role of the Military Police?
16.	Postal workers, health care professionals, cooks and clerks fall under what arm?
17.	What are the five trades that fall under the Communications and Electronics Branch?
Service Support Arms	
18.	Members of the Electrical and Mechanical Engineers are sometimes integrated into what other arm of the CF?
19.	How many Field Ambulance units are the regular and reserve force currently organized into?
20.	The needs of all members of the CF and their families are administered by whom?
21.	This branch is charged with the maintenance of electrical and mechanical equipment in use in the Canadian Army?
22.	Where will regular force members of the Logistics branch be posted?
23.	This trade is responsible for the repair and maintenance of anything that operates with an internal combustion engine.
24.	These two services were amalgamated to form this service as a result of unification in 1968.

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ARMS AND TRADES OF THE CANADIAN ARMY ANSWER SHEET

Questions		Answers
Combat Arms		
1.	It is their responsibility during battle to complete reconnaissance and provide direct fire support.	Armoured.
2.	Armoured personnel carriers are used to transport this type of infantry soldier to / from / around the combat zone.	Mechanized infantry.
3.	What battalions make up Canada's regular force infantry units?	The Royal Canadian Regiment, Princess Patricia's Canadian Light Infantry, and Royal 22^{e} Regiment.
4.	What four branches make up the combat arms team?	Royal Canadian Infantry Corps, Royal Canadian Armoured Corps, Royal Regiment of Canadian Artillery, and Canadian Military Engineers (combat engineers).
5.	How many units comprise the artillery's regular force?	Five.
6.	It is their responsibility to close with and destroy the enemy.	Infantry.
7.	These individuals test, purify and filter water and construct distribution systems.	Combat engineers.
8.	To accomplish its mission the artillery use what type of weapons systems?	Mortars, field artillery, heavy artillery, missile artillery, and anti-aircraft guns and missiles.
9.	These two branches share the same motto “Ubique” (Everywhere).	Royal Regiment of Canadian Artillery, and Canadian Military Engineers
Combat Support Arms		
10.	What is the english translation of the Communications and Electronics Branch motto "Velox Versutus Vigilans"?	Swift, Skilled, Alter.
11.	Whose motto reads "E Tenebris Lux"?	The Intelligence Branch.
12.	This operator is responsible to intercept and analyze electronic transmissions and operate computer-assisted radio direction-finding equipment.	Communicator research operator.
13.	In what cities are reserve intelligence units located?	Edmonton, Alta., Vancouver, B.C., Winnipeg, Man., Toroto, Ont., Ottawa, Ont., Montreal, Que., and Halifax, N.S.

14.	This arm provides assistance and support to the trades of the combat arms.	Combat support arms.
15.	What is the role of the military police?	Contribute to the effectiveness and readiness of the CF and the DND using police, security and operational support service worldwide.
16.	Postal workers, health care professionals, cooks and clerks fall under what arm?	Service support arms.
17.	What are the five trades that fall under the Communications and Electronics Branch?	Signals operator, line technician, land communication and information systems technician, communicator research operator, and signals officer.
Service Support Arms		
18.	Members of the Electrical and Mechanical Engineers are sometimes integrated into what other arm of the CF?	Combat arms.
19.	How many Field Ambulance units are the regular and reserve force currently organized into?	Three regular force and 14 reserve force.
20.	The needs of all members of the CF and their families are administered by whom?	CF chaplains.
21.	This branch is charged with the maintenance of electrical and mechanical equipment in use in the Canadian Army.	Electrical and Mechanical Engineering Branch.
22.	Where will regular force members of the Logistics branch be posted?	1 Service Battalion, Edmonton, Alta., 2 Service Battalion, Petawawa, Ont., or 5 Service Battalion, Valcartier, Que.
23.	This trade is responsible for the repair and maintenance of anything that operates with an internal combustion engine.	Vehicle technicians.
24.	These two services were amalgamated to form this service as a result of unification in 1968?	Royal Canadian Army Medical Corps and Royal Canadian Dental Corps.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 2

EO M420.02 – IDENTIFY THE HISTORY OF THE CANADIAN ARMY

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-704/PG-001, *Gold 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.

Photocopy the History of the Canadian Army Information Cards located at Attachments A–E. All five historical time periods must be researched by the cadets. If there are less than five cadets, one copy of each attachment is required. If there are more than five cadets, additional copies will be required.

Photocopy the History of the Canadian Army Worksheet located at Attachment F for each cadet.

Photocopy the History of the Canadian Army Timeline located at Attachment G for each cadet.

Bring lined paper for use during the activity (3–6 sheets per cadet).

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An in-class activity was chosen for this lesson as it is an interactive way to provoke thought and stimulate interest regarding the history of the Canadian Army.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadets shall have identified the historical significance(s) of a period of Canadian Army history.

IMPORTANCE

It is important for cadets to be aware of the history of the Canadian Army because it provides an understanding of the role of the Canadian Army in the organization and formation of the Canadian Forces (CF) as it now exists.

Teaching Point 1 **Identify the historical significance(s) of a period of Canadian Army history.**

Time: 80 min Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets identify and discuss the historical significance(s) of a period of Canadian Army History.

RESOURCES

- History of the Canadian Army Information Cards located at Attachments A–E (see pre-lesson instructions),
- History of the Canadian Army Worksheet located at Attachment F (one per cadet),
- History of the Canadian Army Timeline located at Attachment G (one per cadet), and
- Lined paper (3–6 sheets per cadet),
- Highlighter (one per cadet), and
- Pen / pencil (one per cadet).

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Brief the cadets prior to the start of the activity, to include:
   a. an explanation of the objective, and
   b. the directions to perform the activity.
2. Assign each cadet a historical time period (depending on numbers, a cadet may be assigned more than one historical time period or two cadets may be assigned the same historical time period).

If two or more cadets are assigned the same historical time period they can work together to complete Stage 2 of the History of the Canadian Army Worksheet. They must complete Stages 1 and 3 individually.

3. Distribute to each cadet:
   a. the History of the Canadian Army Information Card(s) that corresponds with their assigned historical time period,
   b. the History of the Canadian Army Worksheet,
   c. the History of the Canadian Army Timeline,

d. lined paper,

e. a highlighter, and

f. a pen / pencil.

4. Provide the cadets 15 minutes to read through their assigned History of the Canadian Army Information Card(s) and complete Stage 1 of the History of the Canadian Army Worksheet for the assigned historical time period(s).

5. Provide the cadets 20 minutes to complete Stage 2 of the History of the Canadian Army Worksheet for the assigned historical time period(s).

6. Collect one copy of each cadet's trivia questions and answers.

7. Provide the cadets 20 minutes to present the information they gathered to their fellow classmates. Each cadet will be allotted 5 minutes to present their assigned historical time period (if a cadet has more than one time period they will be given 5 minutes for each, if two cadets have the same historical time period they will only have 5 minutes to present).

8. Have each cadet complete Stage 3 of the History of the Canadian Army Worksheet as other cadets present.

9. Conduct a trivia challenge for 15 minutes using the trivia questions developed by the cadets by:

   a. dividing the cadets into two teams;

   b. asking questions by rotating from team to team; and

   c. awarding five points for each correct answer and taking away two points for each wrong answer.

10. Debrief the cadets by asking:

    a. how they felt about the activity,

    b. what they felt they accomplished or learned, and

    c. how they feel the information that they learned can be applied to what they do in cadets.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the in-class activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

The Canadian Army has played an integral role in shaping the CF into what it is today. Researching the Canadian Army from the time of its inception until now provides a more comprehensive understanding of the development of the CF. Possessing this knowledge ensures that cadets are positive ambassadors of the Canadian Army and CF both at home in Canada and overseas if given the opportunity to participate in an exchange.

INSTRUCTOR NOTES / REMARKS

Nil.

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HISTORY OF THE CANADIAN ARMY INFORMATION CARD

PRE-WORLD WAR I [WW I] (1855–1913)

1855—The Militia Act of 1855

The Militia Act of 1855 legislated that money would be provided by the Canadian Government to establish an Active Militia component that would take some of the burden of defence from Great Britain and place it in the hands of Canadian volunteers. The government was responsible for supplying weapons and ammunition, paying the soldiers and covering the cost of uniforms for the 5 000 men.

Some of the oldest regiments of the Canadian Forces—the Canadian Grenadier Guards, Toronto's Queen's Own Rifles and the Halifax Rifles in Nova Scotia—can trace their official origins back to the 1860s.

1868—The Militia Act of 1868–Canadian Ministry of Militia and Defence

By 1868, the British government was determined to make Canada accept the whole burden of defence, and exerted pressure on the Canadian Government to accept more responsibility for the defence of Canada. The ministry's headquarters was located in Ottawa and there were nine militia districts distributed among the provinces:

- four in Ontario,
- three in Quebec (2 french and 1 english),
- one in New Brunswick, and
- one in Nova Scotia.

Members were divided into two separate components. The Active Militia consisted of 40 000 volunteers who signed up for a period of three to five years and the Non-Permanent Active Militia (NPAM) accounted for all other able-bodied men between the ages of 18–60 years. Unfortunately, the units were ill-equipped for the field and remained secondary to the permanent soldiers of the British garrison.

1871—Militia General Order No. 24–Birth of the Canadian Army

With Britain pulling its soldiers out of Canada, except for members of the Royal Navy at naval bases in Halifax, N.S., and Esquimalt, B.C., and a small garrison in Halifax, the Canadian Government was forced to establish their own defence plan. On October 20, 1871, Militia General Order No. 24 was issued to establish two field artillery batteries in the following locations:

- A Battery–Fort Henry, Kingston, Ont., and
- B Battery–Quebec Citadel, Quebec City, Que.

In 1887 a third field battery was formed—C Battery—in Esquimalt, B.C.

These three initial batteries are now perpetuated by the 1st Regiment of the Royal Canadian Horse Artillery—Canada's senior regular force component.

The order also established a distinction between professional soldiers and volunteer soldiers. At this point, the citizens of Canada and its government did not see the need to establish a full regular army since the United States was no longer seen as a threat. With this in mind, they renamed the two components of the army:

- Permanent Active Militia (PAM)—professional soldiers, and
- Non-Permanent Active Militia (NPAM)—volunteer soldiers.

There were no infantry or cavalry PAM units established, however many NPAM existed at this time.

1883—Militia Act of 1883

To ensure that members of the NPAM could reach optimal efficiency, the Canadian Government came to the decision that additional regular units needed to be established. The act stated that:

1. regular units would provide the care and protection of forts, magazines, armaments and war stores; and
2. schools of military instruction would be established in conjunction with the regular units to provide training to members of the NPAM.

In addition to the three regular artillery batteries established in 1871, the following were authorized:

- one troop of cavalry, and
- three companies of infantry.

In addition, as a result of the policy detailed in the Militia Act, the following occurred:

- an Infantry School Corps was established (to become the Royal Canadian Regiment [RCR]) with companies in Fredericton, N.B., Saint John, N.B., and Toronto, Ont.;
- a Cavalry School Corps was established (to become the Royal Canadian Dragoons [RCD]) in Quebec City, Que.;
- the artillery batteries were brigaded (joined) to form the Regiment of Canadian Artillery (RCA); and
- a Mounted Infantry School was established in 1885 (to become the Lord Strathcona's Horse [LSH]) in Winnipeg, Man.

1899–1902—The Boer War

The Boer War resulted from over two centuries of conflict between the British Empire and the two independent Boer republics of the South African Republic and the Orange Free State. It was fought from October 11, 1899, until May 31, 1902.

The first organized body of troops from Canada to serve overseas was dispatched to South Africa in 1899, at the request of the British Government. The initial force was recruited from the PAM and the NPAM and formed the 2nd Special Service Battalion of the RCR with six companies. The RCR was followed by others such as the RCD, Canadian Mounted Rifles and the LSH. A total of 8 300 Canadians enlisted for service in the Boer War of which 242 died. More casualties were caused by disease than by military action. Canada received its first battle honour outside of Canada for the service of the RCR at Paarderburg, South Africa.

Support for the war effort was mixed in Canada—English Canadians offered immediate support, while French Canadians did not want to get involved. In an attempt to comprise, then Prime Minister, Wilfred Laurier agreed to support the British by providing volunteers, equipment and transportation to the war. Pay and return transport to Canada would be the responsibility of Britain.

1904–1906— Militia Act of 1904

In 1904, a new Militia Act proclaimed that Canadians would command the militia and royal authority over the force would no longer be delegated to the Governor General. In 1905–1906, the last British garrisons at Halifax, N.S., and Esquimalt, B.C., returned home, and these fortresses passed into Canadian hands.

Between 1896 and 1911, the militia was transformed again to add support corps, such as:

- a corps of engineers,
- a signalling corps,
- a medical corps, and
- an army service corps.

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HISTORY OF THE CANADIAN ARMY INFORMATION CARD

WORLD WAR I (WW I) (1914–1938)

1914–1918—WW I

In 1910, then Prime Minister, Wilfred Laurier stated "When Britain is at war, Canada is at war…There is no distinction." With that in mind when Britain declared war on Germany, August 4, 1914, Canada responded in the classical language of the British answer to the call of duty 'Ready, aye, ready'.

Upon hearing the call for duty, Sir Sam Hughes, Minister of Militia and Defence, began to mobilize an army for service overseas. Members of the Permanent Force (PF) and the Non-Permanent Active Militia (NPAM), who volunteered to serve received initial training in Canada and were shipped overseas in four waves. The first wave left Canada in October 1914. The last wave left two years later in October 1916.

The Canadian Expeditionary Force (CEF) was organized into a number of divisions and ultimately formed the Canadian Corps within the British Army. Each division was comprised of three infantry brigades with four battalions in each. The four infantry divisions of the Canadian Corps comprised the main fighting force of the CEF.

At the peak of WW I, the CEF included:

- 260 numbered infantry battalions,
- two named infantry battalions:
    - The Royal Canadian Regiment (RCR), and
    - Princess Patricia's Canadian Light Infantry (PPCLI);
- four machine gun battalions,
- 13 mounted rifle regiments,
- 13 railway troop battalions,
- five pioneer battalions, and
- numerous support units, including:
    - field and heavy artillery batteries,
    - ambulance,
    - medical,
    - dental,
    - forestry,
    - labour,
    - tunnelling, and
    - service.

The PPCLI was created as an exception to Sir Sam Hughes recruiting methods in the establishment of the CEF. Montreal industrialist Hamilton Gault put up $100 000 to form a new regiment which would recruit experienced soldiers, most of whom had served in the Boer War into its ranks. The regiment was named after the Governor General's daughter, who was also the King's brother, the Duke of Connaught.

Major battles fought by the Canadian Corps include:

- 2nd Battle of Ypres (first use of Poison gas)–1915,
- Galliopli–Royal Newfoundland Regiment–1915–1916,
- Mount Sorrel–1916,
- The Somme–1916,
- Vimy Ridge–1917,
- Lens–1917,
- Passchendaele–1917, and
- Amiens–1918.

The CEF lost over 60 000 men during WW I, representing 9.28 percent of the 600 000 men who enlisted. With over 172 000 men being wounded.

1919–1920—Otter Committee

The Otter Committee was given the mandate in 1919, to investigate and report on the absorption of units of the CEF into the Canadian Militia in order to preserve their identities and the customs and traditions that had been formed during their service in WW I.

The following recommendations applied to the PF:

- the 22nd (French Canadian) Battalion would be re-designated the Royal 22e Regiment;
- the PPCLI would be retained; and
- the RCR and other pre-war PF units were retained.

The following recommendations applied to the NPAM:

- 15 divisions (11 infantry and four cavalry [armoured]) would be established to maintain defence of the country;
- divisions would be fall under a regional command structure with one National Defence Headquarters (NDHQ);
- the service and artillery units and sub-units were not assigned to any of the newly formed brigade groups;
- the numbered battalions of the CEF would be amalgamated into the pre-war militia units and would adopt the traditions, customs and battle honours of the numbered CEF battalion to which they contributed the most.

A world-wide flu influenza occurred from 1918–1920. The epidemic caused 50 000 deaths in Canada—almost equal to the number of Canadian casualties in WW I.

1922—The Department of National Defence Act

An important change in military administration occurred in 1922. The Canadian Parliament passed the Department of National Defence Act, which provided for the organization of a department of that name whose minister was to be “charged with all matters relating to defence, including the Militia, the Military, Naval and Air Services of Canada.” The Chief of the General Staff became the Chief of Staff of the Department of National Defence and was responsible for all three arms.

1936—McNaughton Organization

The deteriorating international situation—the Great Depression—forced the Canadian Government to again issue cuts to the military budget. The NPAM establishment was further reduced from 15 divisions with 134 000 men to seven divisions (six infantry and one cavalry) with 86 000 men. Some regiments were disbanded and some merged with other regiments. As well, in an attempt to modernize the army, cavalry units became mechanized (use tanks rather than horses). Unfortunately, equipment procurement was slow and the government was unwilling to spend money to equip these new units.

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HISTORY OF THE CANADIAN ARMY INFORMATION CARD

WORLD WAR II (WW II) (1939–1949)

1939–1945—WW II

Canada declared war on Germany on September 10, 1939. A partial mobilization of Canadian troops had been ordered and a state of emergency was declared two days earlier, following the British declaration of war. Plans were immediately put into place to organize the Canadian Active Service Force (CASF), which would serve as Canada's fighting representation overseas.

Call for service in the CASF was voluntary and made up of men from the Permanent Force (PF) and Non-Permanent Active Militia (NPAM) units. The 1st Canadian Division organized brigades by region and the 2nd Canadian Division was supposed to do the same, however, due to deployments to Iceland, Western Canada and Quebec, brigades became mixed up and no attempt was made to organize the remaining five divisions regionally.

In 1940, the land force of Canada was renamed—the Canadian Army. The three components of the Canadian Army became known as:

- Canadian Army (Active) Force (CAAF)— the old PF,
- Canadian Army (Reserve) Force (CARF)— the old NPAM, and
- Canadian Army (Overseas) Force (CAOF).

While the first units to land on European soil were primarily infantry, the arrival of two armoured tank brigades and two armoured divisions after 1941 required changes in the organization of Canadian personnel. In 1942, the First Canadian Army was formed with two corps—I Canadian Corps and II Canadian Corps—under the command of General A.L. McNaughton who was succeeded by General H.D. Crerar in 1943.

The First Canadian Army was organized as follows:

I Canadian Corps:

- 1st Canadian Infantry Division–1939,
- 5th Canadian Armoured Division–1941, and
- 1st Canadian Armoured Tank Brigade–1941.

II Canadian Corps:

- 2nd Canadian Infantry Division–1940,
- 3rd Canadian Infantry Division–1941,
- 4th Canadian Armoured Division–1942, and
- 2nd Canadian Armoured Tank Brigade–1943.

Members of the CARF component were tasked with defence of the home front. These home defence divisions —6th, 7th, and 8th—contained a large number of conscripted soldiers which by law could not serve overseas.

The Canadian Women's Army Corps (CWAC) was officially established on July 30, 1941, and recruiting began in September of the same year. In March 1942, the CWAC officially integrated with the Army and placed under military law. Officers of the CWAC held the same ranks and wore the same badges as their male counterparts. Throughout the six-year duration of WW II, over 21 000 women served in the CWAC in Canada and overseas. Some of the duties that members of the CWAC were tasked with included:

- traditional duties (eg, laundry, household chores, cooking, sewing),
- performers for stage shows,
- clerical work,
- health services (eg, medical assistants, dental assistants),
- communication services (eg, switchboard operators, cipher clerks, radar operators),
- drivers, and
- mechanics.

Members of the CWAC made a significant contribution to the war effort and paved the way to the integration of women into the CF.

Notable battles fought by the First Canadian Army include:

- Hong Kong–1941,
- Dieppe–1942,
- Invasion of Sicily–1943,
- Invasion of Italy–1943,
- Ortona–1943,
- Breaking of the Hitler Line/Liri Valley–1944,
- Campaign in Normandy–1944,
- Breaking the Gothic Line and pursuit–1944,
- Battle of the Scheldt–1944,
- Operation Veritable, taking of the Hochwald and Reichwald–1945, and
- Liberation of Holland–1945.

The Dutch Royal family sought refuge in Canada while the Netherlands were occupied by the Germans. Princess Juliana of Netherlands, the heir to the throne, gave birth to her third child, Princess Margriet, on January 19, 1943, at the Ottawa Civic Hospital. To ensure the Dutch citizenship of the baby, the Canadian Parliament passed a special law declaring the hospital room 'extraterritorial'. The day after the new princess was born, the Dutch flag was flown on the Peace Tower—the only time a foreign flag has ever waved atop Canada's Parliament Buildings.

In 1944–1945, the First Canadian Army was responsible for liberating much of the Netherlands from German occupation. To thank Canadians, the people of the Netherlands sent 100 000 hand-picked tulip bulbs to Canada in 1945, which were planted on Parliament Hill and along Queen Elizabeth Drive. In 1946, Princess Juliana sent a gift of 20 000 tulip bulbs to show her personal gratitude for the hospitality she received while in Ottawa.

Since then, every year, Ottawa receives 10 000 tulip bulbs from the Dutch Royal family and plants them as a symbol of peace, freedom and international friendship.

More than 1 million Canadian men and women served in WW II. The First Canadian Army alone enlisted over 750 000. Of those, more than 40 000 paid the supreme sacrifice.

1945—Reorganizing the Army

Following WW II, the Canadian Government was much better prepared to deal with demobilization of its overseas component and secure the future of the military. The CAOF was dissolved and an 'Interim Force' was created while officials decided how to best structure the post-war army.

The CAAF reached a strength of 25 000 personnel in 1946. These numbers permitted the maintenance of a small but effective mobile striking force—a brigade group in strength— always ready for action.

- three infantry battalions (each with a single company of paratroopers):
    - Royal 22^{e} Regiment (R22^{e}R), Valcartier, Que.,
    - Royal Canadian Regiment (RCR), Petawawa, Ont., and
    - Princess Patricia's Canadian Light Infantry (PPCLI), Calgary, Alta;
- two armoured regiments:
    - Royal Canadian Dragoons (RCD), Petawawa, Ont., and
    - Lord Strathcona's Horse (LSH), Calgary, Alta; and
- a regiment of field artillery, Royal Canadian Horse Artillery (RCHA), Shilo, Man.

This new formation also provided for headquarters staff, training establishments, personnel to assist the administration and training of the CARF, and the miscellaneous units essential to the functioning of a modern army. The country was divided into five commands, whose headquarters could serve as divisional headquarters in emergency, with subordinate areas for local administration located in the following cities:

- Halifax, N.S.,
- Montreal, Que.,
- Oakville, Ont.,
- Winnipeg, Man., and
- Edmonton, Alta.

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HISTORY OF THE CANADIAN ARMY INFORMATION CARD

COLD WAR (1950–1980)

1950–1953—The Korean War

On June 25, 1950, the communist North Korean state attacked its South Korean neighbour. Korea had been divided along the 38 degrees north line of latitude following the end of WW II with the northern portion of the country receiving assistance from communist Russia and the southern portion of the country receiving assistance from democratic United States to establish governments. Differences in ideologies were profound, resulting in armed conflict not more than five years after WW II ended. The UN Security Council voted to intervene and called for assistance from member nations to restore peace. Canada, along with 16 other countries, pledged their support to provide assistance to South Korea.

To fulfill its responsibilities with the UN Security Force in Korea, the Canadian Government formed the Canadian Army Special Force (CASF). The CASF was raised and trained as part of the Canadian Army Active Force (CAAF) with recruits coming from volunteers who were veterans, members of the Canadian Army Reserve Force (CARF) and civilians. New field units were established as separate units of existing CAAF regiments (2nd battalions) and the force was titled the 25th Canadian Infantry Brigade Group.

A rotational scheme was developed and implemented in the autumn of 1951. The original infantry units in the brigade began to be replaced by their own 1st Battalions. By the end of the war, all the volunteer members of the CASP had been replaced with members of the CAAF.

The following units formed the 25th Canadian Infantry Brigade Group:

- Royal Canadian Regiment (RCR),
- Princess Patricia's Canadian Light Infantry (PPCLI),
- Royal 22e Regiment (R22eR),
- Lord Strathcona's Horse (LSH),
- The Royal Canadian Dragoons (RCD),
- 1st Regiment, Royal Canadian Horse Artillery (RCHA),
- 2nd Regiment, RCHA, and
- 81st Field Regiment, RCHA.

In the spring of 1951, under the command of the 27th British Commonwealth Infantry Brigade, the 2nd Battalion of the PPCLI played a key role in the battle of Kapyong. The PPCLI, under very trying circumstances, were able to hold their position, stop the Chinese assault and force its retreat. For their distinguished service, they were awarded with a US Presidential Citation—the only Canadian unit to receive such an award.

By the time the Korean War ended in 1953, more than 22 000 Canadians had served with over 300 being killed in battle and 1 200 being wounded.

1951–1993—NATO Support in Germany

Starting in 1951, Canada contributed a brigade group of 10 000 personnel to NATO Forces in Germany. The brigade originally served under the command of I British Corps in NATO's Northern Army Group from 1951–1971 and were tasked to defend West Germany from the north in the event of an attack by the Union of Soviet Socialist Republics (USSR).

This contingent was halved in 1970, due to budget cuts and changes in the defence plan—unification—under the new government of Prime Minister Pierre Elliot Trudeau. Members were relocated to Lahr, Germany, in the southern, less volatile, portion of the country and were co-located with the Canadian Air Division under the Central Army Group. In 1993, the NATO contribution of army personnel was fully terminated.

1954—Redesignation of the Canadian Army

In 1954, the components of the Canadian Army were again redesignated as follows:

- Canadian Army (Active) Force changed to the Canadian Army (Regular) (CARF), and
- Canadian Army (Reserve) Force changed to the Canadian Army (Militia) (CAM).

1957—Formation of Brigade Groups

The divisional organization of the Canadian Army that was established in 1946 was disbanded and an organization of brigade groups was established. Four brigade groups were established.

Three brigade groups were stationed in Canada to provide a force for home defence requirements. They were:

- 1st Canadian Infantry Brigade Group (1 CIBG) (attached to the 1st Canadian Division),
- 2nd Canadian Infantry Brigade Group (2 CIBG) (attached to the 1st Canadian Division), and
- 3rd Canadian Infantry Brigade Group (3 CIBG) (mobile striking force).

One brigade group—4th Canadian Infantry Brigade Group (4 Canadian Mechanized Brigade Group)— was stationed in Europe (Germany) to satisfy Canada's commitment to NATO.

Brigade. A brigade is a formation of between 3 000 and 4 000 troops and comprised of a headquarters and three to four manoeuvre units such as infantry battalions or armoured regiments. Two to four brigades are normally grouped within a division. Combat support (eg, engineers and aviation) and combat service support (eg, logistics and maintenance) are provided to the brigade by the division.

Brigade group. A brigade group is a self-contained all arms fighting organization of between 5 000 and 7 000 soldiers. It is comprised of a headquarters, three to four manoeuvre units, a combat support unit and combat service support units.

1968—Unification

On February 1, 1968, the Canadian Forces Reorganization Bill abolished the Royal Canadian Navy (RCN), the Canadian Army and the Royal Canadian Air Force (RCAF) in order to create a single service—the Canadian Armed Forces commanded by one Chief of Defence Staff, instead of three service chiefs reporting independently to the minister of national defence. Although new units were introduced, the separate elements of sea, land and air continued to exist, and the personnel of each element were identified as seamen, soldiers and airmen.

Prior to unification, integration procedures had already begun to be implemented. The biggest change, in 1965, saw the Navy, Army and Air force commands being replaced with six functional commands, most with regional responsibilities. They were:

- Maritime Command:
    - controlled the RCN's ships, and
    - the RCAF's antisubmarine squadrons on both coasts (until 1975);
- Mobile Command (Force Mobile Command in 1975):
    - controlled army brigade groups and militia,
    - controlled the RCAFs ground support squadrons (until 1975),
- Training Command,
- Material Command,
- Air Defence Command (Air Command in 1975), and
- Air Transport Command (Air Command in 1975).

Many felt that unification led to the loss of the identity of the Canadian Army.

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HISTORY OF THE CANADIAN ARMY INFORMATION CARD

POST COLD WAR (1980–PRESENT)

1980—'De-Unification'

During the 1980s, unification gradually weakened and the three service environments assumed more and more of the old service privileges, centred upon the need for them to retain strong influence in all areas of defence. The overall structure remained the same with the unified chain of command.

1997—Re-organization of the Canadian Forces

The late 1990s again saw the organization of the CF re-structured to meet current operational requirements into the following:

- Maritime Command,
- Land Force Command, and
- Air Command.

The old functional command structure was disbanded and headquarters for each of the new commands was moved to NDHQ. Newly appointed Environmental Chiefs of Staff (Navy, Land and Air) were responsible for advising the Chief of Defence Staff (CDS) of issues relating to their environment, as well as the overall command of their specific areas.

Land Force Command had a regional military structure based on four geographical areas that provide a single chain of command for regular and reserve forces in their regions. They include:

- Land Force Atlantic Area (LFAA) based in Halifax, N.S.,
- Land Force Quebec Area (LFQA) based in Montreal, Que.,
- Land Force Central Area (LFCA) based in Toronto, Ont., and
- Land Force Western Area (LFWA) based in Edmonton, Alta.

The regular force components of the Land Force are organized into three mechanized brigade groups:

- 1 Canadian Mechanized Brigade Group in Canadian Forces Base (CFB) Edmonton, Alta.,
- 2 Canadian Mechanized Brigade Group in CFB Petawawa, Ont., and
- 5 Canadian Mechanized Brigade Group in CFB Valcartier, Que.

Each brigade group is comprised of the following:

- three infantry battalions (two mechanized, one light),
- one armoured regiment,
- one artillery regiment,
- one combat engineer regiment,
- one reconnaissance squadron,
- combat support units (eg, signals, mechanical engineers), and
- service support units (eg, logistics, health services).

One engineer support regiment, one air defence regiment and one electronic warfare squadron also exist outside the structure of the brigade group.

The reserve component of the Land Force is organized into 10 brigade groups that in total are comprised of:

- 17 reconnaissance units,
- 17 artillery units,
- 12 engineer units,
- 51 infantry units,
- 19 logistic units,
- four military police units, and
- four intelligence units.

2005–2008—Defence Policy

The 2005 Defence Policy laid the groundwork for a transformation of the CF. General R.J. Hillier, the CDS from 2005–2008, stated that a new vision to guide the CF in meeting defence and security challenges in the 21st century was required—especially in light of the events of September 11, 2001. The 2005 Defence Policy established that:

- greater emphasis must be placed on the defence of Canada and North America than in the past;
- a reorientation and restructuring of the functions and the command and control of the CF was required to better meet the emerging security demands at home and abroad; and
- through major transformation of the existing command structure, the introduction of new operational capabilities, and the establishment of fully integrated units capable of high-readiness response to foreign and domestic threats, a more integrated and unified approach to operations in the CF can be achieved.

In the 2005 budget, the Government made the largest reinvestment in Canada's military in over 20 years, totalling approximately $13 billion.

2006—Transformation of the CF

As a result of the 2005 Defence Policy, in 2006, four operational command structures were established — Canada Command (CANCOM), Canadian Expeditionary Force Command (CEFCOM), Canadian Special Operations Forces Command (CANSOFCOM), and Canadian Operation Support Command (CANOSCOM).

CANCOM. CANCOM is the CF organization responsible for all routine and contingency CF operations in Canada and continental North America. CANCOM is:

- a single point of contact for Canadian civil authorities seeking CF support (eg, flooding, ice storms),
- a single military command for domestic and continental operations, and
- a focus on Canada as a single theatre of operations.

CANCOM headquarters is located in Ottawa. There are 10 subordinate organizations that report to the commander of Canada Command:

- six Regional Joint Task Forces (JTF):
  - JTF Pacific (JTFP),
  - JTF West (JTFW),
  - JTF North(JTFN),
  - JTF Central (JTFC),
  - JTF East (JTFE), and
  - JTF Atlantic(JTFA);
- three Search and Rescue Regions (Victoria, B.C., Trenton, Ont., and Halifax, N.S.), and
- the Combined Force Air Component Commander located in Winnipeg, Man.

The environmental command structures—maritime, land, air—still exist in conjunction with CANCOM with commanders simultaneously filling their regional environmental role and holding the authority to deploy all naval, army and air force assets based in their area in the event of a domestic crisis or threat.

- Commander MARPAC = Commander JTFP,
- Commander 1 Cdn Air Division = Commander JTFW,
- Commander LFCA = Commander JTFC,
- Commander LFQA = Commander JTFE, and
- Commander MARLANT = Commander JTFA.

CEFCOM. CEFCOM was established in Ottawa on February 1, 2006, as the operational command responsible for planning and conducting all CF operations outside of North America, except those conducted by CANSOFCOM. CEFCOM deploys task forces around the world to carry out military operations ranging from humanitarian aid to peace support to combat. Task forces are comprised of maritime, land, air and special operations forces selected and trained specifically for each mission.

CEFCOM includes the following units and formations:

- CEFCOM headquarters,
- CF Joint Headquarters, and
- Deployed Task Forces.

CANSOFCOM. In response to the need to be able to address threats the CF may receive, CANSOFCOM was established in 2006. CASOFCOM and its member units possess a high level of responsiveness, agility, adaptability and non-conventional skill sets.

CANSOFCOM includes the following units and formations:

- Joint Task Force 2,
- 427 Special Operations Aviation Squadron, and
- Canadian Special Operations Regiment.

CANOSCOM. The CANOSCOM delivers national-level operational support (combat and service) to CF missions at home and abroad. CANOSCOM is designed to work closely and support the three operational commands. All operational support organizations are united to allow the CF to quickly and effectively achieve support to operations both at home and aboard.

The following units and formations comprise CANOSCOM:

- Canadian Forces Joint Support Group,
- CF Joint Signal Regiment,
- Canadian Material Support Group,
- Operational Support Engineer Group, and
- Operational Support Military Police Group.

HISTORY OF THE CANADIAN ARMY WORKSHEET

Historical Time Period:_____

Stage 1 (15 minutes)

1. Read the information sheet(s) once through.
2. While reading the information sheet(s) a second time:
   a. highlight the information believed to be essential to the presentation; and
   b. underline in pencil the information that might be nice to present.

Stage 2 (25 minutes)

3. Using the information highlighted and underlined as a starting point, decide what information is important enough to be presented to the rest of the class. Consider the following questions to help decide what to include:
   a. Is it essential information or it is supporting information?
   b. Is it interesting?
   c. Is there a connection to the Performance Objective (PO) (Identify the Structure of the Canadian Army)?
4. Using the chart provided record what will be presented and what may be presented if time allows.

Information to Present	Information to Present if Time Allows

5. Using the information gathered on the assigned historical time period develop 5–8 trivia questions with answers. Simple yes or no questions are not acceptable.

Questions	Answers

6. When the chart and trivia questions with answers are completed, use the remaining time to practice how the information will be presented (make it interesting).

Stage 3 (25 minutes)

7. During other cadets' presentations, complete the chart below. By the end of each presentation two things that were found interesting or noteworthy should be written, along with one question in relation to the information presented.

Historical Time Period:	
Interesting Point #1	
Interesting Point #2	
Question	

Historical Time Period:	
Interesting Point #1	
Interesting Point #2	
Question	

Historical Time Period:	
Interesting Point #1	
Interesting Point #2	
Question	

Historical Time Period:	
Interesting Point #1	
Interesting Point #2	
Question	

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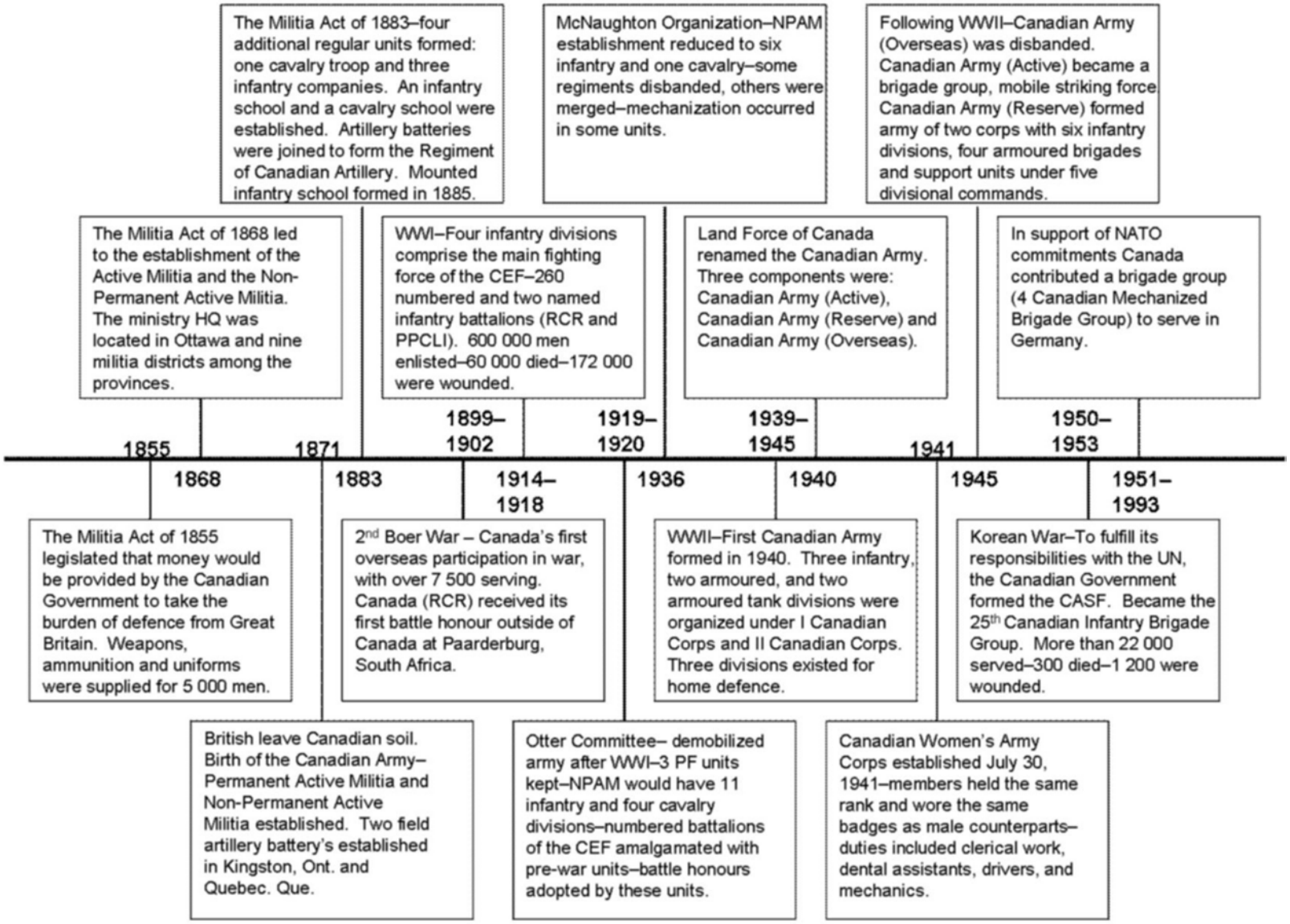
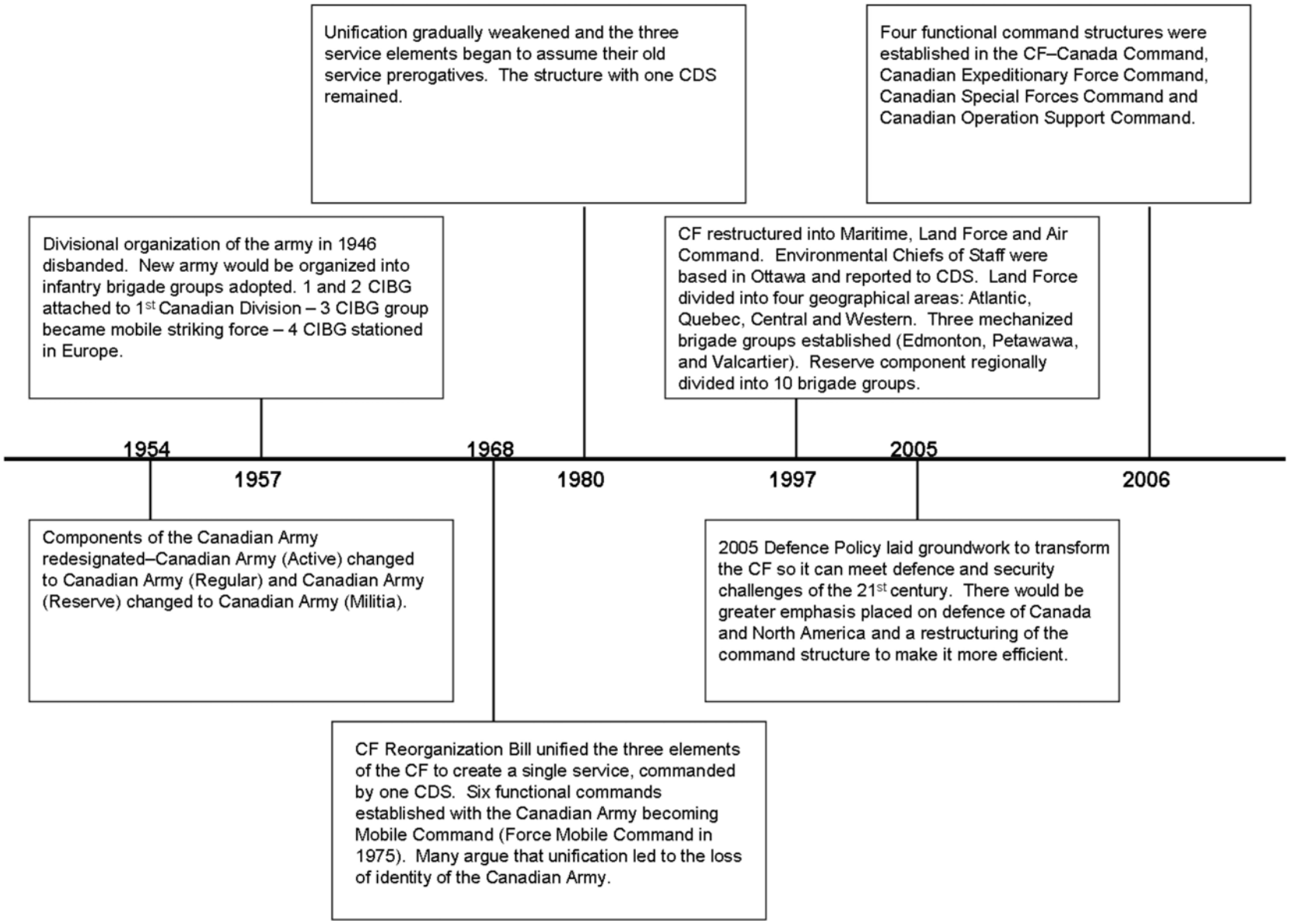
HISTORY OF THE CANAIDAN ARMY TIMELINE




Unification gradually weakened and the three service elements began to assume their old service prerogatives. The structure with one CDS remained.
Four functional command structures were established in the CF–Canada Command, Canadian Expeditionary Force Command, Canadian Special Forces Command and Canadian Operation Support Command.
Divisional organization of the army in 1946 disbanded. New army would be organized into infantry brigade groups adopted. 1 and 2 CIBG attached to 1st Canadian Division – 3 CIBG group became mobile striking force – 4 CIBG stationed in Europe.
CF restructured into Maritime, Land Force and Air Command. Environmental Chiefs of Staff were based in Ottawa and reported to CDS. Land Force divided into four geographical areas: Atlantic, Quebec, Central and Western. Three mechanized brigade groups established (Edmonton, Petawawa, and Valcartier). Reserve component regionally divided into 10 brigade groups.
1954
1957
1968
1980
1997
2005
2006
Components of the Canadian Army redesignated–Canadian Army (Active) changed to Canadian Army (Regular) and Canadian Army (Reserve) changed to Canadian Army (Militia).
2005 Defence Policy laid groundwork to transform the CF so it can meet defence and security challenges of the 21st century. There would be greater emphasis placed on defence of Canada and North America and a restructuring of the command structure to make it more efficient.
CF Reorganization Bill unified the three elements of the CF to create a single service, commanded by one CDS. Six functional commands established with the Canadian Army becoming Mobile Command (Force Mobile Command in 1975). Many argue that unification led to the loss of identity of the Canadian Army.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 3

EO C420.01 – SIMULATE AN INTERVIEW WITH A HISTORIC CANADIAN ARMY LEADER

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-704/PG-001, *Gold 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.

Photocopy the List of Historic Canadian Army Leaders located at Attachment A for each cadet.

Photocopy the Sample Interview Questions located at Attachment B for each cadet.

Photocopy two of each Historic Canadian Army Leader biography located at Attachment C.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An in-class activity was chosen for this activity as it is an interactive way to stimulate interest in historic Canadian Army leaders.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have simulated an interview with a historic Canadian Army leader.

IMPORTANCE

It is important for cadets to gain the knowledge of historic Canadian Army leaders as it will provide an understanding of the influential people that helped shape the history of the Canadian Army. By investigating and studying past leaders, cadets are provided with the opportunity to familiarize themselves with the leadership traits and actions of these amazing men and women. This will also allow the cadets to link these leaders with the previous lessons on the historic and current events of the Canadian Forces (CF).

Teaching Point 1 **Interview a historic Canadian Army leader.**

Time: 50 min Method: In-Class Activity

The following activities are to be conducted in two 30-minute periods, allowing a minimum of one week between each activity for the cadets to prepare for their simulated interviews.

ACTIVITY

Time: 25 min

OBJECTIVE

The objective of this activity is to have the cadets prepare for a simulated interview with a historic Canadian Army leader by researching their biography and creating a list of questions to ask.

RESOURCES

- List of Historic Canadian Army leaders located at Attachment A (one per cadet),
- List of Sample Interview Questions located at Attachment B (one per cadet),
- Historic Canadian Army Leader Biographies located at Attachment C (two per pair), and
- Pen / pencil (one per cadet).

ACTIVITY LAYOUT

Set up the classroom with tables, chairs and the required resources for each pair to research a historic Canadian Army leader and prepare questions for the simulated interview.

ACTIVITY INSTRUCTIONS

Encourage the cadets to gather more information (by using publications or websites) on their chosen historic Canadian Army leader for the simulated interview.

1. Conduct a briefing, to include an explanation of:
   a. the objective and importance of the activity;
   b. how the activity will be conducted; and
   c. the resources that are required to perform the activity.
2. Distribute the List of Historic Canadian Army leaders to each cadet.
3. Introduce the historic Canadian Army leaders.
4. Have the cadets, in pairs, select one historic Canadian Army leader to research. Each pair must select a different historic Canadian Army leader.

5. Distribute the following to each cadet:
    a. list of Sample Interview Questions, and
    b. the biography of their chosen historic Canadian Army leader.
6. Have the cadets, in pairs, research and take notes about their chosen historic Canadian Army leader.
7. Have the cadets, in pairs, prepare three to five questions to ask when simulating an interview with their chosen historic Canadian Army leader, such as:
    a. How long were you in the Canadian Army?
    b. What was your biggest accomplishment as a member of the Canadian Army?
    c. Where did you do some of your schooling?
    d. What did you do after the army?
    e. Were you awarded any medals? If so, which ones?
8. Circulate and assist the cadets as necessary, offering suggestions and advice.
9. Allow the cadets, in pairs, a minimum of one week to finalize the questions and practice the interview.

SAFETY

Nil.

ACTIVITY

Time: 25 min

OBJECTIVE

The objective of this activity is to have the cadets simulate an interview with a historic Canadian Army leader.

RESOURCES

Nil.

ACTIVITY LAYOUT

Set up an area of the classroom for one pair conducting and the remaining viewing the simulated interviews.

ACTIVITY INSTRUCTIONS

1. Allow the cadets, in pairs, to simulate an interview with a historic Canadian Army leader, one pair at a time. One cadet is the interviewer, while the other cadet is the interviewee. Each interview will be no longer than five minutes. The remaining cadets will view the interviews.
2. Have the cadets, in pairs, hand in their research notes to ensure that they have completed the assignment.
3. Conduct a group discussion in which the cadets will discuss:
    a. how they felt about the activity;
    b. what they felt they accomplished;

c. what they learned about the historic Canadian Army leader(s); and

d. what they felt was the most interesting aspect.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the simulated interview will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Study the biography of the chosen historic Canadian Army leader and prepare for the simulated interview. Further information may be gathered (by using publications or websites) on the chosen historic Canadian Army leader.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Being aware of the historic Canadian Army leaders that helped shape the history of the Canadian Army will provide a framework to develop an understanding of the leadership throughout the years. Understanding history and leadership in this way makes it more than just a concept; it provides a connection to real people and real events.

INSTRUCTOR NOTES / REMARKS

This lesson is to be conducted in two 30-minute periods, allowing a minimum of one week between each lesson for the cadet to prepare their simulated interviews.

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LIST OF HISTORIC CANADIAN ARMY LEADERS

General Sir William Dillon Otter: Born December 3, 1843 near Clinton Corners, Ont., and died May 6, 1929 in Toronto, Ont.

Sergeant Edward James Gibson Holland: Born February 2, 1878 in Ottawa, Ont., and died June 18, 1948 in Cobalt, Ont.

General Sir Arthur William Currie: Born December 5, 1875 in Napperton, Ont., and died November 30, 1933 in Montreal, Que.

Colonel Elizabeth Lawrie Smellie: Born March 22, 1884 in Port Arthur, Ont., and died March 5, 1968 in Toronto, Ont.

Lieutenant-Colonel John Alexander McCrae: Born November 30, 1872 in Guelph, Ont., and died January 28, 1918 in Montreal, Que.

General Andrew George Latta McNaughton: Born February 25, 1887 in Moosomin, N.W.T., (Moosomin is now in Saskatchewan) and died July 11, 1966 in Montebello, Que.

General Henry Duncan Graham Crerar: Born April 28, 1888 in Hamilton, Ont., and died April 1, 1965 in Ottawa, Ont.

Sergeant Thomas George Prince: Born October 25, 1915 in Petersfield, Man., and died November 25, 1977 in Winnipeg, Man.

Lieutenant-General Romeo Antonius Dallaire: Born June 25, 1946 in Denekamp, Netherlands.

General Richard J. Hillier: Born 1955, in Campbellton, N.L.

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LIST A SAMPLE INTERVIEW QUESTIONS

1. How long were you in the Canadian Army?
2. What was your biggest accomplishment as a member of the Canadian Army?
3. Where did you do some of your schooling?
4. What did you do in your retirement?
5. Were you awarded any medals, and if so, which ones?
6. Why did you choose to join the Canadian Army?
7. What aspect of the Canadian Army did you miss the most in your retirement?
8. Was there a particular time as a member of the Canadian Army that stood out in your mind the most, and if so, why?
9. Other than your main responsibility, was there anything else that you did in the Canadian Army?
10. What do you think you will be most remembered for?
11. Were you ever responsible for training other members of the Canadian Army, and if so, what were some of your teaching styles?
12. Were you involved in any wars, and if so, which one(s)?
13. Do you have a family, and if so how many were / are in your family?
14. Do you have any family members involved in the Canadian Army, and if so which family members?
15. Were you involved in the Cadet Program, or any youth program, before you joined the Canadian Army?

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General Sir William Dillon Otter
Born December 3, 1843 near Clinton Corners, Ont., and died May 6, 1929 in Toronto, Ont.

Figure C-1 General Sir William Dillon Otter

Note. From *The Northwest Resistance Digitization Project: A Database of Materials held by the University of Saskatchewan Libraries and the University Archives*, Copyright by University of Saskatchewan. Retrieved April 1, 2009, from http://library2.usask.ca/northwest/background/otter.htm

General Sir William Dillon Otter joined the Victoria Rifles, a company of the 2nd Battalion of Rifles (Queen's Own Rifles of Toronto), in October 1861 and in 1865, he became the Adjutant of the Queen's Own. General Otter was promoted to Major in 1869, still Adjutant of the Queen's Own.

In 1880, General Otter published a manual for the Canadian Militia that was ignored until approved in England in 1916. Late in July 1883, he took command of an Infantry School of Military Instruction in Toronto, Ont. He recruited 100 men and established the school at the New Fort (on the grounds of the present-day Canadian National Exhibition). The school opened for instruction in April 1884. In the spring of 1886, General Otter also assumed the duties of Deputy Adjutant General for Military District Number 2 (Toronto and central Ontario) and in 1891, he helped launch the Canadian Military Institute. In 1896, General Otter was appointed the Adjutant General, the highest position available to a Canadian, and the Inspector of Infantry. In October 1899, he was given command of the contingent authorized for South Africa (2nd Boer War), to be called the 2nd Battalion of the Royal Canadian Regiment of Infantry.

General Otter was offered a brigade at Aldershot and in March 1908, he was appointed Chief of the General Staff (CGS) and promoted to Brigadier-General. In 1910, General Otter was appointed Inspector General, an appointment that led to his promotion of acting Major-General. Almost two years later, he was confirmed as a major-general; however, due to his age he was forced to retire on December 1, 1912. General Otter took charge of internment operations in October 1914, where he established camps from Fort Henry near Kingston, Ont., to Nanaimo, B.C.

In 1919, following the end of WW I, General Otter headed up the reorganization committee formed to combine the old militia regiments and the new units of the Canadian Expeditionary Force. In 1921, the government realized that General Otter had never been transferred to the retired list and the error was graciously remedied. On March 9, 1922, his promotion to general made him the second Canadian to attain that rank. Early in 1928, General Otter stumbled on a streetcar and broke his ankle. When he seemed ready to walk, he relapsed and on May 6, 1929, his nurses found him dead.

Sergeant Edward James Gibson Holland
Born February 2, 1878 in Ottawa, Ont., and died June 18, 1948 in Cobalt, Ont.

Figure C-2 Sergeant Edward James Gibson Holland

Note. From *Canadian Museum of Civilization*, Copyright 2009 by Canadian Museum of Civilization Corporation. Retrieved April 1, 2009, from http://www.museedelaguerre.ca/cwm/exhibitions/boer/victoriacrossrecipients_e.shtml

Sergeant Edward James Gibson Holland attended school at Ottawa's Lisgar Collegiate Institute. He developed an early interest in military life as a cadet in the 94th Lisgar Collegiate Institute Cadet Corps, which was originally organized as the Victoria Cross Corps of Ottawa.

When Sergeant Holland was 17, he joined the Non-Permanent Active Militia and served with the 43rd Regiment and the 5th Princess Louise Dragoon Guards from 1895–1897. On December 29, 1899, Sergeant Holland enlisted in the 1st Canadian Mounted Rifle (C.M.R.) Battalion for service in South Africa during the 2nd Boer War. Over the next two months, the 1st C.M.R. Battalion travelled over 600 miles battling Boers. In October 1900, he was promoted to the rank of sergeant and it was in this capacity that he and his fellow men faced the largest scale cavalry attack the Boers had ever mounted.

On November 7, 1900, Sergeant Holland was part of a small rearguard troop that included two 12–inch guns of “D” battery Royal Canadian Field Artillery, where he controlled a weapon known as the Colt Machine Gun.

Assigned to protect the withdrawal of British Infantry and baggage from the Komati River, the Royal Canadian Dragoons were ordered to retire only after the two guns of “D” Battery were safe from enemy capture. “D” Battery’s two field guns, comprised of three troops of approximately 30 men each and the Colt Machine Gun, under Sergeant Holland, were deployed just behind the rim of the arc that extended 1.5 miles across the rear of the departing British column.

His Victoria Cross citation was published in the London Gazette, dated April 23, 1901. The article read:

> Sergeant Holland did splendid work with his Colt gun, and kept the Boers off the two 12–pounders by its fire at close range. When he saw the enemy were too near for him to escape with the carriage, as the horse was blown, he calmly lifted the gun off and galloped away with it under his arm.

The Department of National Defence (DND) named an armoury after Sergeant Holland in Ottawa, Ont.

General Sir Arthur William Currie
Born December 5, 1875 in Napperton, Ont., and died November 30, 1933 in Montreal, Que.

Figure C-3 General Sir Arthur William Currie

Note. From *Canada Heros*, Copyright 2008 by Canada-Heros / Don Jones.
Retrieved April 1, 2009, from http://www.canada-heros.com/currie_arthur.html

General Sir Arthur William Currie was an insurance broker and estate agent before World War One (WW I) broke out. Prior to the war, General Currie served as a militia officer in British Columbia.

Following General Currie's positive conduct with the 2nd (Canadian) Brigade during 1914–1915, notably during the first German gas attack at Second Ypres, he was handed charge of the 1st (Canadian) Division between 1915–1916. As General Currie was impressive with his sure-footed command and meticulous attention to detail, he was promoted as the General Officer Commanding the Canadian Corps in June 1917, being the first Canadian to be promoted to the rank of General during the war.

Largely responsible for the planning and execution of the successful assault against Vimy Ridge, General Currie remained vocal (and successful) in arguing for the retention of the Canadians as a single coherent fighting force. General Currie's preference for managing his troops from far behind the front line further alienated his own troops, although in fact, he was a frequent visitor to the front line. Convinced of the importance of artillery in modern trench warfare, General Currie utilized it with impressive success. Despite a reputation among his troops as 'Guts and Gaiters', he was a capable Canadian army commander who enjoyed a consistently successful run of victories throughout the war.

Knighted in 1917 by King George V, General Currie was the recipient of various other honours, including Commander of the Bath, Legion of Honour, Knight Commander of the Order of St. Michael and St. George, Croix de Guerre and the U.S. Distinguished Service Medal.

Following the war, General Currie served as the Inspector General of the Canadian Militia and from 1920, as Principal and Vice Chancellor of McGill University until his death on November 30, 1933.

Many places across Canada have been named in General Currie's honour: in Richmond, B.C., an elementary school, at the University of Victoria; an on-campus housing building, in Strathroy, Ont., a branch of the Royal Canadian Legion; and at McGill University, the Gymnasium, just to name a few.

Colonel Elizabeth Lawrie Smellie
Born March 22, 1884 in Port Arthur, Ont., and died March 5, 1968 in Toronto, Ont.

Figure C-4 Colonel Elizabeth Lawrie Smellie

Note. From *The Canadian Encyclopedia*, Copyright 2009 by Historica Foundation of Canada. Retrieved April 1, 2009, from http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0007467

In 1909, Colonel Elizabeth Lawrie Smellie became the night supervisor at McKellar General Hospital and in 1915, she joined the Royal Canadian Army Medical Corps.

Colonel Smellie graduated from Johns Hopkins Training School for Nurses in Baltimore, Maryland. After graduation she joined the Canadian Army Nursing Service in World War One (WW I), serving in France, England and Britain. While in England, she was posted at Cliveden, Lady Astor's estate, and became matron of the Moore Barracks Hospital in Shorncliffe where thousands of Canadian soldiers were treated. After WW I, Colonel Smellie taught public health nursing for two years at McGill University, Montreal, Que.

In 1917, Colonel Smellie was awarded the first class Royal Red Cross by King George V at Buckingham Palace. When she returned to Canada, Colonel Smellie was appointed assistant Matron-in-Chief from 1918–1920. During the following years, she helped build the Victorian Order of Nurses (VON) into a thriving nationwide organization. Colonel Smellie was the chief superintendent of the VON from 1923–1947. In 1934, she was made a Commander of the British Empire by King George V.

Colonel Smellie took a leave of absence from the VON during World War Two (WW II). From 1940–1944, she re-entered the army and served as Matron-in-Chief in Canada of the Royal Canadian Army Medical Corps. In 1941, Colonel Smellie began laying the foundations of the Canadian Women's Army Corps.

In 1944, Colonel Smellie was promoted to Colonel, becoming the first woman to attain the rank of Colonel in the Canadian Army. After WW II, she returned to the VON and retired in 1947.

Colonel Smellie died in Toronto, Ont. and is buried in Riverside Cemetery in Thunder Bay, Ont.

In front of McKellar General Hospital in Thunder Bay, Ont., a plaque was erected in her honour and in January 2000, Canada Post designed a stamp that portrayed Colonel Smellie.

Lieutenant-Colonel John Alexander McCrae
Born November 30, 1872 in Guelph, Ont., and died January 28, 1918 in Montreal, Que.

Figure C-5 Lieutenant-Colonel John Alexander McCrae

Note. From *Guelph Civic Museum*, Copyright 2009 by guelpharts.ca / wellingtonarts.ca and respective artists. Retrieved Apr 1, 2009, from http://guelph.ca/museum/mccrae/story_of_john_mccrae.htm

In 1886, at the age of 14, Lieutenant-Colonel John Alexander McCrae joined the Hatfield Cadet Corps. Three years later, he enlisted in the Militia field battery commanded by his father. Lieutenant-Colonel McCrae began writing poetry while attending Guelph Collegiate Institute.

While attending university, Lieutenant-Colonel McCrae had sixteen poems and short stories published in various magazines. While becoming educated, he continued his military career, becoming a gunner with the Number 2 Battery in Guelph, Ont. in 1890, Quartermaster Sergeant in 1891, Second-Lieutenant in 1893 and Lieutenant in 1896. While at university, he became a member of the Queen's Own Rifles of Canada of which he later became company captain.

The South African (2nd Boer War) started in 1899 and Lieutenant-Colonel McCrae felt it was his duty to serve in South Africa. He was commissioned to lead an artillery battery from Guelph, Ont., which became part of "D" Battery, Canadian Field Artillery. After being promoted to Captain and then to Major, Lieutenant-Colonel McCrae resigned from the 1st Brigade of Artillery in 1904. He was not associated with the military again until 1914. When war was declared in 1914, Lieutenant-Colonel McCrae was appointed brigade-surgeon to the First Brigade of Canadian Forces Artillery as second-in-command as a Major.

In 1915, Lieutenant-Colonel McCrae was in the trenches near Ypres, Belgium, traditionally known as Flanders. Some of the heaviest fighting of the war took place during the Second Battle of Ypres. In the trenches, he tended to hundreds of soldiers and was surrounded by dead and dying men. Hundreds of crosses marked graves in the field and poppies were already beginning to bloom between them. On May 22, 1915, while under heavy fire, he wrote *In Flanders Fields*; it was the last poem he ever wrote.

Lieutenant-Colonel McCrae was then transferred to Number 3 Canadian General Hospital in France, tending to the wounded from the Battle of Somme, Vimy Ridge, the Third Battle of Ypres, Arras and Pasachendaele. By mid January of 1918, the damp climate had affected his health. Lieutenant-Colonel McCrae was ordered to a warmer location, but the transfer never happened because, he was bed-ridden and on January 28, he died from pneumonia and meningitis complications.

General Andrew George Latta McNaughton
Born February 25, 1887 in Moosomin, N.W.T., (Moosomin is now in Saskatchewan) and died July 11, 1966 in Montebello, Que.

Figure C-6 General Andrew George Latta McNaughton

Note. From *Juno Beach Centre*, Copyright 2006 by Digital Wizards (Ontario) Inc. Retrieved April 1, 2009, from http://www.junobeach.org/e/3/can-pep-can-mcnaughton-e.htm

General Andrew George Latta McNaughton enlisted in the Militia in 1909, graduated from McGill University in Montreal, Que., in 1912, and enlisted in the 4th Battery of the Canadian Expeditionary Force in 1914. General McNaughton was educated in physics and engineering, and as this knowledge was beneficial to the artillery, he was promoted rapidly. After World War One (WW I), he was at the head of the Canadian Artillery Corps and he remained with the Canadian Permanent Forces as Chief of the General Staff, working at mechanizing the armed forces and modernizing the militia.

General McNaughton was the General Officer Commanding of the 1st Canadian Infantry Division from 1939–1940, the First Canadian Corps from 1940–1942, and was the General Officer Commanding-in-Chief of the First Canadian Army from 1942–1943.

When World War Two (WW II) broke out, General McNaughton became the Commanding Officer of the 1st Canadian Infantry Division. Under his leadership, the Division grew and was reorganized as a corps in 1940, and then as an army in 1942. His contribution to the development of new techniques was outstanding, especially in the field of detection and weaponry. General McNaughton's knowledge and developments still caused criticism for his poor judgment regarding military strategy, especially his approval of the ill-fated operation against Dieppe. Pressured by critics and weakened by health problems, he resigned his command in December 1943.

Prime Minister King’s trust toward General McNaughton remained strong and he was appointed Minister of Defence in 1944, with the mandate to solve the conscription issue (forced military service). Unable to find a solution, Canadians denied him the support he needed to be elected to the House of Commons.

After WW II, General McNaughton became Canada’s Representative to the United Nations' (UN) Atomic Energy Commission, chairing the Canadian Atomic Energy Control Commission from 1946–1948. General McNaughton was the Permanent Representative to the UN from 1948–1949 and was the President of the Canadian section of the International Joint Commission from 1950–1959.

General Henry Duncan Graham Crerar
Born April 28, 1888 in Hamilton, Ont., and died April 1, 1965 in Ottawa, Ont.

Figure C-7 General Henry Duncan Graham Crerar

Note. From *Juno Beach Centre*, Copyright 2006 by Digital Wizards (Ontario) Inc.
Retrieved April 1, 2009, from http://www.junobeach.org/e/3/can-pep-can-crerar-e.htm

General Henry Duncan Graham Crerar attended the Royal Military College in Kingston, Ont. from 1906–1909 before joining the Militia. During World War One (WW I), he served as a Canadian Field Artillery officer. When WW I ended, General Crerar was already the rank of Lieutenant-Colonel.

In 1923, General Crerar registered at the Camberley Staff College in England, and upon graduation, he accepted a posting as General Staff Officer 2 with the War Office in London. In 1929, he was appointed General Staff Officer 1 at the National Defence Headquarters (NDHQ) in Ottawa.

In 1934, General Crerar attended London's Imperial Defence College. He then returned to NDHQ and became the Director of Military Operations and Intelligence. In March 1939, after serving a few months as Commander of the Royal Military College, General Crerar was recalled to Ottawa to prepare a mobilization plan, as the possibility of another war increased.

As WW II began, General Crerar was posted in London as Brigadier-General at the Canadian Military Headquarters and was responsible for ensuring that the required equipment, barracks and training plans were in place when Canadian troops arrived. In July 1940, he was called back to Ottawa as Vice-Chief General Staff and was promoted a few days later to Chief General Staff.

On April 6, 1942, General Crerar was appointed General Officer Commanding, 1 Canadian Corps. General Crerar and the 1 Canadian Corps joined the 1st Canadian Infantry Division in Italy in October 1943 before he was recalled to England in March 1944 to command the 1st Canadian Army.

Between November 1944 and February 1945, General Crerar had to temporarily relinquish command due to his poor health. During the Rhineland campaign, General Crerar commanded an army with the strength of over 450 000 men, which also included allied units under 1st Canadian Army command.

General Crerar retired from the military in 1946; however, he continued to work by occupying diplomatic postings in Czechoslovakia, the Netherlands and Japan.

Sergeant Thomas George Prince
Born October 25, 1915 in Petersfield, Man., and died November 25, 1977 in Winnipeg, Man.

Figure C-8 Sergeant Thomas George Prince

Note. From *First Nations Drum*, Copyright 2009 by First Nations Drum. Retrieved April 1, 2009, from http://www.firstnationsdrum.com/Fall2002/HisPrince.htm

As a teenager, Sergeant Thomas George Prince joined army cadets in Winnipeg. When World War Two (WW II) broke out in Europe in 1939, Sergeant Prince was accepted as a sapper in the Royal Canadian Engineers, before volunteering for paratrooper service in June 1940. He was one of nine out of a hundred to earn his wings from the parachute school at Ringway, England.

Sergeant Prince was promoted to Lance Corporal as a result of his impressive skills, and in September 1942, he flew back to Canada to train with the first Canadian Parachute Battalion. While training, he was promoted to sergeant.

Sergeant Prince was first called into action in January 1943. As he was a natural hunter, his fieldcraft skills were unequalled and in recognition of unique abilities, he was made reconnaissance sergeant. At night, Sergeant Prince would crawl toward the enemy lines, mostly alone, to listen to the Germans, estimate their numbers and report back to his battalion commander.

After the war in Europe ended, Sergeant Prince returned to Canada and was honourably discharged on June 15, 1945. At the age of 34, one week after the Canadian government announced its involvement in the Korean War, Sergeant Prince again volunteered. The Canadian government formed and trained the 2nd Battalion of the Princess Patricia's Canadian Light Infantry (2PPCLI), which he returned to as a sergeant and assisted in training new recruits.

Due to painful swelling in his knees in May 1951, Sergeant Prince was hospitalized and then assigned to administrative duties. He remained in active service as an administrative sergeant at Camp Borden, in Ontario. His knees responded to the added rest and in March 1952, Sergeant Prince volunteered for a second tour of duty and sailed for Korea in October with the 3rd Battalion PPCLI.

In July, 1953, the Korea Armistice was signed and Sergeant Prince returned to Canada, remaining in the army until September 1954, when he was discharged with a small pension because of his bad knees. Sergeant Prince is Canada's most decorated Aboriginal war veteran.

Lieutenant-General Romeo Antonius Dallaire
Born June 25, 1946 in Denekamp, Netherlands.

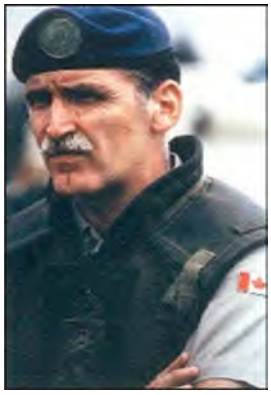

Figure C-9 Lieutenant-General Romeo Antonius Dallaire

Note. From *L.Gen Romeo Dallaire*, Copyright by Romeo Dallaire. Retrieved April 1, 2009, from http://www.romeodallaire.com/public-speaking.htm

Lieutenant-General Romeo Antonius Dallaire joined the Canadian military in 1964. In 1970, he graduated from the Royal Military College of Canada with a Bachelor of Science degree and was commissioned into The Royal Regiment of Canadian Artillery.

Lieutenant-General Dallaire had a distinguished career in the Canadian military, becoming Assistant Deputy Minister (Human Resources) in the Department of National Defence in 1998.

In 1994, Lieutenant-General Dallaire commanded the United Nations Assistance Mission for Rwanda (UNAMIR). His book on his experiences in Rwanda, entitled *Shake Hands with the Devil: The Failure of Humanity in Rwanda*, was awarded the Governor General's Literary Award for Non-Fiction in 2004.

After Lieutenant-General Dallaire retired from the military, he became a Senator and has worked to bring an understanding of post-traumatic stress disorder to the general public. He has also been a lecturer at several Canadian and American universities and has written several articles and chapters in publications on conflict resolution, humanitarian assistance and human rights.

Lieutenant-General Dallaire has received numerous honours and awards, including Officer of the Order of Canada, Grand Officer of the National Order of Quebec and the Aegis Award for Genocide Prevention from the Aegis Trust (United Kingdom). He has also been named a Fellow of the Ryerson Polytechnic University, an Honorary Fellow of the Royal College of Physicians and Surgeons of Canada and has received honorary doctorates from a number of Canadian and American universities.

Lieutenant-General Dallaire is considered a champion of human rights, as he is involved in many committees and activities. Some of these include Advocacy for the Canadian Forces mission to Afghanistan, speaking on issues relating to human rights and genocide prevention and helping lead in a project aimed at the non-proliferation of nuclear weapons. Lieutenant-General Dallaire is working on writing a book on the subject of child soldiers.

General Richard J. Hillier
Born 1955, in Campbellton, N.L.

Figure C-10 General Richard J. Hillier

Note. From *Canadian Army, National Defence and the Canadian Forces*, Copyright 2009 by Department of National Defence. Retrieved April 1, 2009, from http://www.army.dnd.ca/LF/English/1_6_2_2.asp

General Richard J. Hillier joined the army in 1973 after high school and graduated from Memorial University of Newfoundland in 1975 with a Bachelor of Science Degree. After completing armour officer classification training, he joined his first regiment, the 8th Canadian Hussars (Princess Louise's) in Petawawa, Ontario, before serving with the Royal Canadian Dragoons.

General Hillier was admitted to the Officer corps of the Royal Canadian Dragoons, and eventually went on to command the Dragoons' 120 tank strong commitment in Germany during the 1980s. General Hillier still remains affiliated with the Royal Canadian Dragoons.

In 1997, General Hillier commanded the two-brigade commitment to the Red River floodings in Manitoba and in 1998, he commanded the Canadian Forces commitment to the Quebec ice storm.

In 1998, General Hillier was appointed as the Canadian Deputy Commanding General of III Armoured Corps, US Army in Fort Hood, Texas and in 2000, he took command of the Multinational Division (Southwest) in Bosnia-Herzegovina. Throughout his career, General Hillier served in the United States, Europe and in the former Yugoslavia.

After returning to Canada, General Hillier assumed the duties of Assistant Chief of the Land Staff, and on May 30, 2003, assumed the duties of Chief of the Land Staff. In October 2003, he was selected as the next commander of the NATO-led International Security Assistance Force (ISAF) in Kabul, Afghanistan, at which time he commanded over 6 000 soldiers from February 9 to August 12, 2004.

In February 2005, General Hillier became the Chief of Defence Staff (CDS), the highest position in the CF. As the CDS, he was heavily involved in Canada's peacekeeping role in Afghanistan.

On July 1, 2008, General Hillier stepped down as CDS and retired from the CF and was appointed as chancellor of Memorial University of Newfoundland, two days after he retired from the military.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 4

EO C420.02 – VIEW A VIDEO ON A SIGNIFICANT EVENT IN THE HISTORY OF THE CANADIAN ARMY

Total Time:	90 min

THERE IS NO INSTRUCTIONAL GUIDE PROVIDED FOR THIS EO

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 5

EO C420.03 – PARTICIPATE IN A CF FAMILIARIZATION ACTIVITY

Total Time:	270 min

THERE IS NO INSTRUCTIONAL GUIDE PROVIDED FOR THIS EO

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 1

EO M422.01 – REVIEW SILVER STAR NAVIGATION

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-704/PG-001, *Gold 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.

Learning stations are a form of group work, where the cadets learn by sorting through the information presented. When setting up learning stations, ensure there is enough room for each cadet to be comfortable and adequate space for writing down information. When the cadets arrive at a learning station, all required information shall already be available. These stations should be placed close enough together to minimize time for movement and far enough apart to avoid interruptions from other groups. For this lesson, set up three learning stations for reviewing navigation.

Instructors assigned to a learning station shall review their station's questions and locate and record their answers on the sheet provided prior to the cadets' arrival.

Photocopy the Silver Star Navigation Review worksheet located at Attachment A for each cadet.

Make three copies of the Silver Star Navigation Review Worksheet Answer Key located at Attachment B for each learning station instructor. Determine answers for Stations 2 and 3.

Photocopy the Learning Station Information Sheets located at Attachments C, D, and E for each learning station instructor.

Review Attachment A and complete a preliminary run-through of the provided questions for each station.

Review the activities, ensuring they are best suited to the training area, size of the group, staff and training aids available.

Prepare all resources necessary for the selected activities.

Assistant instructors are required at each learning station.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

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

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have reviewed Silver Star navigation.

IMPORTANCE

It is important for cadets to review Silver Star navigation as it is the foundation for global positioning system (GPS) training. Silver Star navigation introduces cadets to the fundamentals of using a GPS receiver. Cadets should take every opportunity to practice and refine these skills.

Teaching Point 1 **Conduct a Silver Star navigation review activity using learning stations.**

Time: 50 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadet review Silver Star navigation.

RESOURCES

- Three GPS receivers,
- Two topographical maps of the local area,
- Nine pencils,
- One pencil eraser,
- Three copies of the Silver Star Navigation Review Worksheet Answer Key located at Attachment B,
- Three copies of the Learning Station Information Sheets located at Attachments C–E,
- One copy of the Silver Star Navigation Review Worksheet located at Attachment A for each cadet, and
- Paper.

ACTIVITY LAYOUT

Set up three learning stations as follows:

- Station 1:
  - one GPS receiver,
  - three pencils,
  - one copy of the Silver Star Navigation Review Worksheet Answer Key, and
  - one copy of the Learning Station 1 Information Sheet;
- Station 2:
  - one GPS receiver,
  - one topographical map of the local area,
  - three pencils,
  - one copy of the Silver Star Navigation Review Worksheet Answer Key,
  - one copy of the Learning Station 2 Information Sheet; and

- Station 3:
    - one GPS receiver,
    - one topographical map of the local area,
    - three pencils,
    - one pencil eraser,
    - one copy of the Silver Star Navigation Review Worksheet Answer Key, and
    - one copy of the Learning Station 3 Information Sheet.

ACTIVITY INSTRUCTIONS

1. Explain to the cadets they will be taking part in a round robin activity with stations. At each station they will be presented with the questions found on their worksheets. Inform the cadets that the activity is to be completed individually.
2. Divide the cadets into three groups, and place each group at one of the learning stations.
3. Provide each cadet a copy of the Silver Star Navigation Review Worksheet located at Attachment A to complete as they rotate through the stations.
4. Assign an assistant instructor to each learning station. Give each assistant instructor a copy of:
    a. the Silver Star Navigation Review Worksheet Answer Key; and
    b. the Learning Station Information Sheet to assist the cadets in completing their worksheets if required.
5. Have the assistant instructor at each station explain the worksheet and what to do.
6. Allow the cadet(s) approximately fifteen minutes to complete the station.
7. Have the cadets explain their answers individually to the instructors.
8. The instructor will confirm the answers are correct by referring to the Silver Star Navigation Worksheet (as required) and correct any errors.
9. Allow one minute for the cadets to move between stations.
10. Have the cadets complete each station, following Steps 5–8.
11. Debrief the cadets at the end of the activity. Discuss any areas of concern and answer any questions.

Station 1: Components of the GPS. At this station, the cadet shall complete the following on the worksheet for Station 1:

1. identify and briefly explain the components of the GPS, to include:
    - satellites,
    - ground stations, and
    - receivers;

2. identify the features of a GPS receiver, to include the following components:
    - antenna,
    - screen,
    - battery compartment, and
    - buttons; and
3. independently navigate through the GPS receiver and locate one of the following:
    - satellite status,
    - menu,
    - position,
    - compass navigation,
    - map, and
    - map screen.

Station 2: Set a map datum on a GPS receiver. At this station, the cadet shall complete the following on the worksheet for Station 2:

1. complete the process for confirming correct coordinate system by:
    - identifying military grid reference system (MGRS) grid system on a topographical map;
    - locating the grid zone designator; and
    - confirming the 100 000-m square identifier;
2. locate the map datum from a topographical map; and
3. set the map datum on a GPS receiver.

Station 3: Identify location using a GPS receiver. At this station, the cadet shall complete the following on the worksheet for Station 3:

1. confirm that the correct coordinate system is set on the GPS receiver;
2. locate the geographical position screen in the GPS receiver;
3. read the grid reference (GR); and
4. plot the eight-figure GR on the topographical map.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the learning stations will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Concepts of Silver Star navigation should be understood before more challenging skills can be introduced at the Gold Star level. Throughout expeditions, there will be requirements to navigate routes. Take every opportunity to practice, whether it is plotting position on a map from a GPS grid reference or helping a junior cadet understand how a GPS receiver works.

INSTRUCTOR NOTES / REMARKS

The navigation activity will consist of three learning stations. The cadets will rotate through the stations every 15 minutes. There will be 5 minutes provided at the end of the lesson to answer questions or provide additional instruction on areas where cadets experienced difficulty.

This EO shall be conducted during the bivouac field training exercise.

Assistant instructors are required for this lesson, at each learning station.

Topographical maps have not been provided, so the cadet can use local area topographical maps.

REFERENCES

A2-036 A-CR-CCP-121/PT-001 Director Cadets 3. (2003). *Royal Canadian Army Cadet reference book*. Ottawa, ON: Department of National Defence.

C2-142 ISBN 0-7645-6933-3 McNamara, J. (2004). *GPS for dummies*. Hoboken, NJ: Wiley Publishing, Inc.

C2-143 ISBN 1-58923-145-7 Featherstone, S. (2004). *Outdoor guide to using your GPS*. Chanhassen, MN: Creative Publishing International, Inc.

C2-144 ISBN 0-07-223171-8 Broida, R. (2004). *How to do everything with your GPS*. Emerville, CA: McGraw-Hill.

SILVER STAR NAVIGATION REVIEW WORKSHEET

Cadet's Name: _____

Note: Use the back of the worksheet or an attached piece of paper(s) for additional notes / calculations if required.

Station 1: Components of the GPS	
Describe how satellites, ground stations, and receivers work. Select the correct statement. Identify the error(s) in the incorrect statements.	**Select the correct statement** 1. The minimum number of satellites that are required to cover the entire Earth is 18. 2. The ground control segment of the GPS is comprised of seven ground stations that track the satellites, monitor their condition and make any necessary adjustments to keep the system accurate. 3. GPS receivers make up the user segment. It is the GPS receiver, whether it is in an airplane, a truck, a boat or in a hiker's hand, that detects the radio signals from the satellite ground stations and calculates the receiver's position.
Identify the components of a GPS receiver.	**Components of a GPS receiver** 1. 2. 3. 4.
Identify and briefly explain the functions of 5 buttons on the GPS receiver.	**Buttons on a GPS receiver** 1. 2. 3. 4. 5.
Navigate through the GPS receiver and locate the selected screen screens determined by the instructor. List the screens identified.	**Screens identified** 1.

Station 2: Set a map datum on a GPS receiver	
Given a topographical map of the local area and a GPS receiver, complete the process for confirming correct Military Grid Reference System (MGRS) coordinates.	**Process for confirming correct MGRS** 1. 2. 3.
Locate the map datum from a topographical map.	**Map Datum**
Set the map datum on a GPS receiver.	**Set Datum**

Station 3: Identify location using a GPS receiver	
Confirm that the correct coordinate system is set on the GPS receiver. What coordinate system is used?	**Confirm correct coordinate system**
Locate geographical position screen in a GPS receiver.	**Locate geographical position screen in a GPS receiver**
Read the GR from the GPS.	**Record the GR**
Plot the GR on the topographical map.	**Plot GR**

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SILVER STAR NAVIGATION REVIEW WORKSHEET ANSWER KEY

Note: Learning stations require preparation of answers. Learning station information sheets have been provided with a detailed description on how each question should be answered.

<table>
<tr><th colspan="2">Station 1: Components of the GPS</th></tr>
<tr><td>Describe how satellites, ground stations, and receivers work.

Select the correct statement. Identify the error(s) in the incorrect statements.</td><td>Select the correct statement
1. The minimum number of satellites that are required to cover the entire Earth is 18.
2. The ground control segment of the GPS is comprised of FIVE ground stations that track the satellites, monitor their condition and make any necessary adjustments to keep the system accurate.
3. GPS receivers make up the user segment. It is the GPS receiver, whether it is in an airplane, a truck, a boat or in a hiker's hand, that detects the radio signals from the SATELLITES and calculates the receiver's position.</td></tr>
<tr><td>Identify the components of a GPS receiver.</td><td>Components of a GPS receiver
1. Antenna
2. Screen
3. Battery Compartment
4. Buttons</td></tr>
<tr><td>Identify and briefly explain the function of 5 buttons on the GPS receiver.</td><td>Buttons on a GPS receiver
1. On / Off
2. Backlight
3. Enter
4. Escape
5. Zoom in
6. Menu
7. NAV
8. Mark
9. Arrow Joystick</td></tr>
<tr><td>Navigate through the GPS receiver and locate the selected screen screens determined by the instructor.

List the screens identified.</td><td>Screens identified
1. Satellite screen
2. Menu
3. Position
4. Compass navigation
5. Map
6. Map screen</td></tr>
</table>

<table>
<tr><th colspan="2">Station 2: Set a map datum on a GPS receiver</th></tr>
<tr><td>Given a topographical map of the local area and a GPS receiver, complete the process for confirming correct MGRS coordinate system.</td><td>Process for confirming correct MGRS coordinate system
The learning station instructor shall reference the local topographical map and complete the following questions prior to the cadets' arrival:

1. Identify MGRS grid system on a topographical map.
Answer:_____

2. Locate the grid zone designator.
Answer:_____

3. Confirm the 100 000-m square identifier.
Answer:_____</td></tr>
<tr><td>Locate the map datum from a topographical map.</td><td>Map Datum
The learning station instructor shall refer to the local topographical map and find the correct datum.

MAP Datum: _____</td></tr>
<tr><td>Set the map datum on a GPS receiver.</td><td>Set Datum
Consult the GPS Receiver User Manual and Learning Station 2 Information Sheet for the detailed instructions on how to set the datum on a GPS receiver.

Datum to be set:_____</td></tr>
</table>

Station 3: Identify location using a GPS receiver	
Confirm that the correct coordinate system is set on the GPS receiver. What coordinate system is used?	**Confirm correct coordinate system** Confirm that the cadet follows the process and ensures the correct coordinate system is set. MGRS coordinate system should be used.
Locate geographical position screen in a GPS receiver.	**Locate geographical position screen in a GPS receiver**
Read the GR from the GPS.	**Record the GR**
Plot the GR on the topographical map.	**Plot GR**

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LEARNING STATION 1 INFORMATION SHEET

HOW THE GPS WORKS

The system is divided into three parts or segments: space, ground control and users. The space segment consists of 24 satellites that orbit 20 200 km above the Earth and send radio signals toward Earth. The radio signals broadcast the position of each satellite in the sky with an electronic code.

Each satellite performs a relatively simple primary task: it transmits a timing signal using its built-in atomic clock. When a device on the ground receives that signal, it can determine its distance from the satellite.

That single measurement alone does not accomplish much, but when a GPS receiver collects timing signals from three different satellites, the receiver can determine two precise coordinates: latitude and longitude. With four satellite signals, the GPS receiver is able to determine altitude as well.

A GPS receiver can also determine speed and heading.

COMPONENTS OF THE GPS

Satellites

The GPS and its satellites have the following characteristics:

- The minimum number of satellites that are required to cover the entire Earth is 18, however the number of satellites in orbit fluctuates between 24 and 29 satellites due to spares and upgrading.
- Satellites orbit in a semi-synchronous orbit (orbits are coordinated, but not identical).
- Each satellite completes an orbit every 12 hours.
- Satellites orbit the Earth at 20 200 km (12 552 miles) (airplanes routinely fly at 11–13 km [37 000–43 000 feet], the shuttle orbits at 370 km [230 miles]).
- Each satellite has three key pieces of hardware:
    - **Computer.** Controls its flight and order functions.
    - **Atomic clock.** Keeps accurate time within three nanoseconds (approximately three-billionths of a second).
    - **Radio transmitter.** Sends signals to Earth.

Ground stations

The ground control segment of the GPS is comprised of five ground stations that track the satellites, monitor their condition and make any necessary adjustments to keep the system accurate. The entire system functions and is monitored by the US Department of Defence. Information from the stations are sent to a master control station—the Consolidated Space Operations Centre (CSOC) at Schriever Air Force Base in Colorado where the data is processed and adjustments are made. The five ground stations are in Hawaii, Colorado, Diego Garcia, Ascension Island and Kwajalein.

Receivers

GPS receivers make up the user segment. It is the GPS receiver, whether it is in an airplane, a truck, a boat or in a hiker's hand, that detects the radio signals from the satellites and calculates the receiver's position.

When a receiver is turned on, it interprets the radio signals and extracts the satellite location information. The GPS signal broadcasts information that tells the receiver the location of each satellite in the system. The receiver then interprets the radio signal to determine the exact time. This is required to calculate position.

The orbits of the GPS satellites ensure that there will be a minimum of four satellites covering any spot on the globe at all times. The receiver uses the signal from one satellite to continuously monitor and be synchronized with the time maintained by the other satellites. The receiver collects the signals from the other satellites and calculates the difference between them. This calculation positions the receiver from each satellite and triangulates its location. Based on a four-satellite fix, the receiver will identify location giving the user latitude, longitude and altitude (altitude is only possible with a four-satellite fix).

COMPONENTS OF A GPS RECEIVER

Antenna. Allows the GPS receiver to receive satellite signals.

Screen. Displays information.

Battery compartment. Stores the receiver power supply.

The buttons in the following list are found on the Magellan eXplorist 200 GPS receiver. Other makes and models of GPS receivers may have different function buttons. Consult the user manual for GPS receiver button functions.

BUTTONS

On / Off. Turns the receiver on and off.

Backlight. Turns the display backlight on and off and changes intensity.

Enter. Accesses highlighted menu items or highlighted screen menu options.

Escape. Cancels data inputs. Closes the accessed function and goes back to the previous screen and moves backward through the navigation screens.

Zoom in. On the map screen zooms in on the map displayed. The map display can be zoomed in to 35 m (100 feet). Also moves through the list of waypoints when using an alphabetical search.

Zoom out. On the map screen zooms out on the map displayed. The map display can be zoomed out to 2736 km (1700 miles). Also moves through the list of waypoints when using an alphabetical search.

Menu. Displays a menu with available options. Options may be selected by using the arrow joystick to highlight the option and pressing "enter" to access it.

NAV. Moves through the navigation screens (Map screen, Compass screen, Position screen, Satellite screen).

Mark. Saves present position as a waypoint. Waypoints are saved and stored in "My Points of Interest".

GOTO. Creates a one-leg route from the present position to a destination selected from the POI database or by using the cursor on the background map and pressing GOTO on a point.

Arrow joystick. Moves the cursor on the map screen. It also moves the highlighted bar to select menu options and data-entry fields.

Figure C-1 Explorist 200 GPS Receiver

Note. From *Magellan eXplorist 200 Reference Manual* (p. 1), 2004, by Thales Navigation, Inc. Copyright 2004 by Thales Nav, Inc.

SATELLITE STATUS

The satellite status screen displays the acquisition of satellites (satellite signal strength and satellite geometry) and the progress of the collection of satellite data. The receiver is constantly monitoring satellites. The display on the satellite status screen graphically depicts the activity.

As new satellites come into view, a new bar appears in the graph. Bars that were solid minutes ago disappear as satellites pass over the horizon. If a satellite is being monitored but not used, the bar will appear hollow. On Wide Area Augmentation System (WAAS) enabled GPS receivers, the WAAS satellite signal strength is indicated on its own bar on the graph. On this screen it is common for GPS receivers to display the following information:

- satellite signal strengths,
- battery strength, and
- estimated position error (EPE).

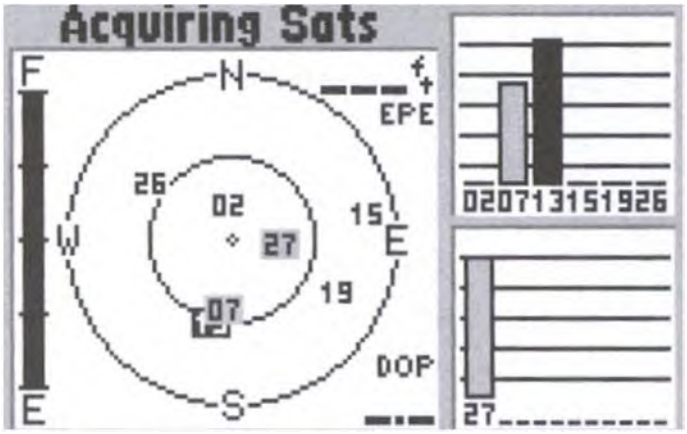

Figure C-2 Satellite Status Screen

Note. From *Outdoor Guide to Using Your GPS* (p. 45), by S. Featherstone, 2004, Chanhassen, MN: Creative Publishing International, Inc.

MENU

This screen is used for customizing the GPS receiver. All data fields can be changed to give a person the information they require including waypoints, routes, time and speed, etc. On this screen it is common for GPS receivers to display the following information:

- customization options for the GPS receiver,
- waypoints and routes, and
- map datum.

Figure C-3 Menu Screen

Note. From *Outdoor Guide to Using Your GPS* (p. 54), by S. Featherstone, 2004, Chanhassen, MN: Creative Publishing International, Inc.

POSITION

The position screen is used for confirming coordinates, datum, time, date, and the EPE. This screen is used infrequently, for brief periods, mostly in planning and after marking a waypoint. Graphics, like a compass rose, are not displayed. This screen is not ideally laid out for user-friendly navigation.

After acquiring enough satellites to begin navigating, many GPS receivers automatically go to the position screen or the map screen. In addition to the information mentioned above, an operator may find current speed, heading and a trip odometer. On some GPS receivers, the information displayed can be changed.

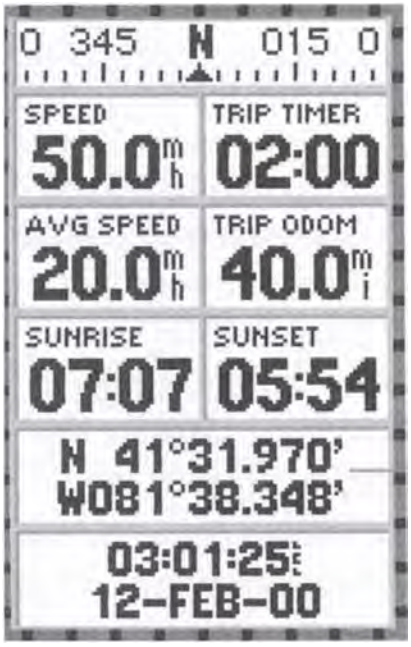

Figure C-4 Position Screen

Note. From *Outdoor Guide to Using Your GPS* (p. 46), by S. Featherstone, 2004, Chanhassen, MN: Creative Publishing International, Inc.

COMPASS NAVIGATION

This screen shows the direction of travel (track) as it relates to the direction of the destination (bearing). It will show the distance from the destination and time to the destination. This screen is used frequently when navigating from point to point and for navigating around obstacles.

The digital compass graphic should not be confused with a real compass. Although they look the same, it can give a very different reading because without movement GPS receivers cannot display direction. Read the owner's manual and determine if the compass is an electronic compass capable of identifying a compass heading while the operator is standing still.

Figure C-5 Compass Navigation Screen

Note. From *Outdoor Guide to Using Your GPS* (p. 47), by S. Featherstone, 2004, Chanhassen, MN: Creative Publishing international, Inc.

MAP

This screen identifies position. A GPS without a built-in map will identify where a person is in relation to another waypoint. A GPS receiver with a built-in map will identify where a person is in relation to landmarks, such as roads, cities and bodies of water. A GPS receiver with downloadable maps will identify where a person is in relation to city streets and topographical features.

The advantage of this screen is its ability to identify the current position by looking at the features on a map rather than just the coordinates. Depending on the zoom level—which is shown at the bottom of the screen—these features may be roads or cities or entire continents.

The map screen allows an operator to pinpoint where they are and create a waypoint on the map by moving the cursor over a feature and pressing ENTER or MARK, making route building easier. The map screen can also serve as an address book. By moving the cursor over a certain waypoint and pressing ENTER, information is displayed, such as phone numbers, addresses, and navigation information.

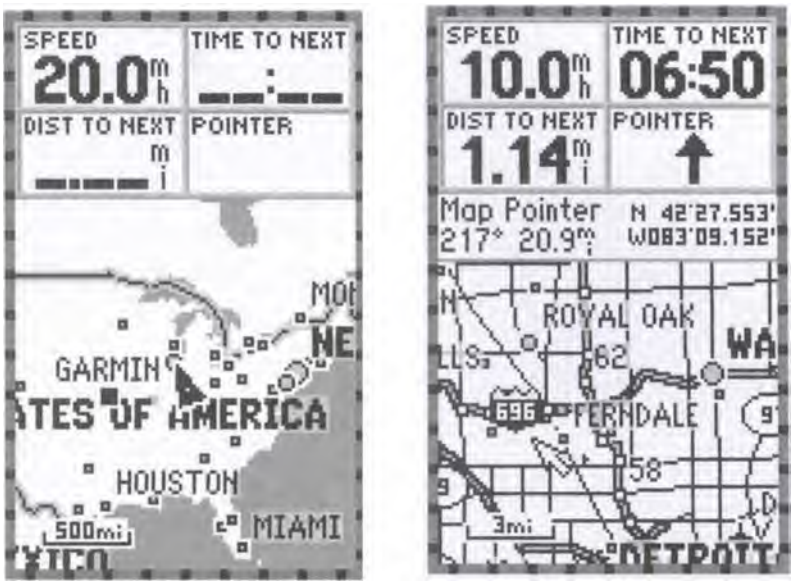

Figure C-6 Map Screen

Note. From *Outdoor Guide to Using Your GPS* (p. 50), by S. Featherstone, 2004, Chanhassen, MN: Creative Publishing International, Inc.

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LEARNING STATION 2 INFORMATION SHEET

PROCESS FOR CONFIRMING CORRECT MGRS COORDINATES

MGRS coordinates allow a GPS receiver to work in conjunction with a topographical map. To confirm the MGRS coordinates correspond with the topographical map the user will have to:

1. Identify the MGRS grid system on the topographical map.
2. Locate the grid zone designator.
3. Confirm the 100 000-m square identifier.

Identifying MGRS Grid System on a Topographical Map

Locating the MGRS grid system on topographical maps provides the navigator with another method to confirm the GPS receiver is reporting coordinates that correspond with the map being used. If the coordinates are different, the navigator will know that the GPS receiver is set to another datum and will have to be adjusted to provide the correct coordinates.

Locating the Grid Zone Designator

The location of the grid zone designator is found in the marginal information. The zone for the example in Figure D-1, is 18 T.

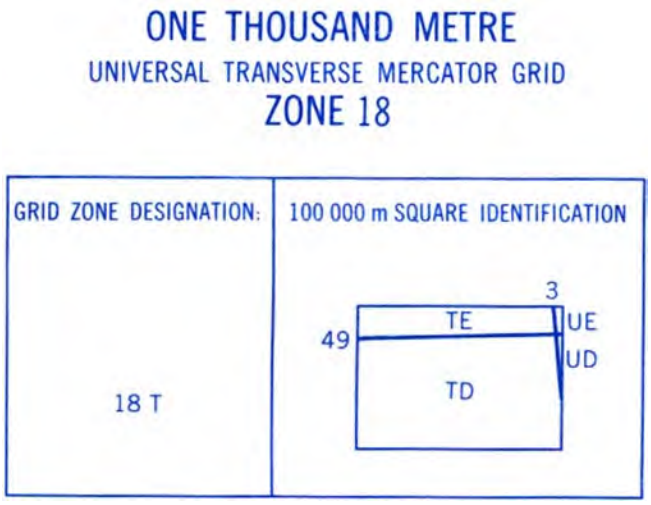

Figure D-1 Grid Zone Designator

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Confirming the 100 000-m Square Identifier

The 100 000-m square identifier is located in the same marginal information area as the grid zone designator. The example in Figure D-1 states that the map is adjacent to the 100 000-m square identifications UE and UD. Additionally when the 100 000-m square identifier on a topographical map joins an adjacent grid zone, the identifier will be noted on the map in the 00 00 grid square. This is illustrated in Figure D-2.

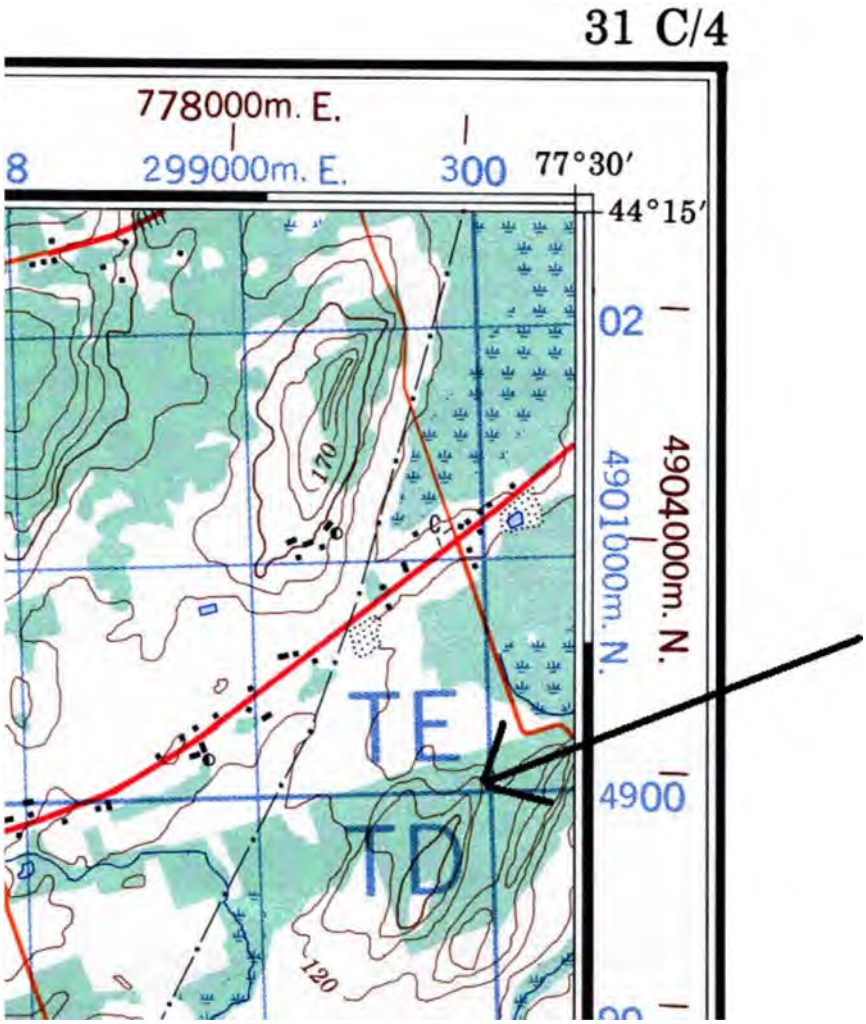

Figure D-2 Topographical Map 100 000-m Square Identifier

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

IDENTIFYING THE MAP DATUM FROM A TOPOGRAPHICAL MAP

The map datum of a topographical map is located in the lower right side of the marginal information, under the conversion scale for elevations.

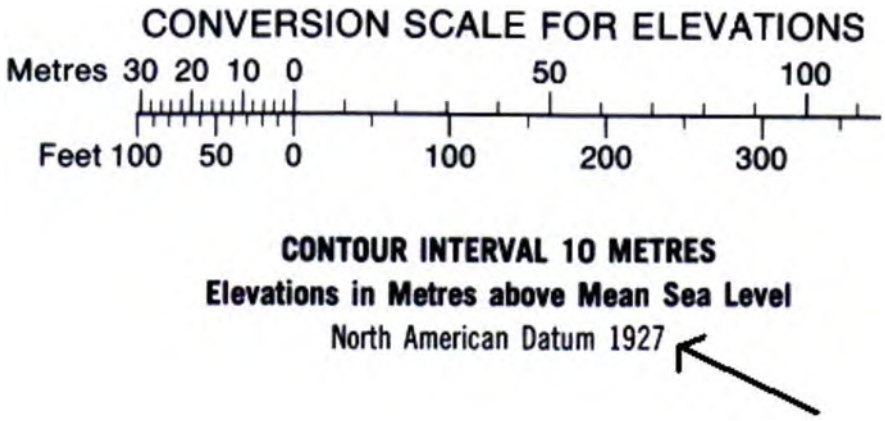

Figure D-3 Map Datum

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

SETTING A DATUM ON A GPS

To set a datum on a GPS:

1. Identify the map datum of the topographical map being used as the reference.
2. With the GPS, go to the set-up menu, then NAVIGATION, then SYSTEM or UNITS.
3. Highlight the map datum's box.
4. Scroll through the list of datums and find the map datum being used.
5. Set the correct datum.

To set the datum of the eXplorist 200 GPS receiver:

1. Power up the receiver.
2. Press the ENTER button.
3. Press MENU button.
4. Highlight the preferences and press ENTER.
5. Highlight the map units and press ENTER.
6. Highlight the map datum and press ENTER.
7. Highlight the correct datum and press ENTER.

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LEARNING STATION 3 INFORMATION SHEET

IDENTIFYING MGRS GRID SYSTEM ON A GPS RECEIVER

Ensure that the GPS receiver coordinate system is set to Military Grid Reference System (MGRS).

GPS receivers will identify the UTM coordinates when reading location, to include:

- grid zone designator,
- 100 000-m square identifier, and
- GR.

GPS receivers, depending on the make and model, are capable of selecting an MGRS accuracy of four-, six-, eight-, and ten-figure GRs. If the GPS receiver being used for this TP is enabled with this capability, it is suggested that it be set to a six-figure GR.

GPS Datum Set to NAD-27 GPS Datum Set to NAD-83

Figure E-1 GPS Receiver Coordinates

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

The coordinates displayed on the GPS receivers in Figure E-1 are set to MGRS. Each GPS receiver is set with a different datum for the same location.

GPS Receiver Datum set to NAD-27	GPS Receiver Datum set to NAD-83
The coordinates are identified as: • grid zone designator—18 T, • 100 000-m square identifier—TD, and • 10-figure GR as—96785 86748	The coordinates are identified as: • grid zone designator—18 T, • 100 000-m square identifier—TP, and • 10-figure GR as—96830 86973

Note the difference between the coordinates of the same location using a different datum.

PROCESS FOR CONFIRMING CORRECT MGRS COORDINATES

MGRS coordinates allow a GPS receiver to work in conjunction with a topographical map. To confirm the MGRS coordinates correspond with the topographical map the user will have to:

1. identify the MGRS grid system on the topographical map;
2. locate the grid zone designator; and
3. confirm the 100 000-m square identifier.

Identifying the MGRS Grid System on a Topographical Map

Locating the MGRS on topographical maps provides the navigator with another method to confirm the GPS receiver is reporting coordinates that correspond with the map being used. If the coordinates are different, the navigator will know that the GPS receiver is set to another datum and will have to be adjusted to provide the correct coordinates.

Locating the Grid Zone Designator

The location of the grid zone designator is found in the marginal information. The zone for the example in Figure E-1, is 18 T.

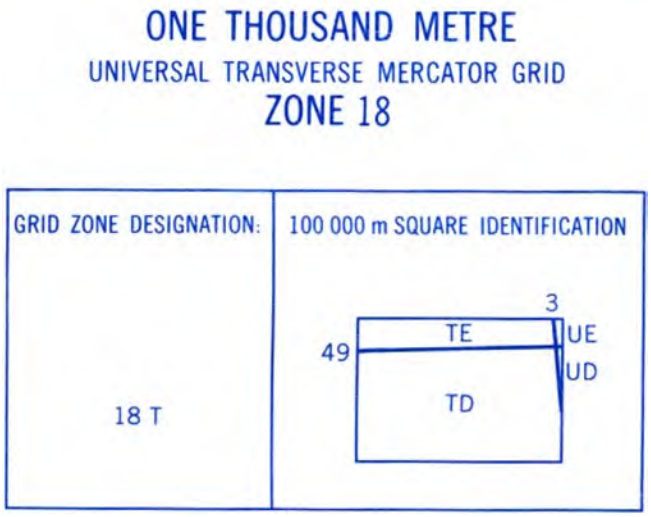

Figure E-2 Grid Zone Designator

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Confirming the 100 000-m Square Identifier

The 100 000-m square identifier is located in the same marginal information area as the grid zone designator. The example in Figure E-2 states that the map is adjacent to the 100 000-m square identifications UE and UD. Additionally, when the 100 000-m square identifier on a topographical map joins an adjacent grid zone, the identifier will be noted on the map in the 00 00 grid square. This is illustrated in Figure E-3.

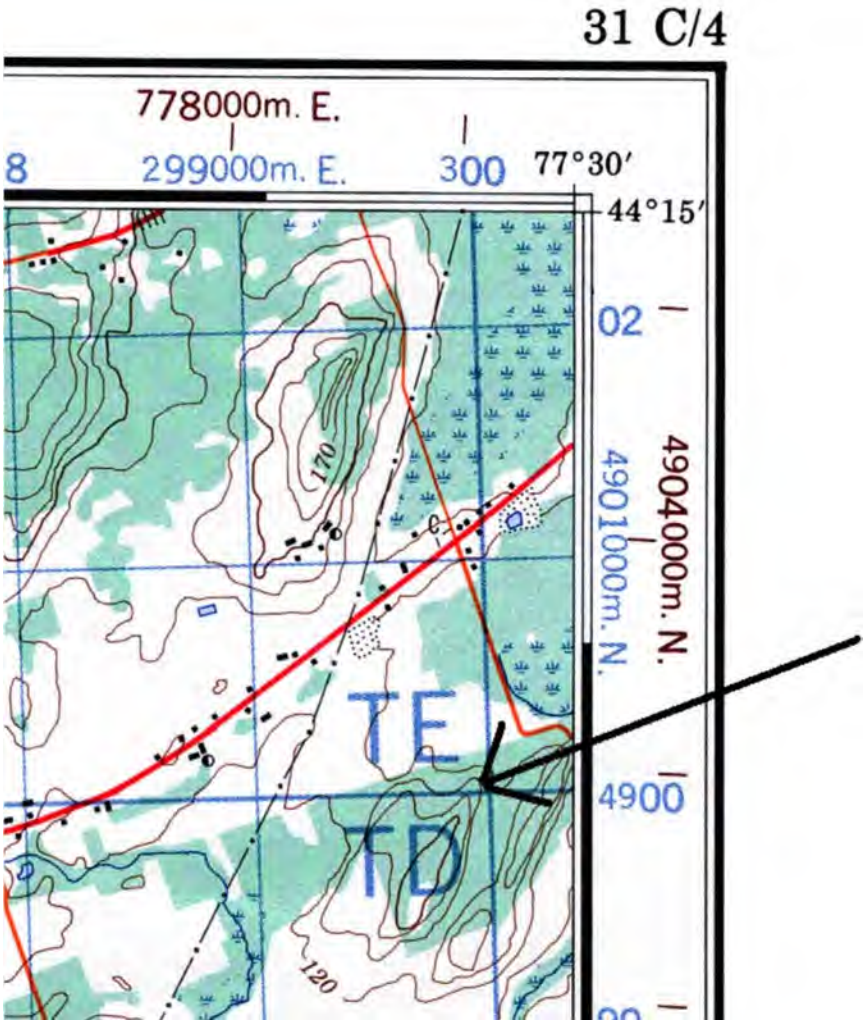

Figure E-3 Topographical Map 100 000-m Square Identifier

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Position. The position screen is used for confirming coordinates, datum, time, date, and the EPE. This screen is used infrequently, for brief periods, mostly in planning and after marking a waypoint. No easy-to-understand graphics, like a compass rose, are displayed.

After acquiring enough satellites to begin navigating, many GPS receivers automatically go to the position screen or the map screen. In addition to the information mentioned above, an operator may find current speed, heading and a trip odometer. On some GPS receivers the information displayed can be changed.

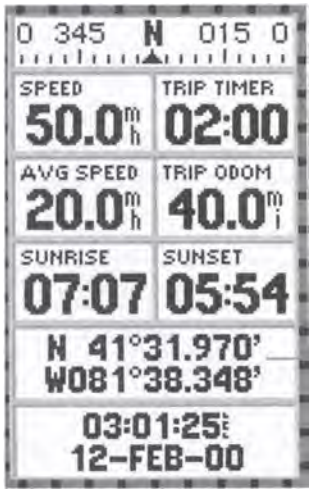

Figure E-4 Position Screen

Note. From *Outdoor Guide to Using Your GPS* (p. 46), by S. Featherstone, 2004, Chanhassen, MN: Creative Publishing International, Inc.

EXTRACTING A 6-FIGURE GR FROM A 10-FIGURE GR

A 10-figure grid reference given from a GPS receiver has 10 digits and is accurate to 1 m. To extract the 6-figure GR from the 10-figure GR one must understand how the figures work.

GRID REFERENCE WRITTEN FIGURES		
Definition	**Easting**	**Northing**
A 10-figure GR accurate to 1 m is written as	96779	86744
An 8-figure GR accurate to 10 m is written as	9677	8674
A 6-figure GR accurate to 100 m of the same coordinates is written as	967	867
A 4-figure GR accurate to 1 000 m of the same coordinates is written as	96	86

As illustrated in the above chart, the 10-figure GR has two sets of numbers. The first five digits are eastings and the second five digits are the northing coordinates. When taking a GR from a GPS receiver, it is important to identify the 10 digits and extract the first three numbers from the easting portion and the first three numbers from the northing portion (eg, **967**79 **867**44). The 6-figure grid reference can then be plotted on a map as GR 967 867.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 2

EO M422.02 – SET A MULTI-LEG ROUTE USING A GLOBAL POSITIONING SYSTEM (GPS) RECEIVER

Total Time: 120 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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.

All information in this lesson is based on the Magellan eXplorist 200 GPS. If a different GPS receiver is being used, consult the owner's manual to ensure the proper terminology and processes are used for this lesson.

Ensure GPS receivers are set up and initialized prior to the start of the lesson.

Create and input five points of interest (POIs) into each GPS receiver. Personalize these POIs so that they can be easily identified by the cadets during the lesson (eg, Gold 1, Gold 2, Gold 3).

Identify four POIs for the cadets to create in the GPS receiver in TP 2 and then link together to form a multi-leg route in TP 4. The POIs chosen must be able to be linked into a route.

Clear all track logs from the GPS receivers.

Create an active track in the GPS receivers of no longer than 100 m. Have the active track begin and end at the same location where the lesson will be taught. Once the active track has been established, stop it. Before TP 7 begins, resume the active track log on each of the GPS receivers.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TPs 1 and 3 to introduce the cadet to the features available on a GPS receiver.

A demonstration and performance was chosen for TPs 2, 4, 5 and 7 as it allows the instructor to explain and demonstrate how to create POIs and routes while providing the cadet the opportunity to practice these skills under supervision.

A demonstration was chosen for TP 6 as it allows the instructor to demonstrate the process of working a GPS receiver providing the cadet with the knowledge on how these skills can be applied in the future.

INTRODUCTION

REVIEW

The review for this lesson is from EO M422.01 (Review Silver Star Navigation).

QUESTIONS:

Q1. What are the components of a GPS receiver?

Q2. What are the five screens on a GPS receiver?

Q3. What does the arrow joystick on the GPS receiver do?

ANTICIPATED ANSWERS:

A1. The components of a GPS receiver are:

- antenna,
- screen,
- battery compartment, and
- buttons.

A2. The five screens on a GPS receiver are:

- satellite screen,
- menu screen,
- position screen,
- compass navigation screen, and
- map screen.

A3. The arrow joystick moves the cursor on the map screen and moves the highlighted bar to select menu options and data-entry fields.

OBJECTIVES

By the end of this lesson the cadet shall have set a multi-leg route using a GPS receiver.

IMPORTANCE

It is important for cadets to be able to set a multi-leg route on a GPS receiver because it allows the cadet to move from point to point without having to input new POIs for each leg, thereby saving time and minimizing the possibility of mistakes.

Teaching Point 1 **Identify the two types of POIs.**

Time: 5 min Method: Interactive Lecture

The purpose of this TP is to introduce the cadets to the two types of POIs that can be used to set a multi-leg route in a GPS receiver.

Depending on the GPS receiver being used, POIs may also be referred to as waypoints or landmarks.

Show cadets each type of POI in the GPS receiver.

The most important function of a GPS receiver is its ability to store POIs because they allow the user to return to a variety of points at a later time. A POI can be anything from a previous campsite to the place where the bus is waiting to pick up the group. POIs can be set prior to leaving or anytime along a route.

An easy way to think about a POI is to think about it as a location on a map marked by a pushpin.

There are two types of POIs:

Marked. A GPS receiver automatically displays the current coordinates of the user's position. Saving this position into the GPS receiver's memory establishes a new POI.

Stored. A POI can also be established even if it is not the user's current position. This stored POI is manually entered coordinates, from the map page of the GPS receiver, or taken from the list of POIs that come pre-loaded into the GPS receiver's memory.

GPS receivers can only store a fixed number of POIs—some limit the user to 250, while others can hold 1 000.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What is a POI?

Q2. When can POIs be set on a GPS receiver?

Q3. What is the difference between a marked and a stored POI?

ANTICIPATED ANSWERS:

A1. A POI can be anything from the previous campsite to the place where the bus is waiting to pick the group up.

A2. POIs can be set prior to leaving or anytime along a route.

A3. A marked POI saves the user's current location, while a stored POI is a manually entered GR, from the map page of the GPS receiver, or taken from the list of POIs that come pre-loaded into the GPS receiver's memory.

Teaching Point 2 **Explain, demonstrate and have the cadets identify and create POIs.**

Time: 20 min Method: Demonstration and Performance

For this skill TP it is recommended that instruction take the following format:

1. Identify the components of a POI.
2. Explain and demonstrate each mark while the cadets observe.
3. Explain and demonstrate each step required to complete each mark. Monitor the cadets as they practice each step.
4. Monitor the cadets' performance as they practice each mark.

Note: Assistant instructors may be used to monitor the cadets' performance.

Inform the cadets that once they receive their GPS receiver they will only pick it up when told to do so, follow along with the instructions and only press the buttons they are directed to press.

Distribute the GPS receivers to the class. Depending on the number of GPS receivers available and the number of cadets in the class, some cadets may have to pair up.

IDENTIFY A POI

The following information can be saved in the GPS receiver when a POI is marked in order to distinguish one POI from another:

Location. Indicates the coordinates of the POI, using the coordinate system set on the GPS receiver.

Name. POIs can receive a name of the user's choice or be automatically assigned a number from the GPS receiver. Many GPS receivers limit the number of characters that can be used to name the POI, so come creativity is usually required. Many users develop a list of common abbreviations to use when naming POIs such as CS for campsite, BS for best site, WS for water source, etc.

Date and time. Automatically recorded and saved when a POI is created.

Icon / symbol. Some GPS receivers allow the user to assign an icon / symbol to the newly created POI. This icon / symbol appears on the map page when the area around the POI is displayed. This is an optional feature and is not required—a default icon / symbol appears when one is not selected by the user.

CREATE POIs

Always confirm that the GPS receiver is set to the correct coordinate system and map datum prior to creating POIs.

There are four different ways that POIs can be created and saved into the memory of the GPS receiver. They are created using:

- a quick mark,
- a personalized mark,

- a coordinate mark, and / or
- a map cursor mark.

Quick Mark

The steps to execute a quick mark are as follows:

1. press MARK; and
2. press ENTER.

A quick mark uses the mark position defaults and therefore is not personalized by the user. To distinguish the POI from other POIs it is automatically assigned a number. Numbers are assigned in chronological order and no two POIs have the same number. For example, the first marked POI would be saved as POI001.

Personalized Mark

A personalized mark is inputted in the same way as a quick mark. Once the coordinates have been entered it is then personalized to enable easy identification, by entering:

1. name, and
2. icon / symbol.

The steps to create a POI using a personalized mark are as follows:

1. press MARK;
2. personalize the POI by:
    a. moving the arrow joystick to highlight the name field;
    b. pressing ENTER;
    c. moving the arrow joystick to select the character desired, pressing ENTER after each character is selected;
    d. moving the arrow joystick to OK, once all characters have been selected;
    e. pressing ENTER;
    f. moving the arrow joystick to highlight the icon / symbol field;
    g. pressing ENTER;
    h. moving the arrow joystick to the desired icon / symbol; and
    i. pressing ENTER to select the icon / symbol;
3. move the arrow joystick to highlight the save field; and
4. press ENTER.

Coordinate Mark

A coordinate mark is entered when coordinates from a topographical map are being used or if the user has been given a set of coordinates that they want to make into a POI.

The steps to create a POI using a coordinate mark are as follows:

It is important to make sure that the GPS receiver has been set to the same coordinate system as the coordinates that are going to be entered.

1. press MARK;
2. move the arrow joystick to highlight the location field;
3. press ENTER;
4. use the arrow joystick to adjust the characters in the first line (grid zone designation and 100 000-m square identification) of the location field;
5. press ENTER to move to the second line of the location field;
6. use the arrow joystick to adjust the characters in the second line (grid reference) of the location field;

Moving the arrow joystick in an up / down motion will increase / decrease the value at the cursor point.

Moving the arrow joystick in a left / right motion will move the cursor point to the left / right.

7. press ENTER;
8. personalize the POI, if desired (as detailed in Personalize a Mark, Step 2);
9. move the arrow joystick to the save field; and
10. press ENTER.

Have the cadets input the four POIs identified prior to the lesson using a coordinate mark into the GPS receiver. If the initial POI is the current location, it shall be entered using a personalized mark.

Map Cursor Mark

A map cursor mark allows the user to mark a position, other than the current position, by moving the cursor around the map to a specific place to create a POI.

The steps to create a POI using a map cursor mark are as follows:

1. go to the map screen page of the GPS receiver;
2. move the arrow joystick to put the GPS receiver into cursor mode;
3. move the arrow joystick until it is over the location of the desired POI;
4. press MARK;
5. personalize the POI, if desired (as detailed in Personalize a Mark, Step 2);
6. move the arrow joystick to the save field;

7. press ENTER; and

8. press ESC to exit the cursor mode.

CONFIRMATION OF TEACHING POINT 2

The cadets marking of POIs using the quick mark, personalized mark, coordinate mark, and map cursor mark will serve as the confirmation of this TP.

Teaching Point 3 **Discuss types of routes.**

Time: 5 min Method: Interactive Lecture

The purpose of this TP is to introduce the cadets to the different types of routes that can be developed on a GPS receiver. Ensure that the cadets understand the difference between the three routes discussed.

Routes are the least understood and one of the most important functions of a GPS receiver. Understanding how to use routes makes navigating using a GPS receiver much more enjoyable.

Route. A route is a series of POIs strung together to make an electronic path that also represents the trail the user intends to follow.

Leg. The segment between each set of POIs is called a leg.

A single route can be made up of a number of different legs.

There are three different types of routes that can be developed on a GPS receiver.

GOTO route. A GOTO route is the simplest and most common type of route. A GOTO route is a one-leg route with a starting point (present location) and a destination (selected POI). This type of route is useful when travelling to a specific manually-entered or stored POI. GOTO routes can only be used once.

Multi-leg route. A multi-leg route is a number of GOTO routes combined together. For example, if a GOTO route is from point A to point B then a multi-leg route would go from point A to point B to point C to point D and so on. Multi-leg routes can be saved into the memory of the GPS receiver and used repeatedly.

Backtrack route. As an individual walks with their GPS receiver, it records their tracks by automatically saving coordinates. A backtrack route uses these tracks to create a multi-leg route, in reverse order, enabling the user to navigate back to the start location following the same exact path. A backtrack route can be saved into the memory of the GPS receiver and used repeatedly.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. What is the difference between a route and a leg?

Q2. What is a multi-leg route?

Q3. How are the POIs of a backtrack route saved into the GPS receiver?

ANTICIPATED ANSWERS:

A1. A route is a series of POIs strung together to make an electronic path that also represents the trail the user intends to follow and a leg is the segment between each set of POIs.

A2. A multi-leg route is a number of GOTO routes combined together.

A3. The POIs of a backtrack route are saved into the GPS receiver automatically as tracks while the individual walks.

Teaching Point 4 **Explain, demonstrate and have the cadets create a GOTO route.**

Time: 15 min Method: Demonstration and Performance

For this skill TP it is recommended that instruction take the following format:

1. Explain and demonstrate creating a GOTO route while the cadets observe.
2. Explain and demonstrate each step required to create a GOTO route. Monitor the cadets as they practice each step.
3. Monitor the cadets' performance as they practice creating a GOTO route and walking to the destination POI.

Note: Assistant instructors may be used to monitor the cadets' performance.

Always confirm that the GPS receiver is set to the correct coordinate system and map datum prior to creating a GOTO route.

A GOTO route is the most commonly route used on a GPS receiver. A GOTO route has the following features:

- It is a straight line from the user's present location to a selected POI.
- It can not be saved.
- It is erased when the GPS receiver is turned off.
- It is created using stored POIs.

All POIs that have been saved or that were pre-loaded into the GPS receiver can be accessed using the POI database. POIs can be searched by nearest to present location or alphabetically. The POI database is accessed by:

1. pressing MENU;
2. using the arrow joystick to highlight POINTS OF INTEREST;
3. pressing ENTER;
4. using the arrow joystick in an up / down motion to highlight MY POINTS OF INTEREST;
5. using the arrow joystick in a left / right motion to select NEAREST or ALPHABETICALLY;
6. pressing ENTER; and
7. using the arrow joystick to highlight the desired POI.

The steps to create a GOTO route are as follows:

1. press GOTO;
2. use the POI database to select (highlight) the POI that will be the destination; and
3. press ENTER.

If there is already an existing GOTO route set, the GPS receiver will ask the user to confirm the creation of the new GOTO route. Pressing ENTER will erase the previous route to create the new route.

Once ENTER has been pressed, the last viewed navigation screen will be displayed, updated with information relating to the GOTO route that was just created. On the map screen, a line will be drawn from the current POI to the destination POI—this represents the GOTO route. The compass screen will change to display the name of the destination POI.

A GOTO route can also be created from a map cursor mark. Cadets will not be required to complete this skill.

The steps to create a GOTO route from a map cursor mark are as follows:

1. while viewing the map screen, use the arrow joystick to turn on the cursor mode;
2. continue using the arrow joystick to move the cursor to a point on the map that represents the desired destination;
3. press GOTO;
4. highlight YES to create a new GOTO route;
5. press ENTER;
6. highlight YES to create GOTO route to the current cursor position; and
7. press ENTER.

Once any route has been set, a GPS receiver indicates the following information:

- distance to the destination POI,
- bearing to the destination POI,
- how long it will take to reach the destination,
- if the user is on / off course, and
- how to get back on course, if off course.

The GPS receiver only indicates distance and bearing when the user is moving forward.

GOTO routes can also be created using the map cursor.

When navigating to a POI the GPS receiver indicates arrival at the destination POI. Depending on the GPS receiver being used, this may be a beep, a vibration or a flash on the screen.

CONFIRMATION OF TEACHING POINT 4

The cadets' creation of a GOTO route will serve as the confirmation of this TP.

Teaching Point 5 **Explain, demonstrate and have the cadets create and activate / deactivate a multi-leg route.**

Time: 30 min Method: Demonstration and Performance

For this skill TP it is recommended that instruction take the following format:

1. Explain and demonstrate creating a multi-leg route while the cadets observe.
2. Explain and demonstrate each step required to create a multi-leg route. Monitor the cadets as they practice each step.
3. Explain and demonstrate activating / deactivating a multi-leg route will the cadets observe.
4. Explain and demonstrate each step required to activate / deactivate a multi-leg route. Monitor the cadets as they practice each step.
5. Monitor the cadets' performance as they practice creating a multi-leg route, activating a multi-leg route, navigating using a multi-leg route and deactivating a multi-leg route.

For the practical portion of this TP, cadets will create a multi-leg route with three legs using stored POIs.

Note: Assistant instructors may be used to monitor the cadets' performance.

MULTI-LEG ROUTE

Always confirm that the GPS receiver is set to the correct coordinate system and map datum prior to a multi-leg route.

Multi-leg routes can be used to navigate to a final destination using multiple legs. A route with multiple legs allows the user to incorporate rest stops, terrain features (eg, travelling around a lake), contingency plans, emergency evacuations, etc.

A multi-leg route has the following features:

- It can be saved in the memory of the GPS receiver (the number of routes which can be saved is dependent on the GPS receiver being used).
- It remains active, even after the GPS receiver has been turned off.
- It can be edited, reversed, deleted, or viewed on the map.
- It allows for leg destination points to be switched when the route is active (eg, instead of going to the lake, the user many choose to go directly to the campsite and skip the lake).

Create a Multi-Leg Route

The steps to create a multi-leg route are as follows:

1. press MENU;
2. use the arrow joystick to highlight ROUTES;
3. press ENTER;
4. use the arrow joystick to highlight NEW;
5. press ENTER;
6. ensure ADD POI is highlighted and press ENTER;
7. use the POI database to add POIs by highlighting the desired POI and pressing ENTER after each one;
8. use the arrow joystick to highlight SAVE ROUTE once all the desired POIs have been entered;
9. press ENTER;
10. use the arrow joystick and the ENTER button to input a route name;
11. highlight OK; and
12. press ENTER.

Activate / Deactivate a Multi-Leg Route

Once a multi-leg route has been created, it is saved in the memory of the GPS receiver. While a GOTO route is automatically activated, a multi-leg route must be activated manually by the user. An active route is the route that the user is presently navigating on. A route remains the active route until it is deactivated or a new route is activated.

The steps to activate / deactivate a route are as follows:

1. press MENU;
2. use the arrow joystick to highlight ROUTES;
3. press ENTER;
4. use the arrow joystick to highlight the name of the route that is to be activated / deactivated;
5. press MENU;
6. highlight ACTIVATE ROUTE or DEACTIVATE ROUTE; and
7. press ENTER.

As with a GOTO route, once a multi-leg route has been activated / deactivated the GPS receiver returns to the last viewed navigation screen with the route chosen activated or deactivated.

When navigating using an activated multi-leg route, the GPS receiver indicates when approaching the end of each leg. Once the POI at the end of a leg has been reached, the GPS receiver automatically recalculates to the next leg, until the route is complete.

CONFIRMATION OF TEACHING POINT 5

The cadets' creation of a multi-leg route will serve as the confirmation of this TP.

Teaching Point 6 **Demonstrate how to modify a multi-leg route.**

Time: 15 min Method: Demonstration

The purpose of this TP is to demonstrate to cadets the different ways to modify an established multi-leg route. Demonstrate each skill, ensuring that the cadets can see the GPS receiver. If an assistant instructor is available, divide the cadets into two groups and have the assistant instructor demonstrate to one group.

MODIFY A MULTI-LEG ROUTE

Once a multi-leg route has been created, there may be a requirement to modify some aspects of the route. There are four ways to modify a multi-leg route:

- change the destination leg of an active route;
- edit a saved route;
- reverse the route; and
- delete a route.

Change the Destination Leg of an Active Route

When created, a multi-leg route will has many different legs incorporated into it—with each leg having its own destination. In some instances, the user may want to skip a leg and move directly to the next leg. The GPS

receiver allows the user to change the destination leg and then recalculates the navigation instructions based on the new destination.

Use the following multi-leg route which begins at the campground as an example:

- the first leg takes the user from the campground to the bridge;
- the second leg takes the user from the bridge to the lake; and
- the third leg takes the user from the lake to the park where lunch will be served.

The route would be campground > bridge > lake > park.

The user could decide to skip the lake and go directly to the park, by changing the destination leg from the lake to the park.

The destination leg of a route can only be changed if the route is active.

The steps to change the destination leg of an active route are as follows:

1. press MENU;
2. use the arrow joystick to highlight ROUTES;
3. press ENTER;
4. use the arrow joystick to highlight the active route;
5. press MENU;
6. highlight SELECT LEG;
7. press ENTER;
8. use the arrow joystick to highlight the new destination POI from the route list (in the example it would be 'park');

The current active leg in the route list will be bolded.

9. press ENTER;
10. use the arrow joystick to highlight YES and confirm the action;
11. press ENTER; and
12. press NAV to return to the last viewed navigation screen.

The multi-leg route recalculates and the user is able to navigate to the new destination.

Edit a Saved Route

A saved multi-leg route can be edited by:

- adding a leg;
- inserting a new leg;
- deleting a leg; or
- replacing a leg.

The steps to edit a saved multi-leg route are as follows:

1. press ENTER;
2. use the arrow joystick to highlight ROUTES;
3. press ENTER;
4. use the arrow joystick to highlight the name of the route that is to be edited;
5. press ENTER;
6. choose any of the following:
    a. add a leg:
        (1) use the arrow joystick to highlight ADD POI;
        (2) press ENTER;
        (3) search the POI database for the new POI; and
        (4) highlight the desired POI and press ENTER;

The new POI is added to the end of the route.

    b. insert a new leg:
        (1) use the arrow joystick to highlight the POI that the new leg will be inserted in front of;
        (2) press MENU;
        (3) highlight INSERT POI;
        (4) press ENTER;
        (5) search the POI database for the new POI; and
        (6) highlight the desired POI and press ENTER;
    c. delete a leg:
        (1) use the arrow joystick to highlight the POI that is to be deleted;
        (2) press MENU;

(3) highlight DELETE POI; and

(4) press ENTER;

d. replace a leg:

(1) use the arrow joystick to highlight the POI that is to be replaced;

(2) press MENU;

(3) highlight REPLACE POI;

(4) press ENTER;

(5) search the POI database for the new POI; and

(6) highlight the desired POI and press ENTER;

7. use the arrow joystick to highlight SAVE ROUTE once the route has been edited;
8. press ENTER;
9. highlight OK;
10. press ENTER.

Reverse a Route

Reversing a route takes a previously saved route and recreates it in the reverse order.

Using the previous multi-leg route example, the reverse route would be park > lake > bridge > campground.

The steps to reverse a route are as follows:

1. press MENU;
2. use the arrow joystick to highlight ROUTES;
3. press ENTER;
4. use the arrow joystick to highlight the name of the route that is to be reversed;
5. press MENU;
6. highlight REVERSE ROUTE; and
7. press ENTER.

Delete a Route

The number of routes that can be saved in the GPS receiver's memory depends on the GPS receiver being used. Once the memory is full, routes have to be deleted to add new routes.

The steps to delete a route are as follows:

1. press MENU;
2. use the arrow joystick to highlight ROUTES;

3. press ENTER;
4. use the arrow joystick to highlight the name of the route to be deleted;
5. highlight DELETE ROUTE;
6. press ENTER;
7. highlight YES to confirm the deletion; and
8. press ENTER.

CONFIRMATION OF TEACHING POINT 6

QUESTIONS:

Q1. What are the four ways to modify a multi-leg route?

Q2. Changing the destination leg of a route allows the user to do what?

Q3. What should the user do if the GPS receiver's memory is full and they can not add a new multi-leg route?

ANTICIPATED ANSWERS:

A1. The four ways to modify a multi-leg route are:

- change the destination leg of an active route;
- edit a saved route;
- reverse the route; and
- delete a route.

A2. Changing the destination leg of a route allows the user to skip a leg(s) of an active route.

A3. If the GPS receiver's memory is full the user has to delete a route.

Teaching Point 7 **Explain, demonstrate and have the cadets create and deactivate a backtrack route.**

Time: 20 min Method: Demonstration and Performance

For this skill TP it is recommended that instruction take the following format:

1. Explain and demonstrate creating a backtrack route from a track log while the cadets observe.
2. Explain and demonstrate each step required to create a backtrack route from a track log. Monitor the cadets as they practice each step.
3. Monitor the cadets' performance as they practice creating a backtrack route from a track log and walk on that route.

Ensure that the track log is resumed on the cadets GPS receivers.

Note: Assistant instructors may be used to monitor the cadets' performance.

Tracks. The coordinates of the user's current position. They are automatically created and saved into the memory of the GPS receiver when it is turned on and the tracks feature is enabled.

Track log. A series of tracks strung together. Tracks automatically become a track log that, if the user chooses, can be saved for use later. A track log can also be made into:

- a multi-leg route, and / or
- a backtrack route.

Track logs are not recorded when the GPS receiver is turned off or if it loses satellite reception.

Ensure that the cadets understand that the track log function can be turned on and turned off, that track logs can be saved and tracks can be cleared. They will not be required to complete these skills.

To enable the track log:

1. press MENU;
2. use the arrow joystick highlight TRACK LOG;
3. press ENTER;
4. use the arrow joystick to highlight ACTIVE TRACK;
5. press MENU;
6. highlight NEW TRACK; and
7. press ENTER.

To stop / resume a track log:

1. press MENU;
2. use the arrow joystick to highlight TRACK LOG;
3. press MENU with the ACTIVE TRACK highlighted;
4. highlight STOP LOGGING / RESUME LOGGING; and
5. press ENTER.

To save a track log:

1. press MENU;
2. use the arrow joystick highlight TRACK LOG;
3. press ENTER;
4. use the arrow joystick to highlight ACTIVE TRACK;
5. press MENU;

6. highlight SAVE;
7. press ENTER;
8. use the arrow joystick and the ENTER button to assign the track a name;
9. use the arrow joystick to highlight OK; and
10. press ENTER.

To clear the active track:

1. press MENU;
2. use the arrow joystick to highlight TRACK LOG;
3. press ENTER;
4. use the arrow joystick to highlight ACTIVE TRACK;
5. press MENU;
6. highlight clear TRACK;
7. press ENTER.

BACKTRACK ROUTE

A backtrack route uses track logs to create a route that returns the user to their start point following the exact path that was taken.

The steps to creating a backtrack route are as follows:

1. press MENU;
2. use the arrow joystick to highlight TRACK LOG;
3. press ENTER;
4. use the arrow joystick to highlight ACTIVE TRACK;
5. press MENU;
6. highlight BACKTRACK;
7. press ENTER; and
8. press ENTER.

Once a backtrack route has been activated, the GPS receiver no longer records track information.

The steps to deactivating a backtrack route are as follows:

1. press MENU;
2. highlight TRACK LOG;
3. press MENU;

4. highlight ACTIVE TRACK;
5. press MENU;
6. highlight DEACTIVATE;
7. press ENTER; and
8. press ENTER.

CONFIRMATION OF TEACHING POINT 7

The cadets' creation of a backtrack route will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' creation of a GOTO route, a multi-leg route and a backtrack route will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 422 PC.

CLOSING STATEMENT

Being able to set a multi-leg route is one of the most important skills to master when using a GPS receiver. The establishment of a route ensures efficient and accurate travel from POI to POI, making the experience more enjoyable for all.

INSTRUCTOR NOTES / REMARKS

GPS receiver instructions are based on the Magellan eXplorist 200. For instruction on use with other GPS receiver models, refer to the user's manual.

This EO shall be conducted during the allocated bivouac field training exercise.

REFERENCES

C1-178 Thales Navigation Inc. (2004). *Magellan eXplorist 200 GPS user manual*. San Dimas, CA: Thales Navigation Inc.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 3

EO M422.03 – FOLLOW A MULTI-LEG ROUTE USING A GLOBAL POSITIONING SYSTEM (GPS) RECEIVER

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-704/PG-001, *Gold 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.

Photocopy Attachment A (Input a Multi-Leg Route in the Magellan eXplorist 200 GPS Receiver) for each cadet.

Design a 4-km route with a minimum of 12 legs.

Assistant instructors are required for this lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A practical activity was chosen for this lesson as it is an interactive way to allow cadets to experience following a multi-leg route using a GPS receiver in a safe and controlled environment.

INTRODUCTION

REVIEW

The review for this lesson is from EO M422.02 (Set a Multi-Leg Route Using a Global Positioning System [GPS] Receiver).

QUESTIONS:

Q1. Describe the differences between the two types of points of interest (POIs).

Q2. What are the steps to create a personalized mark?

Q3. What is a GOTO route?

ANTICIPATED ANSWERS:

A1. A marked POI saves the user's current location, while a stored POI can be a manually entered GR. It can be marked from the map page of the GPS receiver, or it can taken from the list of POIs that come pre-loaded into the GPS receiver's memory.

A2. To create a personalized mark:

1. press MARK;
2. personalize the POI by:
   (a) moving the arrow joystick to highlight the name field;
   (b) pressing ENTER;
   (c) moving the arrow joystick to select the character desired, pressing ENTER after each character is selected;
   (d) moving the arrow joystick to OK once all characters have been selected;
   (e) pressing ENTER;
   (f) moving the arrow joystick to highlight the icon / symbol field;
   (g) pressing ENTER;
   (h) moving the arrow joystick to the desired icon / symbol; and
   (i) pressing ENTER to select the icon / symbol;
3. move the arrow joystick to highlight the save field; and
4. press ENTER.

A3. A GOTO route is the simplest and most common type of route. A GOTO route is a one-leg route with a starting point (present location) and a destination (selected POI). This type of route is useful when travelling to a specific manually entered or stored POI. GOTO routes can only be used once.

OBJECTIVES

By the end of this lesson the cadet shall have followed a multi-leg route using a GPS receiver.

IMPORTANCE

It is important for cadets to know how to follow a multi-leg route using a GPS receiver as each leg represents a checkpoint during an expedition. Breaking the expedition into legs allows for planning in rest points, meal locations, sleep locations and ensures that cadets feel a sense of success as the expedition progresses. Multi-leg routes also reaffirm the group is on the correct course, limiting the chances of becoming lost.

Teaching Point 1 **Have the cadets, in groups of four, practice following a multi-leg route using a GPS receiver.**

Time: 80 min Method: Practical Activity

BACKGROUND KNOWLEDGE

PROCESS FOR CONFIRMING CORRECT MILITARY GRID REFERENCE SYSTEM (MGRS) COORDINATES

MGRS coordinates allow a GPS receiver to work in conjunction with a topographical map. To confirm the MGRS coordinates correspond with the topographical map, the user will have to:

1. Identify the MGRS grid system on the topographical map.
2. Locate the grid zone designator.
3. Confirm the 100 000-m square identifier.

Identifying MGRS Grid System on a Topographical Map

Locating the MGRS grid system on topographical maps provides the cadet with another method to confirm the GPS receiver is reporting coordinates that correspond with the map being used. If the coordinates are different, the navigator will know that the GPS receiver is set to another datum and will have to be adjusted to provide the correct coordinates.

Locating the Grid Zone Designator

The location of the grid zone designator is found in the marginal information. The zone for the example in Figure 1 is 18 T.

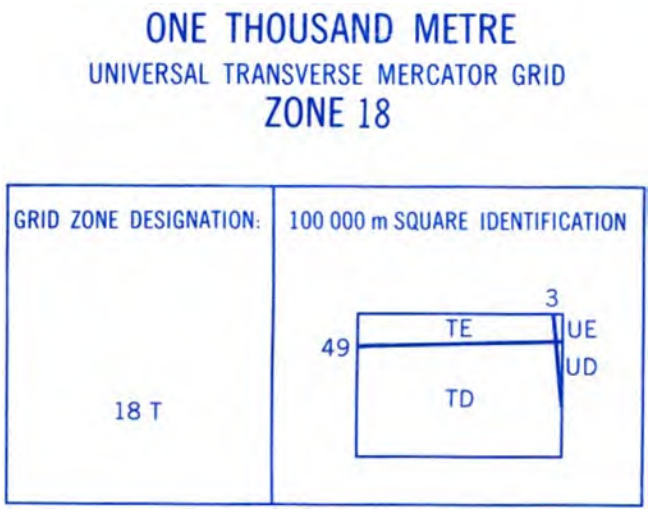

Figure 1 Grid Zone Designator

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Confirming the 100 000-m Square Identifier

The 100 000-m square identifier is located in the same marginal information area as the grid zone designator. The example in Figure 1 states that the map is adjacent to the 100 000-m square identifications UE and UD. Additionally when the 100 000-m square identifier on a topographical map joins an adjacent grid zone, the identifier will be noted on the map in the 00 00 grid square. This is illustrated in Figure 2.

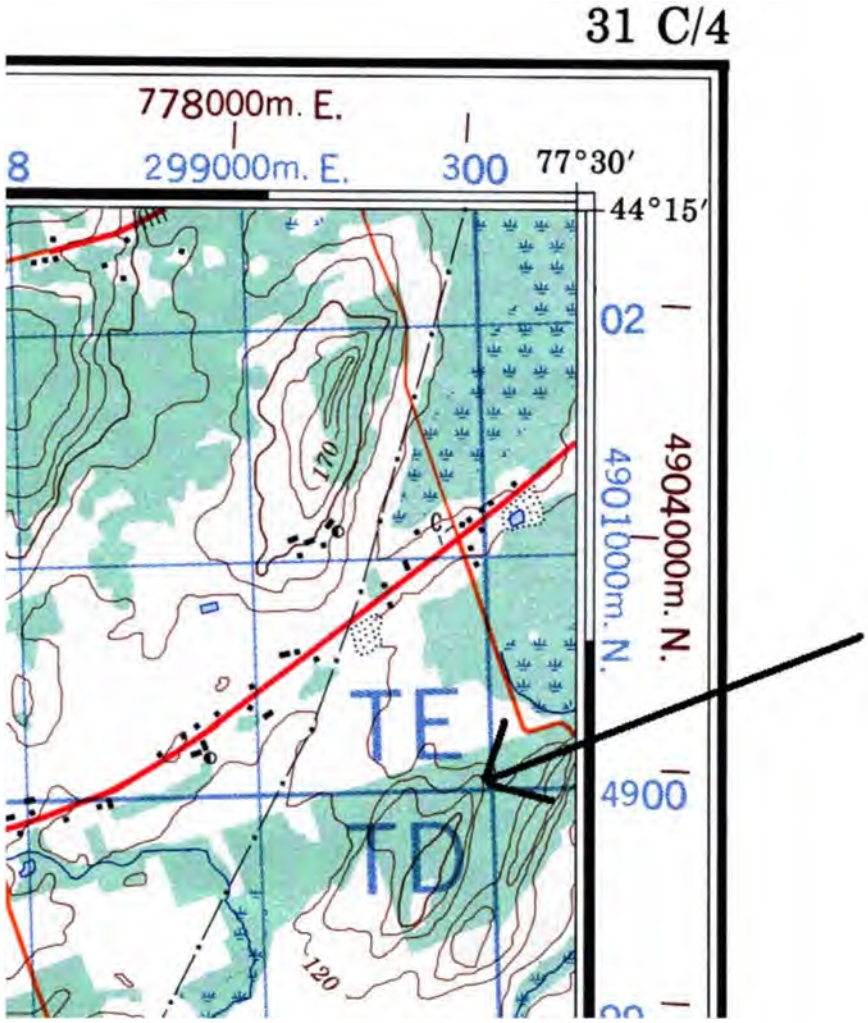

Figure 2 Topographical Map 100 000-m Square Identifier

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

IDENTIFYING THE MAP DATUM FROM A TOPOGRAPHICAL MAP

The map datum of a topographical map is located in the lower right side of the marginal information, under the conversion scale for elevations.

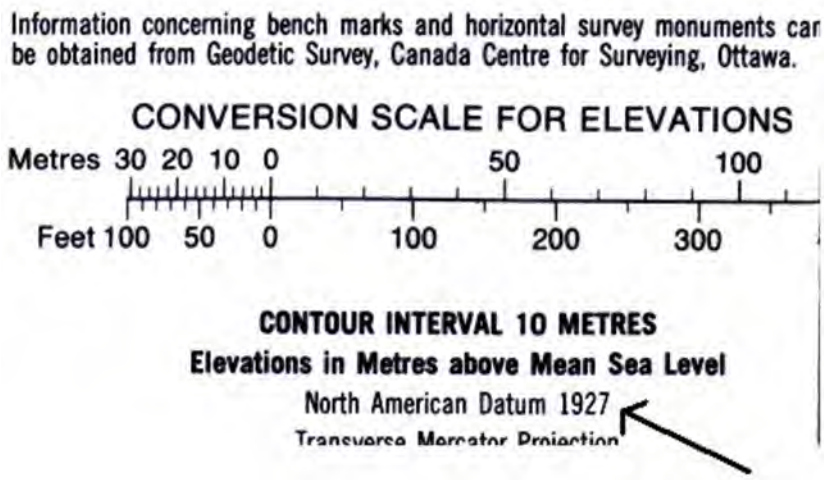

Figure 3 Map Datum

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

SETTING A DATUM ON A GPS

To set a datum on a GPS:

1. Identify the map datum of the topographical map being used as the reference.
2. With the GPS, go to the set-up menu, then "navigation", then "system" or "units".
3. Highlight the map datum's box.
4. Scroll through the list of datums and find the map datum being used.
5. Set the correct datum.

To set the datum of the eXplorist 200 GPS receiver:

1. Power up the receiver.
2. Press the ENTER button.
3. Press MENU button.
4. Highlight the preferences and press ENTER.
5. Highlight the map units and press ENTER.
6. Highlight the map datum and press ENTER.
7. Highlight the correct datum and press ENTER.

IDENTIFYING MGRS GRID SYSTEM ON A GPS RECEIVER

Ensure that the GPS receiver coordinate system is set to Military Grid Reference System (MGRS).

GPS receivers will identify the Universe Transverse Mercator (UTM) coordinates when reading location, to include:

- grid zone designator,
- 100 000-m square identifier, and
- GR.

GPS receivers, depending on the make and model, are capable of selecting an MGRS accuracy of four-, six-, eight-, and ten-figure GRs. If the GPS receiver being used for this TP is enabled with this capability, it is suggested that it be set to a six-figure GR.

GPS Datum Set to NAD-27 GPS Datum Set to NAD-83

Figure 4 GPS Receiver Coordinates

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

The coordinates displayed on the GPS receivers in Figure 4 are set to MGRS. Each GPS receiver is set with a different datum for the same location.

GPS Receiver Datum Set to NAD-27	GPS Receiver Datum Set to NAD-83
The coordinates are identified as: • grid zone designator—18 T, • 100 000-m square identifier—TD, and • 10-figure GR as—96785 86748	The coordinates are identified as: • grid zone designator—18 T, • 100 000-m square identifier—TP, and • 10-figure GR as—96830 86973

Note the difference between the coordinates of the same location using a different datum.

Position. The position screen is used for confirming coordinates, datum, time, date, and the estimated position error (EPE). This screen is used infrequently, for brief periods, mostly in planning and after marking a waypoint. No easy-to-understand graphics, like a compass rose, are displayed.

After acquiring enough satellites to begin navigating, many GPS receivers automatically go to the position screen or the map screen. In addition to the information mentioned above, an operator may find current speed, heading and a trip odometer. On some GPS receivers the information displayed can be changed.

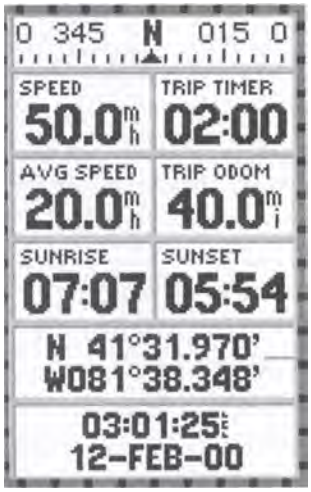

Figure 5 Position Screen

Note. From *Outdoor Guide to Using Your GPS* (p. 46), by S. Featherstone, 2004, Chanhassen, MN: Creative Publishing International, Inc.

EXTRACTING A 6-FIGURE GR FROM A 10-FIGURE GR

A 10-figure grid reference given from a GPS receiver has 10 digits and is accurate to 1 m. To extract the 6-figure GR from the 10-figure GR one must understand how the figures work.

GRID REFERENCE WRITTEN FIGURES		
Definition	**Easting**	**Northing**
A 10-figure GR accurate to 1 m is written as	96779	86744
An 8-figure GR accurate to 10 m is written as	9677	8674
A 6-figure GR accurate to 100 m of the same coordinates is written as	967	867
A 4-figure GR accurate to 1 000 m of the same coordinates is written as	96	86

As illustrated in the above chart, the 10-figure GR has two sets of numbers. The first five digits are eastings and the second five digits are the northing coordinates. When taking a GR from a GPS, receiver it is important

to identify the 10 digits and extract the first three numbers from the easting portion and the first three numbers from the northing portion (eg, **967**79 **867**44). The 6-figure grid reference can then be plotted on a map as GR 967 867.

CREATING A PERSONALIZED MARK

The steps to create a personalized mark are as follows:

1. press MARK;
2. personalize the POI by:
    a. moving the arrow joystick to highlight the name field;
    b. pressing ENTER;
    c. moving the arrow joystick to select the character desired, pressing ENTER after each character is selected;
    d. moving the arrow joystick to OK, once all characters have been selected;
    e. pressing ENTER;
    f. moving the arrow joystick to highlight the icon / symbol field;
    g. pressing ENTER;
    h. moving the arrow joystick to the desired icon / symbol; and
    i. pressing ENTER to select the icon / symbol;
3. move the arrow joystick to highlight the save field; and
4. press ENTER.

CREATING A COORDINATE MARK

The steps to create a coordinate mark are as follows:

It is important to make sure that the GPS receiver has been set to the same coordinate system as the coordinates that are going to be entered.

1. press MARK;
2. move the arrow joystick to highlight the location field;
3. press ENTER;
4. use the arrow joystick to adjust the characters in the first line (grid zone designation and 100 000-m square identification) of the location field;
5. press ENTER to move to the second line of the location field;
6. use the arrow joystick to adjust the characters in the second line (grid reference) of the location field;

Moving the arrow joystick in an up / down motion will increase / decrease the value at the cursor point.

Moving the arrow joystick in a left / right motion will move the cursor point to the left / right.

7. press ENTER;
8. personalize the POI, if desired (as detailed personalize a mark, Step 2);
9. move the arrow joystick to the save field; and
10. press ENTER.

CREATING A MULTI-LEG ROUTE

The steps to create a multi-leg route are as follows:

1. press MENU;
2. use the arrow joystick to highlight ROUTES;
3. press ENTER;
4. use the arrow joystick to highlight NEW;
5. press ENTER;
6. ensure 'add POI' is highlighted and press ENTER;
7. use the POI database to add POIs by highlighting the desired POI and pressing ENTER after each one;
8. use the arrow joystick to highlight SAVE ROUTE once all the desired POIs have been entered;
9. press ENTER;
10. use the arrow joystick and the ENTER button to input a route name;
11. highlight OK; and
12. press ENTER.

ACTIVATING A MULTI-LEG ROUTE

The steps to activate a multi-leg route are as follows:

1. press MENU;
2. use the arrow joystick to highlight ROUTES;
3. press ENTER;
4. use the arrow joystick to highlight the name of the route that is to be activated;
5. press MENU;
6. highlight ACTIVATE ROUTE; and
7. press ENTER.

ACTIVITY

Time: 80 min

OBJECTIVE

The objective of this activity is to have the cadets, in a group of no more than four, follow a multi-leg route using a GPS receiver.

RESOURCES

- GPS receiver (one per group),
- Start point,
- Three POIs (per group),
- Compass (one per group),
- Topographical map of the local area (one per group),
- Whistle (one per cadet),
- First aid kit (one),
- Hand-held radio (one per group), and
- Input a Multi-leg Route in the Magellan eXplorist 200 GPS Receiver handout located at Attachment A (one per cadet).

ACTIVITY LAYOUT

Break the route into three legs (POIs) for each group.

ACTIVITY INSTRUCTIONS

1. Brief the cadets prior to the start of the activity, to include an explanation of:
   a. the objectives and importance of the activity;
   b. the coordinates they will require to input their routes, including start and end points and the POIs; and
   c. any safety guidelines that must be followed while performing the activity.
2. Divide cadets into groups of no more than four.
3. Provide one GPS receiver, topographical map of the local area, compass and hand-held radio to each group.
4. Provide a whistle and a copy of the Input a Multi Leg Route in the Magellan eXplorist 200 GPS Receiver handout to each cadet.
5. Have each group determine who will navigate each leg.
6. Assign each cadet within each group their POI coordinates.

7. Have the cadets, in navigating order, input their provided coordinates using a GPS receiver by:
    a. confirming that the GPS receiver is set to the correct coordinate system;
    b. confirming that the correct map datum is set;
    c. marking the start point, using a personalized mark by;
        (1) pressing MARK;
        (2) personalizing the POI by:
            (a) moving the arrow joystick to highlight the name field;
            (b) pressing ENTER;
            (c) moving the arrow joystick to select the character desired, pressing ENTER after each character is selected;
            (d) moving the arrow joystick to OK once all characters have been selected;
            (e) pressing ENTER;
            (f) moving the arrow joystick to highlight the icon / symbol field;
            (g) pressing ENTER;
            (h) moving the arrow joystick to the desired icon / symbol; and
            (i) pressing ENTER to select the icon / symbol;
        (3) moving the arrow joystick to highlight the save field; and
        (4) pressing ENTER;
    d. establishing three POIs using coordinate marks by:
        (1) pressing MARK;
        (2) moving the arrow joystick to highlight the location field;
        (3) pressing ENTER;
        (4) using the arrow joystick to adjust the characters in the first line (grid zone designation and 100 000-m square identification), as required;
        (5) pressing ENTER to move to the second line of the location field;
        (6) using the arrow joystick to adjust the characters in the second line (gird reference) of the location field;
        (7) pressing ENTER;
        (8) personalizing the POI, if desired;
        (9) moving the arrow joystick to the save field;
        (10) pressing ENTER; and
        (11) repeating the process for the remaining POIs; and

e. creating a multi-leg route by:

(1) pressing MENU;

(2) using the arrow joystick to highlight ROUTES;

(3) pressing ENTER;

(4) using the arrow joystick to highlight NEW;

(5) pressing ENTER;

(6) ensuring ADD POI is highlighted and pressing ENTER;

(7) using the POI database to add POIs by highlighting the desired POI and pressing ENTER after each one;

(8) using the arrow joystick to highlight SAVE ROUTE once all the desired POIs have been entered;

(9) pressing ENTER;

(10) using the arrow joystick and the ENTER button to input a route name;

(11) highlighting OK; and

(12) pressing ENTER.

8. Have the cadets, in navigating order:

a. activate the route by:

(1) pressing MENU;

(2) using the arrow joystick to highlight ROUTES;

(3) pressing ENTER;

(4) using the arrow joystick to highlight the name of the route that is to be activated;

(5) pressing MENU;

(6) highlighting ACTIVATE ROUTE; and

(7) pressing ENTER; and

b. navigate to each POI along the set route using the GPS receiver (within a 10-m radius).

9. Debrief the cadets by asking:

a. how they felt about the activity;

b. what part of the activity they found difficult;

c. what they felt they accomplished; and

d. what they would try to improve if given the chance to complete the activity again.

SAFETY

Cadets will be navigating legs on their own. Additional instructors will be required to monitor the activity by positioning themselves in random locations along the route.

Provide cadets with a safety bearing to travel on in the case of GPS receiver fails or in the event of becoming lost.

END OF LESSON CONFIRMATION

The cadets' participation in the GPS navigation activity will serve as the confirmation of this lesson.

CONCLUSION

REVIEW

Nil.

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 422 PC.

CLOSING STATEMENT

The ability to identify route legs and input those legs into a GPS allows one to divide up the route when navigating. Dividing the expedition route into legs allows the leader to prepare for rest stops, meal breaks and particular points to use as overnight rest points. A leg also provides the group with minor points of accomplishments and promotes individual and team morale.

INSTRUCTOR NOTES / REMARKS

This EO shall be conducted during the allocated bivouac field training exercise.

Additional instructors will be required to supervise the cadets while participating in the activity. Assistant instructors shall be randomly placed along the route to assist cadets.

The type of GPS receiver may vary. If the Magellan eXplorist 200 is not being used to refer the owner's manual for instructions and proper methods of use.

REFERENCES

C1-178 Thales Navigation Inc. (2004). *Magellen eXplorist 200 GPS user manual*. San Dimas, CA: Thales Navigation Inc.

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Input a Multi-Leg Route in the Magellan eXplorist 200 GPS Receiver

To input a multi-leg route in a GPS receiver:

1. Confirm that the GPS receiver is set to the correct coordinate system.
2. Confirm that the correct map datum is set.
3. Mark the start point, using a personalized mark by:
    a. pressing MARK;
    b. personalizing the POI by:
        (1) moving the arrow joystick to highlight the name field;
        (2) pressing ENTER;
        (3) moving the arrow joystick to select the character desired, pressing ENTER after each character is selected;
        (4) moving the arrow joystick to OK once all characters have been selected;
        (5) pressing ENTER;
        (6) moving the arrow joystick to highlight the icon / symbol field;
        (7) pressing ENTER;
        (8) moving the arrow joystick to the desired icon / symbol; and
        (9) pressing ENTER to select the icon / symbol;
    c. moving the arrow joystick to highlight the save field; and
    d. pressing ENTER.
4. Establish three POIs using coordinate marks by:
    a. pressing MARK;
    b. moving the arrow joystick to highlight the location field;
    c. pressing ENTER;
    d. using the arrow joystick to adjust the characters in the first line (grid zone designation and 100 000-m square identification), as required;
    e. pressing ENTER to move to the second line of the location field;
    f. using the arrow joystick to adjust the characters in the second line (gird reference) of the location field;
    g. pressing ENTER;
    h. personalizing the POI, if desired;
    i. moving the arrow joystick to the save field;

j. pressing ENTER; and

k. repeating the process for the remaining POIs.

5. Create a multi-leg route by:

a. pressing MENU;

b. using the arrow joystick to highlight ROUTES;

c. pressing ENTER;

d. using the arrow joystick to highlight NEW;

e. pressing ENTER;

f. ensuring ADD POI is highlighted and pressing ENTER;

g. using the POI database to add POIs by highlighting the desired POI and pressing ENTER after each one;

h. using the arrow joystick to highlight SAVE ROUTE once all the desired POIs have been entered;

i. pressing ENTER;

j. using the arrow joystick and the ENTER button to input a route name;

k. highlighting OK; and

l. pressing ENTER.

6. Activate the route by:

a. pressing MENU;

b. using the arrow joystick to highlight ROUTES;

c. pressing ENTER;

d. using the arrow joystick to highlight the name of the route that is to be activated;

e. pressing MENU;

f. highlighting ACTIVATE ROUTE; and

g. pressing ENTER.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 4

EO C422.01 – LOCATE A GEOCACHE

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-704/PG-001, *Gold 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.

Create four geocaches for cadets to locate. Record information about each geocache on the Geocache Information Form located at Attachment A and photocopy one for each group. This form will be provided to the cadets to assist them with locating geocaches.

For each geocache, place a number of small treasures and a geocache register inside a watertight storage vessel. Label each vessel and place it in the appropriate location.

The activity is developed using four geocaches. Each cadet shall have the opportunity to practice locating a geocache. Depending on the number of cadets, more geocaches may be required.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to introduce the cadets to geocaching.

A practical activity was chosen for TP 2 as it is an interactive way for the cadets to locate a geocache and increase their Global Positioning System (GPS) receiver navigation skills in a safe, controlled environment. This activity contributes to the development of navigation skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have located a geocache.

IMPORTANCE

Geocaching is an activity where an individual locates points and objects through given coordinates using a GPS and provided clues. This activity develops GPS receiver skills, and benefits the cadet by practicing moving from points of origin to intended destinations using a GPS receiver.

Teaching Point 1 **Describe the sport of geocaching.**

Time: 5 min Method: Interactive Lecture

GEOCACHING

The word geocaching is pronounced *GEE-oh-cash-ing* and comes from two separate words; geo, for geology and cache, which means a hidden store of goods or valuables. Geocaching is a worldwide activity where one person establishes a cache and posts its location for others to find. Participants load the coordinates of the cache into their GPS receiver, and then use it to find the cache.

The most common website for information about geocaching is www.geocaching.com. This website allows participants to locate geocaches or to report the location of new geocaches.

ORIGIN

Geocaching originated in May 2000 when the United States government turned off GPS selective availability (selective availability purposely degrades the accuracy of the GPS signal). At that point, civilian GPS receivers, that were formerly accurate to 90-m (300 feet), became accurate to 3–9 m (10–30 feet). This level of accuracy offered some new creative possibilities.

When accuracy was increased, the recreational user developed a hide-and-seek type game with a high-tech twist and treasure. An individual would find a location in some out-of-the way place, record its coordinates and leave a stash behind for another gamer to locate.

EQUIPMENT REQUIRED

A GPS receiver and cache coordinates are all that is required to geocache. Geocache coordinates define the location of a geocache. They can be found through friends and on the Internet. The following items will provide a geocacher with a more enjoyable experience:

Spare batteries. Geocaching depends on the use of a GPS receiver; the GPS receiver is powered by batteries. In the event a GPS receivers' batteries expire while in use, it is imperative that the geocacher have replacement batteries.

Map and compass. In the event the GPS receiver fails or the batteries go dead, the map and compass will serve as a backup tool for navigation. A map will also provide the navigator with a detailed view of the landscape. Not all GPS receivers provide enough detail to effectively understand contours and terrain.

Pen or pencil and paper. Used for taking notes about the route and to leave notes in the cache.

An item to leave in the cache. Most caches have treasures left for individuals to find. The best items are unique, out-of-the-ordinary items (eg, foreign coins, fossils, exotic matchbooks, or anything that is attractive to a collector). Once an individual has located a cache they take a treasure and replace it with one of their own.

Appropriate clothes and footwear. Geocaching can have the navigator crossing various types of terrain in many different conditions. A geocacher should wear clothing suitable to stay warm and dry for the environmental conditions of the day and the terrain to be covered.

Food and water. Some caches take all day to find; it is important to be prepared with enough food and water to successfully complete the search.

Trekking pole or walking stick. If the terrain is rough, a good walking stick or set of trekking poles can make travelling up and down hills and negotiating uneven surfaces easier.

Flashlight. Can be used in order to see into cracks and crevices where a cache might be hidden. It also becomes useful if forced to travel in low light conditions.

Cellphone. In case contact with emergency services is required.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What is geocaching?

Q2. When did geocaching originate?

Q3. What equipment is required to geocache?

ANTICIPATED ANSWERS:

A1. Geocaching is a worldwide activity where one person establishes a cache and posts its location for others to find. Participants load the coordinates of the cache into their GPS receiver, and then use it to find the cache.

A2. Geocaching originated in May 2000.

A3. A GPS receiver and geocache coordinates are all that is required to geocache.

Teaching Point 2 **Have the cadets, in groups of three, locate a geocache.**

Time: 20 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in groups of three, locate a geocache.

RESOURCES

- GPS receiver (one per group),
- Compass (one per group),
- Geocache coordinates,
- Topographical map of the local area (one per group), and
- Geocache treasures (eg, pencils, markers, erasers, shoe polish, instructions to properly tie parade boots).

ACTIVITY LAYOUT

Set up a round robin geocache hunt.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of three and provide each group with a GPS receiver.
2. Give each group the geocache coordinates.
3. Have each group choose a treasure item to place inside the geocache.
4. Have each group participate in a free-for-all (select geocaches of their own choice) style search by:
    a. receiving all completed geocache information forms;
    b. setting up the GPS receiver by:
        (1) confirming that the correct coordinate system is set; and
        (2) confirming the correct map datum is set;
    c. creating a point of interest (POI) from a coordinate mark by:
        (1) pressing MARK;
        (2) moving the arrow joystick to highlight the location field;
        (3) pressing ENTER;
        (4) using the arrow joystick to adjust the characters in the first line (grid zone designation and 100 000-m square identification) of the location field;
        (5) pressing ENTER to move to the second line of the location field;
        (6) using the arrow joystick to adjust the characters in the second line (grid reference) of the location field;
        (7) pressing ENTER;
        (8) personalizing the POI, if desired;
        (9) moving the arrow joystick to the save field; and
        (10) pressing ENTER;
    d. navigating to the geocache by:
        (1) selecting a GOTO route;
        (2) choosing the geocache POI;
        (3) navigating to the area;
        (4) searching the area of the POI for the geocache; and
        (5) locating the geocache; and
    e. swapping a treasure and obtaining the next geocache information form.
5. Have each group repeat Steps 4 b–e until they have located all four geocaches.

6. Conduct a debriefing by asking the cadets:
    a. how they felt about the activity;
    b. how they felt they worked together;
    c. what portion of the activity challenged them the most;
    d. how their teammates assisted them when they were challenged; and
    e. if there are any specific examples of when their team experienced difficulty.

SAFETY

The possibility exists for cadets to become lost or disoriented while searching for a geocache. Establish boundaries, a stop time and a safety bearing before cadets participate in the activity.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the geocache activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the geocache activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Participating in geocaching will develop a better working knowledge of how to use and navigate with a GPS receiver. The skills used in geocaching directly relate to expedition training and navigating with a GPS receiver.

INSTRUCTOR NOTES / REMARKS

The instructor is to create sample geocaches, select a location in the vicinity of the class, place the geocaches and mark the coordinates prior to conducting this lesson.

REFERENCES

C1-178 Thales Navigation Inc. (2004). *Magellan eXplorist 200 GPS user manual*. San Dimas, CA: Thales Navigation Inc.

C2-142 ISBN 0-7645-6933-3 McNamara, J. (2004). *GPS for dummies*. Hoboken, NJ: Wiley Publishing, Inc.

GEOCACHE INFORMATION FORM

Geocache Name:		Geocache Name:	
GEOCACHE DETAILS		GEOCACHE DETAILS	
Coordinate System	MGRS	Coordinate System	MGRS
Grid Zone Designation		Grid Zone Designation	
100 000-m Square Identification		100 000-m Square Identification	
Map Datum		Map Datum	
Grid Reference Coordinates		Grid Reference Coordinates	
Location Description / Hint		Location Description / Hint	
Geocache Name:		**Geocache Name:**	
GEOCACHE DETAILS		GEOCACHE DETAILS	
Coordinate System	MGRS	Coordinate System	MGRS
Grid Zone Designation		Grid Zone Designation	
100 000-m Square Identification		100 000-m Square Identification	
Map Datum		Map Datum	
Grid Reference Coordinates		Grid Reference Coordinates	
Location Description / Hint		Location Description / Hint	
Geocache Name:		**Geocache Name:**	
GEOCACHE DETAILS		GEOCACHE DETAILS	
Coordinate System	MGRS	Coordinate System	MGRS
Grid Zone Designation		Grid Zone Designation	
100 000-m Square Identification		100 000-m Square Identification	
Map Datum		Map Datum	
Grid Reference Coordinates		Grid Reference Coordinates	
Location Description / Hint		Location Description / Hint	

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 5

EO C422.02 – CREATE A GEOCACHE

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-704/PG-001, *Gold 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.

Photocopy the Stash a Cache Record and Report Form located at Attachment A for each cadet.

Visit www.geocaching.com and print the information sheet of a geocache in the local area for use in TP 3.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for this lesson to introduce the cadet to creating a geocache.

INTRODUCTION

REVIEW

The review for this lesson is from EO C422.01 (Locate a Geocache).

QUESTIONS:

Q1. What is geocaching?

Q2. When did geocaching originate?

Q3. What equipment is required to geocache?

ANTICIPATED ANSWERS:

A1. Geocaching is a worldwide activity where one person establishes a cache and posts its location for others to find. Participants load the coordinates of the cache into their GPS receiver, and then use it to find the cache.

A2. Geocaching originated in May 2000.

A3. A GPS receiver and geocache coordinates are all that is required to geocache.

OBJECTIVES

By the end of this lesson the cadet shall be able to create a geocache.

IMPORTANCE

It is important for cadets to create a geocache. Cadets who participate in expeditions may come across unique places that they would consider a location many people would enjoy visiting. Being able to establish a geocache will allow others to seek out and find their unique location.

Teaching Point 1 **Identify factors to consider when selecting a container to store a geocache.**

Time: 5 min Method: Interactive Lecture

CHARACTERISTICS OF A GEOCACHE STORAGE CONTAINER

Creating a geocache requires careful planning. The geocache contains items that will have to be stored inside the container and must be able to withstand environmental conditions.

Durability

The type of container used to store a geocache should be based on the location. Considerations should include human traffic and environmental conditions, such as:

- deep cold,
- freezing,
- rapid thawing,
- rain, and
- extreme heat.

The contents of a geocache have to be protected from the environment in a waterproof container. Items can be placed inside a plastic bag within a container that is not waterproof but this is not recommended.

Size

Location can determine the size of a geocache. Urban geocaches are usually smaller, allowing the creator to hide them from the general passerby. Larger geocaches are generally placed in rural or wilderness locations. There is no set size of a geocache, but the standard that has been established reflects the following:

Micro. Tiny in size; roughly the size of a matchbox or 35-mm film canister.

Figure 1 Micro Key Chain Cache

Note. From "Shop Groundspeak," by Groundspeak, 2008, *Micro-Cache Capsule*. Copyright 2000–2008 by Groundspeak, Inc. Retrieved March 18, 2009, from http://shop.groundspeak.com/productDetail.cfm?CategoryID=13&ProductID=47

Small. Large enough to hold a small logbook; similar to the size of a small butter container (250–500 mL) or slightly larger.

Figure 2 Small Cache Stone

Note. From "Shop Groundspeak," by Groundspeak, 2008, *Small Cache Stone*. Copyright 2000–2008 by Groundspeak, Inc Retrieved March 18, 2009, from http://shop.groundspeak.com/productDetail.cfm?CategoryID=13&ProductID=24

Regular. Plastic storage containers and ammo boxes (30–50 cal) are considered regular size. They are able to store most items, large or small, and contain a large log book.

Figure 3 Pelican Cache Container–Medium

Note. From "Shop Groundspeak," by Groundspeak, 2008, *Pelican Cache Container–Medium*. Copyright 2000–2008 by Groundspeak, Inc. Retrieved March 18, 2009, from http://shop.groundspeak.com/productDetail.cfm?CategoryID=13&ProductID=131

Large. This container is the size of a 19-L (5-gallon) bucket or fuel can.

Colour

Containers can be any colour, but since the point of geocaching is to locate a hidden treasure, it is common to have the geocache coloured to blend in with the surrounding environment. Depending on the terrain and vegetation, olive and black are good colours for camouflage.

Figure 4 Geocache Container

Note. From "BB," by BBC, 2005, *Photo Galleries*. Retrieved March 17, 2009, from http://www.bbc.co.uk/wiltshire/content/image_galleries/wiltshire_05_year_in_pixs_gallery.shtml?6

CONTENTS OF A GEOCACHE

Visitor Register

Every geocache contains a visitor register or log. It allows people to record their success in finding the cache and leave a comment for others. The size of the cache will affect the size of the register. The register may be a small scroll or a large notebook. Some cache hiders paste their logo or some other graphic on the cover of the visitor register.

When creating a geocache, seek approval from the unit commanding officer to place the corps crest or logo on the register. If one is not available, seek approval to use the Royal Canadian Army Cadets Corps (RCACC) Crest or the Canadian Cadet Movement (CCM) logo (as illustrated in Figures 5 and 6).

Figure 5 Sample Corps Crest

Note. Created by 2562 Queen Elizabeth Royal Canadian Army Cadet Corps. Retrieved March 17, 2009, from http://2562army.zapto.org

Figure 6 Royal Canadian Army Cadets Crest

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Figure 7 Cadets Canada

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Pen or Pencil

Allows other geocachers to write in the register about their discovery and share their experience with others. Pencils are the best option to place in the geocache as ink will freeze in the cold.

Trinkets or Treasures

These act as a reward for the visiting person. These items should be unique and interesting. They can include pins, medals, coins, pictures, etc. Geocaching is a family sport so put a mix of things that appeal to both young and old participants. There should be no need to continuously replace the trinkets, as geocachers should trade with the contents that have been initially placed in the cache. There is no specific requirement to fill the container with trinkets, but most caches have between 6–12 small items.

Resealable Plastic Bag

The container used should be waterproof but there is always the possibility the container may get damaged or left open. Store items that will be affected by moisture (eg, register, pen and treasures) inside the resealable bag.

If extra space is available inside the geocache container, include a few extra resealable bags in case the ones being used become damaged.

Identifying Information

The cache should have some information that identifies it as a geocache. There are two types of identifying information that can be found at a geocache:

Geocache information sheet. Describes what geocaching is and provides instructions to the finder (as illustrated in Figure 8). The geocaching.com website has this sheet available in a number of different languages. Laminating this sheet is a good idea. Be sure to record the geocache's name and its coordinates.

GEOCACHE SITE–PLEASE READ

Geocache Name:_____

Coordinates:_____

Congratulations, you've found it! Intentionally or not!

What is this hidden container sitting here for? What the heck is this thing doing here with all these things in it?

It is part of a worldwide game dedicated to Global Positioning System (GPS) users, called Geocaching. The game basically involves a GPS user hiding "treasure" (this container and its contents), and publishing the exact coordinates so other GPS users can come on a "treasure hunt" to find it. The only rules are if you take something from the cache, you must leave something for the cache and you must write about your visit in the visitor register. Hopefully, the person who hid this container found a good spot that is not easily found by uninterested parties. Sometimes, a good spot turns out to be a bad spot, though.

IF YOU FOUND THIS CONTAINER BY ACCIDENT:

Great! You are welcome to join us! We ask:

- Please do not move or vandalize the container. The real treasure is just finding the container and sharing your thoughts with everyone else who finds it.
- If you wish, go ahead and take something. But please also leave something of your own for others to find, and write it in the visitor register.
- If possible, let us know that you found it, by visiting the website listed below.

Geocaching is open to everyone with a GPS and a sense of adventure. There are similar sites all over the world. The organization has its home on the Internet. Visit our website if you want to learn more, or have any comments:

http://www.geocaching.com

If this container needs to be removed for any reason, please let us know. We apologize, and will be happy to move it.

Figure 8 Geocache Information Sheet

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Official geocache label. Identifies the container as a geocache. It provides the name of the geocache, contact name and contact information, (as illustrated in Figure 9). It is not required to place this information on the container, but it helps reduce the chances of someone thinking it may be dangerous. It should be placed on the outside of the container, and be visible and waterproof.

Geocaches registered with www.geocaching.com shall have an official geocaching label affixed to it. Contact information and the website with information pertaining to the geocache must be listed.

Figure 9 Official Geocache Label

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What factors should be considered when selecting a geocache container?

Q2. The size of a geocache container sets a limit on what?

Q3. What are some of the items that can be place in a geocache?

ANTICIPATED ANSWERS:

A1. The durability, size and colour are the factors that should be considered when selecting a geocache container.

A2. The size of a geocache container limits the amount of items and treasures that can be placed in the container.

A3. Items that can be placed in a geocache are:

- visitor register,
- pen or pencil,
- trinkets or treasures,
- resealable plastic bag, and
- identifying information.

Teaching Point 2 **Describe geocache locations.**

Time: 10 min Method: Interactive Lecture

GEOCACHE LOCATIONS

A geocache location should offer a unique challenge or experience for the finder. What some might consider an easy cache might present exciting challenges for others. Guidelines exist when determining where geocaches should / should not be located.

The location of a cache defines its success and popularity; location is like marketing—make it appeal to people.

Locations a Geocache Should Be Placed

In the vicinity of a unique feature. Locating a place that has a unique feature will be interesting and attractive to geocachers.

In a location where there is incredible scenery or a gorgeous view. Geocachers enjoy visiting places that have a great view. Not every geocacher is going to look for a difficult challenge; searching for a scenic site with little difficulty will be just as rewarding to some.

In a location that provides a significant challenge. Geocaches that are challenging to find or difficult to get to are popular.

Locations a Geocache Should Not Be Placed

Underground. Covering a geocache with some leaves or branches is okay but burying a geocache is not acceptable. Geocaches are not to be dug up as if they were pirate booty.

Environmentally sensitive areas. Archaeological sites, historic sites and fragile environments are areas that have been deemed out of bounds and should not be disturbed.

National parks or designated wilderness areas. These areas are protected from human traffic. Placing a geocache here is not acceptable in the geocaching community.

Within 46 m (150 feet) of railroad tracks. For safety reasons, geocaches are not to be placed near railroads.

Anywhere that might cause concerns about possible terrorist activities. Since the terrorist attacks in the United States of America (USA), people have become wary of strange objects, containers, and cases. When selecting a site for a geocache, give consideration to what others, who are not playing the game, may think if they come across the cache. Try to avoid placing caches near, on or under public structures. These may include, but are not limited to highway bridges, dams, government buildings, elementary and secondary schools, and airports.

Within 160 m (one tenth of a mile) of another geocache. Placing a geocache in close proximity of another could become confusing over time. Research the location online to determine there is no other geocaches close by. This is geocaching etiquette.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. What makes a geocache attractive for others to visit?

Q2. Where should geocaches not be placed?

Q3. Why should geocaches not be placed near government buildings or public structures?

ANTICIPATED ANSWERS:

A1. Geocachers like to find caches in locations that have some unique features or incredible scenery and that are challenging to navigate.

A2. Geocaches should not be placed:

- underground,
- in environmentally sensitive areas,
- in national parks or designated wilderness areas,
- within 46 m (150 feet) of railroad tracks,
- anywhere that might cause concerns about possible terrorist activities, and
- within 160 m (one-tenth of a mile) of another geocache.

A3. People who do not understand the game may mistake a geocache for something dangerous.

Teaching Point 3 **Identify how to submit a geocache to a website.**

Time: 10 min Method: Interactive Lecture

ACCESSING GEOCACHE WEBSITES

Search the Internet to locate websites that post geocaches. There is no cost associated with most geocache websites. Websites have rules and guidelines to follow when submitting a geocache.

The website www.geocaching.com is one of the most popular geocaching websites.

REGISTERING THE GEOCACHE BY SUBMITTING THE GEOCACHE INFORMATION

Distribute the Stash a Cache Record & Report Form located at Attachment A to each cadet. This is the information a website requires to post a geocache.

Show the cadets the information sheet of the geocache in the local area printed from www.geocaching.com

Log on to a website and begin the process for submitting a cache. The site should guide cadets through the process with an online form about the geocache. The contents of the form will vary from site to site; however, the information below is some of the common information that would be submitted when posting a geocache.

Geocache type. There are many types of geocaches, including traditional (a single container), multi-cache (clues to one or more other caches in a single cache point), virtual (a location that does not have a container), and letterbox (clues are listed instead of coordinates). When submitting information, the type of geocache will have to be identified.

Geocache size. Can be from a micro size (35-mm film canister) to a large size (19-L bucket). Reference the website form and select the size of the geocache.

Nickname. The name of the geocache.

Date placed. Commonly written as mm/dd/yyyy.

Coordinates. The standard system used is latitude and longitude.

When inputting latitude and longitude coordinates and switching to Military Grid Reference System (MGRS), the original coordinates will automatically change.

Location. Lists the province and country.

Difficulty rating. Typically based on a scale from one to five: one being easy and five being hard. The scale is often developed by the host website; when filling out this information, consult their rating system.

Terrain rating. Typically based on a scale from one to five: one being easy and five being hard. The scale is often developed by the host website; when filling out this information, consult their rating system.

Short description. Provides the geocacher with location information, such as terrain, general difficulty levels, and altitudes.

Long description. Provides details about the geocache, including contents and what the container looks like.

Trackable items. These items are placed as treasures. The requirement of the finder is to report online back to the creator of the geocache, and comment that they have located their trackable treasure and will follow up when they place the item in another geocache. The item will continue to get tracked as it is passed from geocache to geocache**.**

MAINTAINING THE GEOCACHE

Servicing a Geocache

Once a geocache has been established it becomes the responsibility of the creator to maintain the cache. This means visiting the cache periodically to verify that it is still there and in the same condition. The cache may need to be resupplied with little trinkets and treasures. If the site seems like it is being disturbed or damaged, consider moving the geocache or removing the geocache entirely. If one determines they no longer want to manage the geocache, it must be entirely removed from the location and the website.

Overseeing Posted Blogs

The geocache created will hopefully be visited by many people. By registering the geocache online, the website(s) will allow visitors to submit a blog (small note) on the geocache visited. It is the responsibility of the geocache creator to ensure the blogs posted are legitimate and to determine if the entry is a true or false report.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. What website is the most popular website for geocaching?

Q2. What does the scale of terrain difficulty explain?

Q3. Who is responsible to maintain a geocache?

ANTICIPATED ANSWERS:

A1. The most popular website for geocaching is www.geocaching.com

A2. The scale of terrain difficulty describes the rating system used to determine how difficult the terrain is when traveling to the geocache; one being easy and five being hard.

A3. The creator of the geocache is responsible to maintain it.

END OF LESSON CONFIRMATION

QUESTIONS:

Q1. What website is the most popular website for geocaching?

Q2. What kinds of items are located inside a geocache?

Q3. In what type of coordinates would a geocache usually be recorded?

ANTICIPATED ANSWERS:

A1. The most popular website for geocaching is www.geocaching.com

A2. The items placed in a geocache should be unique and interesting. They can include pins, medals, coins, and pictures.

A3. The coordinates would usually be recorded in latitude and longitude.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

GPS technology is a very accurate way to navigate from point to point. Geocashing is one of the fastest ways to get real-world experience with a GPS receiver. This sport is a fun and challenging activity that combines modern technologies with outdoor navigation skills.

INSTRUCTOR NOTES / REMARKS

Print a list of local geocaches from a website (eg, www.geocaching.com) illustrating the information from an established geocache.

EO C422.01 (Locate a Geocache) shall be completed prior to conducting this lesson.

Time has not been allocated during this lesson for the cadets to create a geocache. A geocaching activity has been developed as an option in EO C422.06 (Practice Navigation as a Member of a Small Group). Corps are strongly encouraged to use these complementary periods to create and locate geocaches.

REFERENCES

C2-142 ISBN 0-7645-6933-3 McNamara, J. (2004). *GPS for dummies*. Hoboken, NJ: Wiley Publishing, Inc.

Stash a Cache
Record and Report Form

GEOCACHE TYPE	eg, Traditional, Multi or Letterbox.
GEOCACHE SIZE	eg, Micro, Small, Regular or Large.

NICKNAME	

DATE PLACED MM/DD/YYYY	

COORDINATES	Latitude & Longitude Degrees and Minutes N _____ ° _____ `  W _____ ° _____ `	MGRS Grid Zone Designator _____ 100 000-m Square Identifier_____ 10-Figure GR: E_____ N _____

LOCATION	

DIFFICULTY RATING (select one)	1	1.5	2	2.5	3	3.5	4	4.5	5
TERRAIN RATING (select one)	1	1.5	2	2.5	3	3.5	4	4.5	5

SHORT DESCRIPTION	Provide the geocacher with location information, such as terrain, general difficulty levels and altitudes.

LONG DESCRIPTION	Provide details about the cache, including contents of the cache and what the container looks like.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 6

EO C422.03 – DISCUSS MAP SOFTWARE

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-704/PG-001, *Gold 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.

If available, provide an example using a global positioning system (GPS) receiver that is capable of connecting with a computer complete with the manufacturer's software.

If the resources are available, connect to the Internet and access Google Earth. Provide a simulation on how to upload information from a GPS receiver to Google Earth.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for this lesson to introduce the cadet to map software for GPS receivers.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have discussed map software.

IMPORTANCE

It is important for cadets to know that map software is available and GPS receiver units are capable of networking with a computer and web-based software. The combination of map software and GPS receivers has the ability to enhance planning and tracking capabilities. Cadets can plan their route on a computer, review their route with more detail, print usable maps and download prepared routes with waypoints and points of interest (POIs). The ability to perform these functions may allow the cadet to plan and design the navigation component of a day hike or expedition with meticulous scrutiny.

Teaching Point 1 **Describe GPS manufacturer software features.**

Time: 15 min Method: Interactive Lecture

SOFTWARE FEATURES

GPS receiver manufacturers have developed a number of software products that allow the user to access the GPS receiver's map on a computer. The ability to work with the map on a computer allows the cadet to plan and prepare routes and study the terrain along the route.

Every GPS receiver's make and model is typically sold with a different base map (preloaded map that comes with the purchase of a GPS receiver). These maps can be added to commercially available maps / software to upload a different map. This allows new and improvised benefits like increased detail, different styles of maps (eg, topographical, nautical) or updated maps.

Different manufacturers' GPS receivers are similar, but have specific differences that separate one from the other.

The following points identify a GPS receiver's software functions when connected to a computer. Most GPS receivers have these common features:

Setting POIs. Software packages have POIs such as restaurants, stations and geographic features shown on the maps that may be viewed with a computer or GPS receiver. These POIs can be set while using the computer and later downloaded to the receiver for use while travelling along the planned route.

Printing maps on a personal computer. The maps from a GPS receiver with the manufacturer's computer software allow the user to view and print maps, measure distances, and plan trips. The ability to print the map provides a hard copy of the planned route, reducing the requirement to purchase additional maps of the area.

Uploading maps, waypoints, routes and tracks to GPS receivers. One purpose of mapping programs is to upload maps to the GPS receiver. The maps appear in colour and are the same on the computer and the GPS receiver screen, although the GPS receiver displays smaller portions of the map compared to the computer screen. Once a map is uploaded to the computer, waypoints, routes, and tracks can be uploaded from the computer to a GPS receiver. The user can plot several waypoint locations on the computer map and then transfer them to the GPS receiver.

Downloading GPS receiver data to a personal computer. With GPS mapping software, information that has been recorded with the GPS receiver, such as waypoints, routes, and tracks, can be downloaded. This data can then be viewed as an overlay on the maps displayed on the computer or stored on the computer's hard drive for future reference.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What common software features are available for computers and GPS receivers?

Q2. What is the benefit of having the ability to print a map from the computer GPS receiver software?

Q3. What information can be downloaded from a GPS receiver to a computer?

ANTICIPATED ANSWERS:

A1. The common software features available for computers and GPS receivers are options that allow the users to:

- set POIs;
- print maps on a computer;
- upload maps, waypoints, routes and tracks to GPS receivers; and
- download GPS receiver data to a personal computer.

A2. The ability to print the map gives the user a hard copy of the planned route, reducing the requirement to purchase additional maps of the area.

A3. The information that has been recorded with the GPS receiver, such as waypoints, routes, and tracks, can be downloaded. This data can then be viewed as an overlay on the maps displayed on the computer or stored on the computer's hard drive for future reference.

Teaching Point 2 **Describe web-based resources.**

Time: 10 min Method: Interactive Lecture

WEB-BASED RESOURCES

During this TP explain to the cadets how GPS receivers are now being used for many different purposes other than navigation. Allow the cadets to comment and express their experiences and ideas to help develop and support the information presented.

GPS receivers are used for more than just navigation. Entrepreneurs have developed many ways to use a GPS receiver to help with tracking, locating, measuring, and positioning. These applications are available through the Internet.

The Internet provides the GPS receiver user with many sites where they can access and upload their treks. Google Earth is a program provided free by Google (www.google.com) that allows the GPS receiver user to link with the program and upload their trekking history, including start and finish locations, waypoints and POIs. This program then maps out the trek and displays it on a overlay of the map provided by the program. The program is also capable of providing real-time tracking.

Information that is uploaded is surrendered to the website and the data then becomes available for anyone to view and use.

This is just one example of a web-based resource that is available to GPS receiver users. Other web-based resources can be used for:

- pet and animal tracking,
- personal safety locators and trackers,
- theft deterrence devices for automotive vehicles,
- cell phone tracking,

- child monitoring and communications, and
- athletic training tracking.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. What other websites exist for GPS users?

Q2. What can a GPS receiver user do when they access the program Google Earth?

Q3. What other web-based resources exist for GPS receiver users?

ANTICIPATED ANSWERS:

A1. The answers provided will be based on the cadets' experience with web-based resources.

A2. A GPS receiver user can upload their trekking history, including start and finish location, waypoints and POIs. Google Earth maps out the trek and displays it on a overlay of the map provided by the program. The site is also capable of providing real time tracking.

A3. The other web-based resources can be used for:

- pet and animal tracking,
- personal safety locators and trackers,
- theft deterrence devices for automotive vehicles,
- cell phone tracking,
- child monitoring and communications, and
- athletic training tracking.

END OF LESSON CONFIRMATION

QUESTIONS:

Q1. What are three software features of GPS receiver manufacturer software for computers?

Q2. What is the main purpose of mapping programs on a computer?

Q3. What website can be used to interface with a GPS receiver and provide an overlay of a persons trek?

ANTICIPATED ANSWERS:

A1. Three features of GPS receiver manufacturer software for computers can include any of the following:

- set POIs,
- print maps on a computer,
- upload maps, waypoints, routes and tracks to GPS receivers, and
- download GPS receiver data to a computer.

A2. The main purpose of mapping programs on a computer is to upload maps to the GPS receiver.

A3. Google Earth can interface with a GPS receiver.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

GPS receivers have many capabilities. Cadets are able to access the Internet and link the GPS receiver with the computer, uploading information from the GPS receiver to obtain a visual representation and description of the areas travelled. This information can be shared with other cadets who wish to retrace a route that someone has already travelled.

INSTRUCTOR NOTES / REMARKS

Nil.

REFERENCES

C2-142 ISBN 0-7645-6933-3 McNamara, J. (2004). *GPS for dummies*. Hoboken, NJ: Wiley Publishing, Inc.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 7

EO C422.04 – MEASURE A GRID BEARING WITH A PROTRACTOR

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-704/PG-001, *Gold 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.

Photocopy the Steps to Measure a Grid Bearing With a Protractor handout located at Attachment A for each cadet.

Photocopy the Steps to Converting Bearings located at Attachment B for each cadet.

Prepare the topographical map of the area being used. A minimum of four sets of six-figure grid references (GRs) for the start and finish points.

Identify a minimum of four grid bearings and four magnetic bearings to convert.

For the activity in TP 3, select a location, such as a sports field or park, where cadets can march on a bearing for at least 100 paces. From the start point, take a bearing that will allow cadets to march no less than 100 paces in a straight line with the magnetic declination of the compass set at zero, 10° mils west and 10° mils east, safely and within visibility of the start point.

Assistant instructors may be required for this lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to introduce the cadet to the features of a protractor.

A demonstration and performance was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate the skill of measuring grid bearings with a protractor and converting bearings while providing an opportunity for the cadet to practice the skill under supervision.

A practical activity was chosen for TP 4 as it is an interactive way to allow cadets to experience following a magnetic bearing in a safe and controlled environment.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have measured a grid bearing with a protractor.

IMPORTANCE

It is important for cadets to know how to measure a grid bearing with a protractor as it is much more accurate than the compass when measuring grid bearings and it provides the cadet an opportunity to enhance their map and compass skills by using another useful navigation tool.

Teaching Point 1 **Describe the features of a protractor.**

Time: 10 min Method: Interactive Lecture

This TP is to describe the features of the protractor to the cadets. Distribute a protractor to every cadet so they can clearly see each feature and point to each feature as it is described.

Refer to Figure 1 to aid in locating and describing the features of the protractor.

FEATURES OF A PROTRACTOR

The protractor is made of flexible plastic. Its features include:

1. 1 : 50 000 scale romer,
2. 1 : 25 000 scale romer,
3. a hole in each romer for plotting GRs,
4. conversion scale for converting between mils and degrees,
5. graduations in mils (outside edge),
6. graduations in degrees (outside edge),
7. 1 : 50 000 scale for measuring distance,
8. 1 : 25 000 scale for measuring distance,
9. centre lines (vertical and horizontal),
10. a centre hole, and
11. conversion scales for converting units of distance.

The outside of the protractor indicates both degrees and mils.

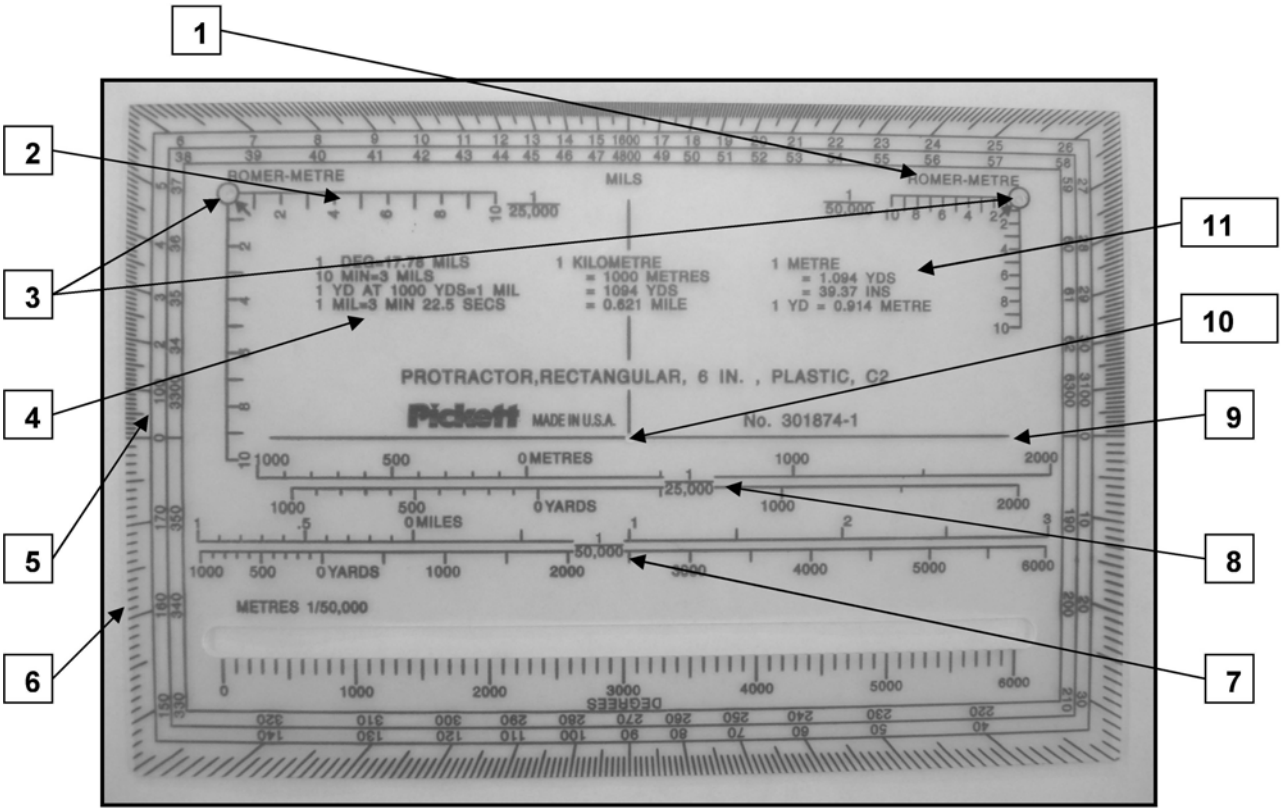

Figure 1 Protractor

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What is the protractor made of?

Q2. How many romers are there on the protractor and where are they located?

Q3. What do the graduations around the outside edge of the protractor show?

ANTICIPATED ANSWERS:

A1. The protractor is made of flexible plastic.

A2. There are two romers: 1 : 25 000 and 1 : 50 000 scale, located at the top left and right hand corners.

A3. The graduations are in mils and degrees.

Teaching Point 2 **Explain, demonstrate and have the cadets measure a grid bearing with a protractor.**

Time: 20 min Method: Demonstration and Performance

For this skill TP, it is recommended that instruction take the following format:

1. Explain and demonstrate the complete skill of how to measure a grid bearing with a protractor while cadets observe, to include:
   a. plotting the six-figure GR start and finish points;
   b. placing the protractor on the map;
   c. aligning the protractor parallel to the eastings; and
   d. reading the grid bearing at the point where the plotting ray crosses the edge of the protractor.
2. Explain and demonstrate each step required to measure a grid bearing with a protractor.
3. Have each cadet practice each step.
4. Have each cadet perform the complete skill.

Distribute a copy of the Steps to Measure a Grid Bearing with a Protractor handout located at Attachment A for each cadet, as a reference.

MEASURE A GRID BEARING WITH A PROTRACTOR

The steps to measuring a grid bearing with a protractor are:

Step 1. Plot the six-figure GR start and finish points by:

- sharpening the pencil that is being used, as this will allow for a more accurate plotting of a bearing;

The line of the plotting ray that is created must be accurate and thin. If the plotting ray is slightly off or thick, it can cause the bearing reading to be off, which can cause the final location to be missed by the navigator.

- identifying, using a romer to create a precise dot, the start GR and marking it as Point A on the map;
- identifying, using a romer to create a precise dot, the finish GR and marking it as Point B on the map;
- drawing a straight line, using the edge of the protractor, starting from Point A and continuing to Point B (This line is called the plotting ray); and
- extending the plotting ray past Point A and B and mark the line with an arrow to indicate the direction of travel. This will make it easier to read the bearing.

The plotting and reading of grid bearings on a map can be done by using either a protractor or a compass; however, the protractor is a more accurate measure.

Figure 2 Step 1 to Measuring a Grid Bearing With a Protractor

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Step 2. Place the protractor on the map by:

- ensuring the centre hole is on the plotting ray and the centre line is over an easting line on the map;
- orienting zero mils to the top of the map (north); and
- ensuring the mils scale is placed east or west of the grid lines, as required.

If the bearing to be plotted is estimated to be between 0 and 3 200 mils, the protractor must be placed so that the mils scale is to the east of the easting line.

If the bearing to be plotted is estimated to be between 3 200 mils and 6 400 mils, the protractor must be placed so that the mils scale is to the west of the easting line.

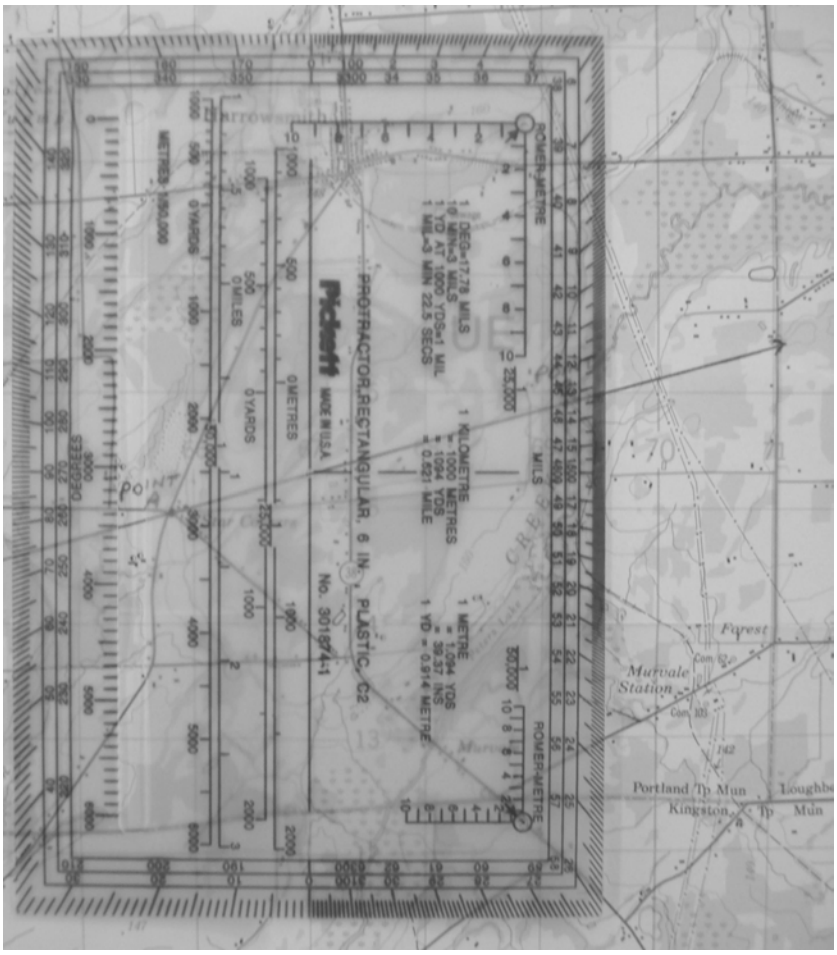

Figure 3 Step 2 to Measuring a Grid Bearing With a Protractor

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Step 3. Align the protractor parallel to the eastings by:

- sliding the centre hole along the plotting ray; and
- matching the vertical line on the protractor with an easting line.

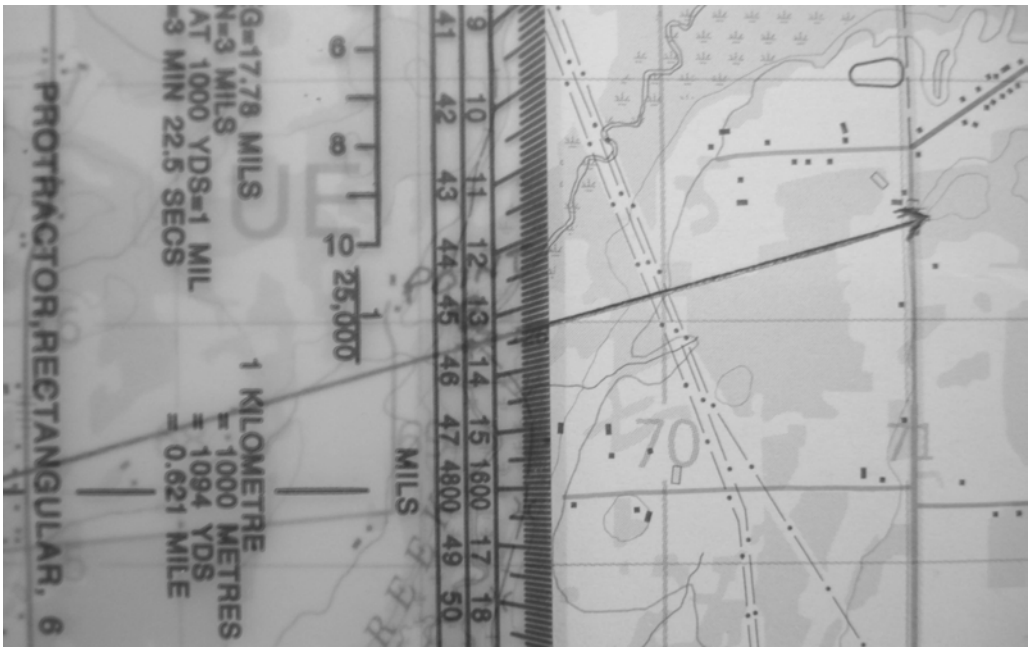

Figure 4 Step 3 to Measuring a Grid Bearing With a Protractor

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Step 4. Read the grid bearing at the point where the plotting ray crosses through the mils graduations on the side of the protractor by:

- finding and reading the grid bearing off the protractor on the mils scale;
- determining which bearing is the correct one; and
- recording the bearing.

By referring to basic knowledge of cardinal points and their mils equivalents, a close estimate of the bearing can be determined prior to plotting and reading the grid bearing.

CONFIRMATION OF TEACHING POINT 2

The cadets' measuring a grid bearing with a protractor will serve as the confirmation of this TP.

Teaching Point 3 **Conduct an activity where the cadets will demonstrate the effects of magnetic declination adjustment.**

Time: 30 min Method: Practical Activity

The magnetic declination correctly set on a compass will help to identify the bearing from one's current location to a prominent object, which will save hours when in the wilderness.

The term magnetic declination is correctly used to identify the difference between true north (axis of the earth) and magnetic north (compass). Because the army rarely uses true north for land navigation, it is common to refer to the difference between grid north (map) and magnetic north (compass), the grid magnetic angle, as magnetic declination.

Magnetic declination is the difference between grid north (map) and magnetic north (compass). It is caused by the different locations of the north of the eastings and the magnetic north pole.

Declination changes due to the constantly shifting magnetic pole. Although this change is ongoing, the variation is minor, therefore only the annual change (change over the course of one calendar year) is calculated.

Where it is necessary to convert from degrees to mils or vice versa when following a bearing, the following conversion factors may be useful.

- 1° = 17.8 mils;
- 1' = 0.3 mils;
- 1 mil = 3.4'

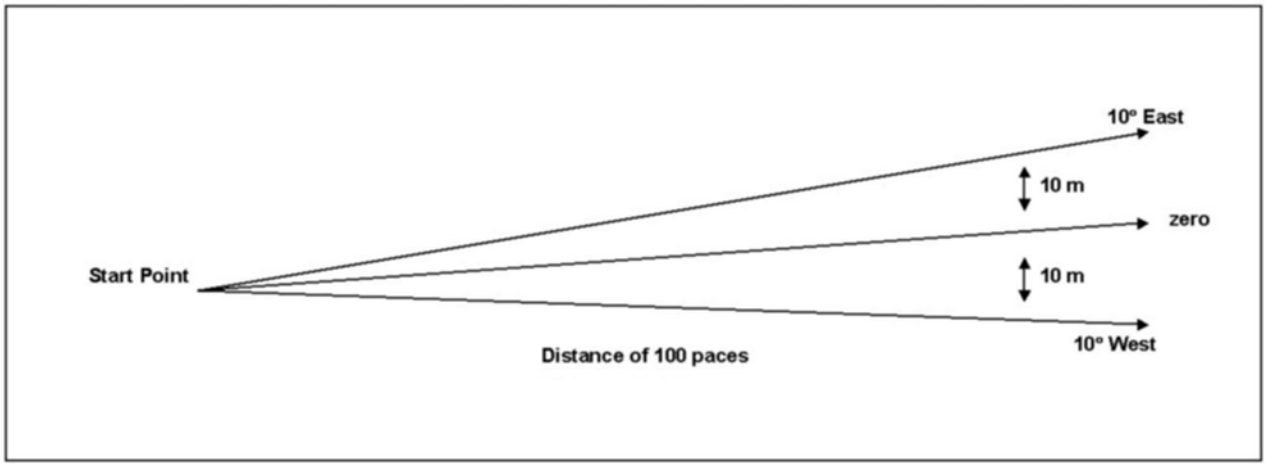

Figure 5 Following a Magnetic Bearing Description

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

ACTIVITY

Time: 25 min

OBJECTIVE

The objective of this activity is to have the cadets demonstrate the effects of magnetic declination by following three different magnetic bearings to determine the importance of calculating the correct magnetic declination on a compass.

RESOURCES

- Topographical map (one per cadet),
- Compass (one per cadet),

- Marker, with flag (one per cadet),
- A predetermined distance, and
- Predetermined magnetic declinations.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a safety briefing.
2. Select three cadets to march on the bearings.
3. Issue each cadet the required resources.
4. Have one cadet follow a bearing for 100 paces with the magnetic declination on the compass set to zero.
5. Have a cadet follow a bearing for 100 paces with the magnetic declination on the compass set to 10 degrees east.
6. Have a cadet follow a bearing for 100 paces with the magnetic declination on the compass set to 10 degrees west.
7. Once the three cadets have marched 100 paces, have them stop and mark the spot with a flagged marker that is visible from a distance and return to the start point.
8. From the start point, have the cadets observe the three points and note the difference. Also inform them that if the cadets were to keep walking, the further they are from the start point, the further apart they would become.

This activity demonstrates that an incorrect magnetic declination set on a compass can affect the final destination when following a bearing.

9. Conduct a debriefing.

SAFETY

Cadets shall be briefed on boundaries.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in demonstrating the effects of magnetic declination when following a magnetic bearing will serve as the confirmation of this TP.

Teaching Point 4 **Explain, demonstrate and have the cadets convert bearings.**

Time: 20 min Method: Demonstration and Performance

For this skill TP it is recommended that instruction take the following format:

1. Explain and demonstrate the complete skill of how to measure a grid bearing with a protractor while cadets observe, to include:
   a. identifying the grid or magnetic bearing;
   b. converting the bearing; and
   c. listing the magnetic or grid bearing.
2. Explain and demonstrate each step required to convert bearings.
3. Have each cadet practice each step.
4. Have each cadet practice the complete skill.

Distribute a copy of the Steps to Converting Bearings handout located at Attachment B for each cadet, as a reference.

Refer to A-CR-CCP-703/PF-001, *Silver Star Instructional Guides*, EO M322.02 (Calculate Magnetic Declination), if further information is required.

Use the pre-determined grid bearings and magnetic bearings when converting.

CONVERT BEARINGS

Bearings taken on a map are grid bearings and bearings taken using a compass to an object on the ground are magnetic bearings. Given the fixed point of reference for these two types of bearings, north, is not the same for grid bearings (map north located at the top of the eastings) and magnetic bearings (magnetic north), there is a requirement to convert the bearings when switching from using a map to using a compass. Some compasses will do this automatically when the magnetic declination is set on the compass. When using compasses without the magnetic declination set or a protractor the bearing will have to be manually converted.

Map users will identify the declination in the marginal information through a declination diagram depicting the true, grid, and magnetic bearing of any line within the area of the map sheet.

The steps to converting a grid bearing to a magnetic bearing are:

1. Calculate the current magnetic declination.
2. Adjust for the magnetic bearing by either adding or subtracting the appropriate angle, which is called the grid magnetic angle (GMA), to / from the grid bearing.

When converting grid bearings to magnetic bearings, the following mathematical formulas are used:

- When the GMA is **west** of Grid North, **add** the magnetic declination to the grid bearing (west is best).
- When the GMA is **east** of Grid North, **subtract** the magnetic declination from the grid bearing (east is least).

Grid magnetic angle is the horizontal angular difference between grid north and magnetic north. This is the number that is applied when converting from magnetic to grid bearings.

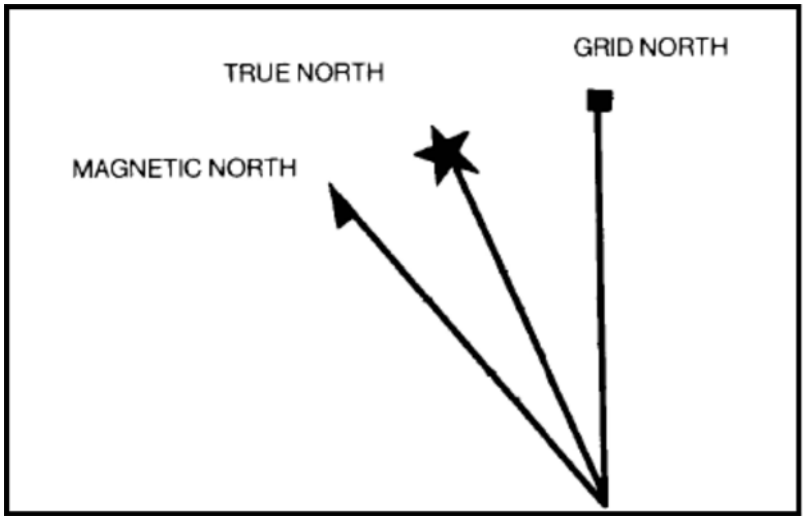

Figure 6 Three Norths

Note. From *Maps, Field Sketching, Compasses and the Global Positioning System* (p. 51), by Canadian Forces, 2006, Ottawa, ON: Department of National Defence.

3. List the magnetic bearing.

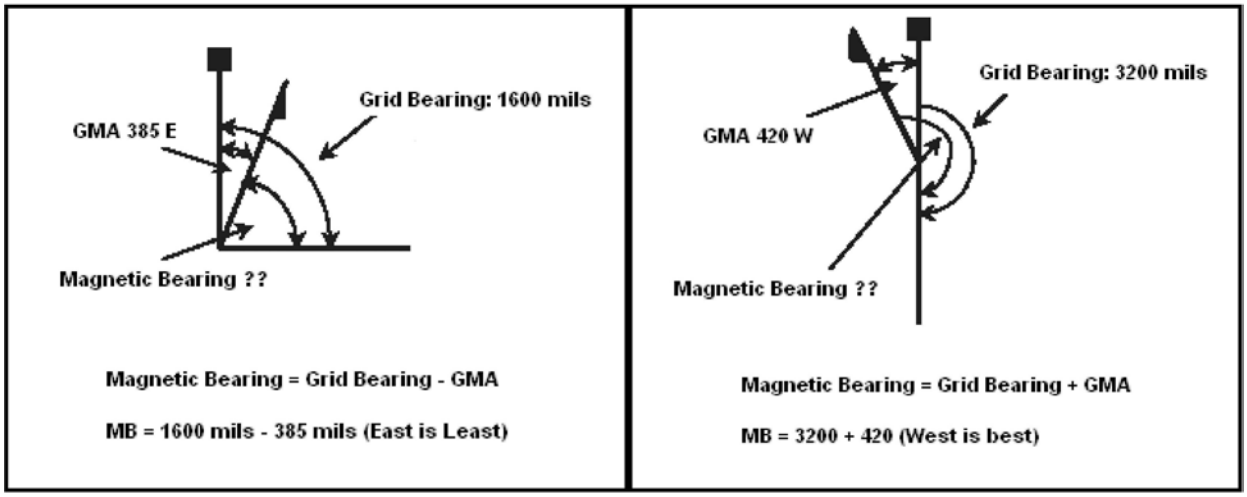

Figure 7 Examples of Converting Grid Bearings to Magnetic Bearings Diagram

Note. From *Land Environmental Training*, by Director Cadets 6 (Personnel, Policy and Training), 2009, Ottawa, ON: Department of National Defence.

The steps to converting a magnetic bearing to a grid bearing are:

1. Calculate the current magnetic declination.
2. Adjust for the magnetic bearing by either adding or subtracting the GMA from the magnetic bearing.

When converting magnetic bearings to grid bearings, the following mathematical formulas are:

- When the GMA is **west** of Grid North, **subtract** the magnetic declination from the magnetic bearing (west is least).
- When the GMA is **east** of Grid North, **add** the magnetic declination to the magnetic bearing (east is best).

3. List the grid bearing.

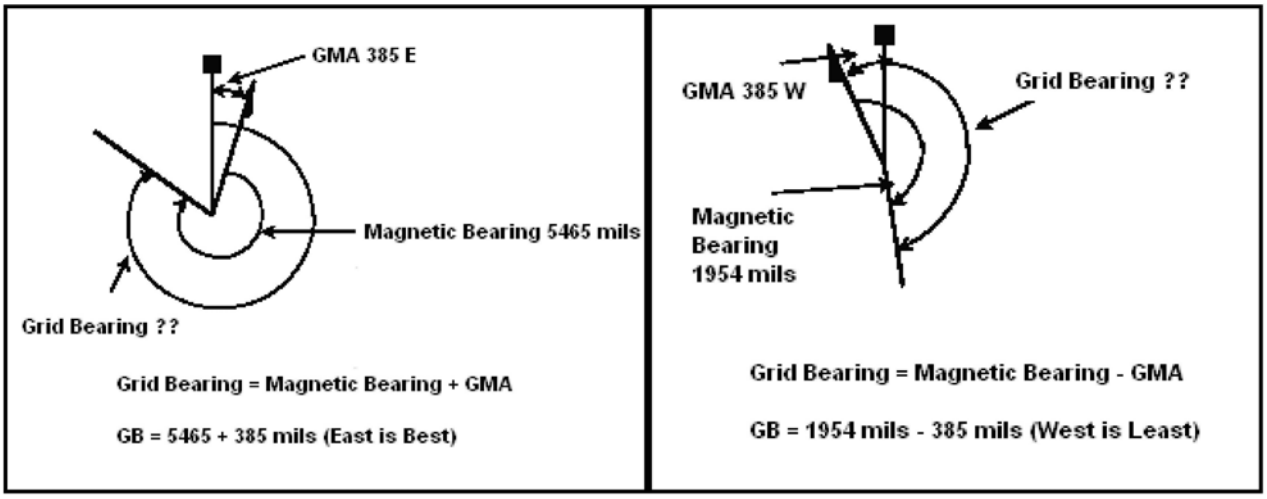

Figure 8 Examples of Converting Magnetic Bearings to Grid Bearings Diagram

Note. From *Land Environmental Training*, by Director Cadets 6 (Personnel, Policy and Training), 2009, Ottawa, ON: Department of National Defence.

Figures 7 and 8 show the relative positions and values of the angles from the information supplied.

It is important to place the bearings in their correct positions relative to each other in accordance with the map information supplied. Once a correct and relative diagram has been made, with the values inserted, the conversion of bearings is straightforward.

Another useful tool is to create a table, Magnetic–Declination–Grid, then add or subtract in the direction referred to by the declination.

Example 1, with all the required information.

Magnetic	Declination	Grid
1725 mils	W 125 mils	1600 mils
For West declination, going west, the mathematical formula for finding the magnetic bearing: 1600 mils + 125 mils = 1725 mils.		

Example 2, the grid bearing is missing.

Magnetic	Declination	Grid
3200 mils	W 250 mils	**?**
If **?** + 250 mils = 3200 mils, then 3200 mils - 250 mils = 2950 mils. The answer is 2950 mils.		

Example 3, the magnetic bearing is missing.

Magnetic	Declination	Grid
?	W 300 mils	6050 mils
If **?** - 300 mils = 6050 mils, then 6050 mils + 300 mils = 6350 mils. The answer is 6350 mils.		

All bearings are measured clockwise from their north point. The magnetic bearing will be greater than the corresponding grid bearing by the amount of the GMA.

CONFIRMATION OF TEACHING POINT 4

The cadets' performance of converting bearings will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' measuring of a grid bearing with a protractor will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Knowing how to measure a grid bearing with a protractor enhances map and compass skills and allows cadets to plot bearings by using another useful tool, while navigating confidently during field training exercises.

INSTRUCTOR NOTES / REMARKS

Topographical maps can be requested through RCSU.

REFERENCES

A2-041 B-GL-382-005/PT-001 Directorate of Army Doctrine 8. (2006). *Maps, field sketching, compasses and the global positioning system*. Ottawa, ON: Department of National Defence.

C2-041 ISBN 0-07-136110-3 Seidman, D., & Cleveland, P. (1995). *The essential wilderness navigator*. Camden, ME: Ragged Mountain Press.

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Steps to Measure a Grid Bearing With a Protractor

The steps to measuring a grid bearing with a protractor are:

Step 1. Plot the six-figure GR start and finish points by:

1. sharpening the pencil that is being used, as this will allow for a more accurate plotting of a bearing;
2. identifying, using a romer to create a precise dot, the start GR and marking it as Point A on the map;
3. identifying, using a romer to create a precise dot, the finish GR and marking it as Point B on the map;
4. drawing a straight line, using the edge of the protractor, starting from Point A and continuing to Point B (This line is called the plotting ray); and
5. extending the plotting ray past Point A and B and mark the line with an arrow to indicate the direction of travel. This will make it easier to read the bearing.

Step 2. Place the protractor on the map by:

1. ensuring the centre hole is on the plotting ray and the centre line is over an easting line on the map;
2. orienting zero mils to the top of the map (north); and
3. ensuring the mils scale is placed east or west of the grid lines, as required.

Step 3. Align the protractor parallel to the eastings by:

1. sliding the centre hole along the plotting ray; and
2. matching the vertical line on the protractor with an easting line.

Step 4. Read the grid bearing at the point where the plotting ray crosses through the mils graduations on the side of the protractor by:

1. finding and reading the grid bearing off the protractor on the mils scale;
2. determining which bearing is the correct one; and
3. recording the bearing.

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Steps to Converting Bearings

The steps to converting a grid bearing to a magnetic bearing are:

1. Calculate magnetic declination.
2. Adjust for the magnetic bearing by either adding or subtracting the appropriate angle, which is called the grid magnetic angle (GMA), to / from the grid bearing.

When converting grid bearings to magnetic bearings, the following mathematical formulas are:

- When the GMA is **west** of Grid North, **add** it to the grid bearing (west is best).
- When the GMA is **east** of Grid North, **subtract** it from the grid bearing (east is least).

3. List the magnetic bearing.

The steps to converting a magnetic bearing to a grid bearing are:

1. Calculate magnetic declination.
2. Adjust for the magnetic bearing by either adding or subtracting the GMA from the magnetic bearing.

When converting magnetic bearings to grid bearings, the following mathematical formulas are:

- When the GMA is **west** of Grid North, **subtract** it from the magnetic bearing (west is least).
- When the GMA is **east** of Grid North, **add** it to the magnetic bearing (east is best).

3. List the grid bearing.

The Magnetic–Declination–Grid table. Add or subtract in the direction referred to by the declination.

Magnetic	Declination	Grid
1725 mils	W 125 mils	1600 mils
For West declination, going west, the mathematical formula for finding the magnetic bearing: 1600 mils + 125 mils = 1725 mils.		

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 8

EO C422.05 – DETERMINE LOCATION USING RESECTION

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-704/PG-001, *Gold 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.

Photocopy the Steps to Determine Location Using Resection handout located at Attachment A for each cadet.

Select a location where three prominent objects are easily identifiable and can be seen both on the map and on the ground. Ensure compasses and topographical maps of the local area are available.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate the skill of determining location using resection while providing an opportunity for the cadet to practice the skill under supervision.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall be expected to determine their location using resection, within +/- 500 m.

IMPORTANCE

It is important for cadets to know how to determine their location using resection as it provides the cadet an opportunity to enhance their map and compass skills. If a cadet is required to find their location and / or report their location, they will be able to do so quickly and effectively.

Teaching Point 1 **Explain, demonstrate and have the cadets determine their location using resection.**

Time: 50 min Method: Demonstration and Performance

This TP demonstrates to the cadet how to determine location using resection. For this skill TP, it is recommended that instruction take the following format:

1. Explain and demonstrate the complete skill of determining location using resection while cadets observe, to include:
   a. calculating the current declination of the topographical map;
   b. setting the current declination on the compass;
   c. locating three prominent objects;
   d. identifying the location of the three prominent objects on the topographical map;
   e. marking the three prominent objects on the topographical map;
   f. determining the magnetic bearing to each prominent object using a compass;
   g. determining the back bearing for each prominent object;
   h. plotting each back bearing on the topographical map; and
   i. determining location based on the intersection of the lines or the centre of the triangle created.
2. Explain and demonstrate each step required to determine location using resection.
3. Have the cadets practice each step.
4. Have the cadets practice the complete skill.

Provide guidance to the cadets as they learn how to determine location using resection.

Distribute a copy of the Steps to Determine Location Using Resection Information Sheet located at Attachment A for each cadet, as a reference.

Refer to B-GL-382-005/PT-001, *Maps, Field Sketching, Compasses and the Global Positioning System*, for further information on determining location using resection.

DETERMINE LOCATION USING RESECTION

In the absence of local details and contours on a map, location can be determined from distant objects such as hilltops, corners of woods, other natural features, or buildings. When determining location using resection, it is better to select three points so that a triangle is formed and the location will be inside the triangle.

The steps to determining location using resection are:

1. Calculate the current declination of the topographical map.
2. Set the current declination on the compass.
3. Locate three prominent objects that can be seen from the current location. The three surrounding points should form a triangle.

Ensure that the three prominent objects are readily identifiable objects that can be seen both on the map and on the ground.

4. Identify the location of the three prominent objects on the topographical map.
5. Mark the three prominent objects on the topographical map.
6. Determine the magnetic bearing to each prominent object using a compass.
7. Determine the back bearing for each prominent object.
8. Plot each back bearing on the topographical map by:
    a. placing the compass on the topographical map, without disturbing the dial setting, so that one side of the base plate intersects the symbol of the object and the compass is pointing in the direction of travel;
    b. keeping an edge of the compass base on the symbol of the object, lining up the meridian lines on the compass with the easting lines on the map by rotating the compass and ensuring that the edge of the compass is always in contact with the prominent object;

Keep the compass meridian lines that are on the bottom of the dial parallel to the eastings on the map, so the orienting arrow points up or north on the map.

    c. drawing a line along the edge of the compass that intersects and extending the line from the symbol of the object, in the direction of the back bearing; and
    d. repeating Steps a–c for the second and third prominent objects.
9. The lines should meet in a small triangle. Determine the location from the centre of the triangle created.

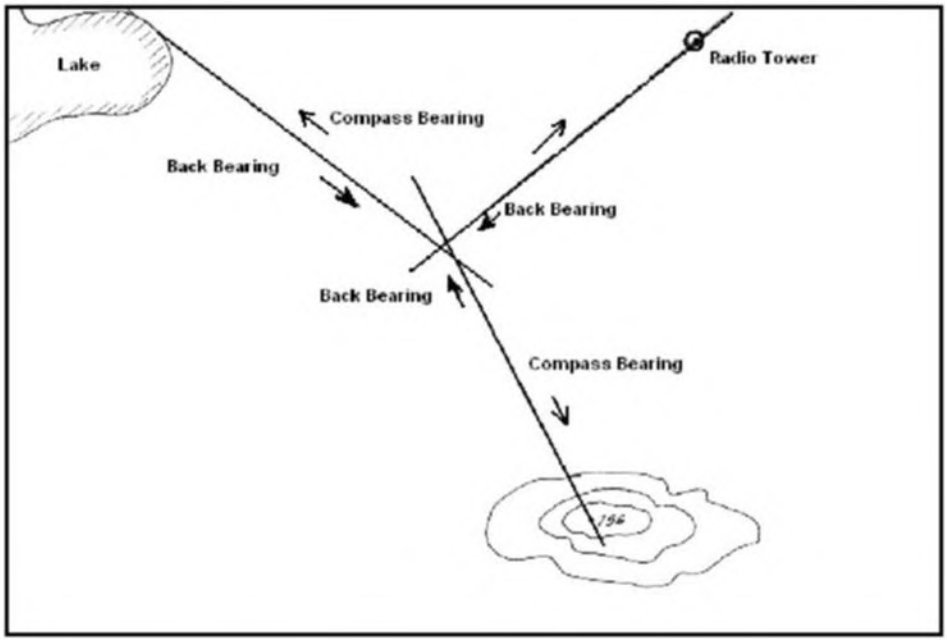

Figure 1 Three-Point Resection

Note. From *Royal Canadian Army Cadet Reference Book* (p. 5-56), by Director Cadets 3, 2003, Ottawa, ON: Department of National Defence.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. In the absence of local detail and contours on a map, what type of objects can be used when determining location using resection?

Q2. When determining location using resection, what are the first two steps that must be completed?

Q3. After completing the resection, what shape has been created and how do you determine your location?

ANTICIPATED ANSWERS:

A1. Answers may vary. Some examples may include hilltops, corners of woods, other natural features, or buildings.

A2. The first two steps are:

1. Calculate the current declination of the topographical map.
2. Set the current declination on the compass.

A3. The lines should meet in a small triangle. Location is then determined from the centre of the triangle created.

END OF LESSON CONFIRMATION

The cadets' determining their location using resection will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Knowing how to quickly and effectively complete a resection will enhance map and compass skills and will allow location to be determined, while navigating during field training exercises.

INSTRUCTOR NOTES / REMARKS

Nil.

REFERENCES

A2-041 B-GL-382-005/PT-001 Directorate of Army Doctrine 8. (2006). *Maps, field sketching, compasses and the global positioning system*. Ottawa, ON: Department of National Defence.

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Steps to Determine Location Using Resection

The steps to determining location using resection are:

1. Calculate the current declination of the topographical map.
2. Set the current declination on the compass.
3. Locate three prominent objects. The three surrounding points form a triangle.
4. Identify the location of the three prominent objects on the topographical map.
5. Mark the three prominent objects on the topographical map.
6. Determine the magnetic bearing to each prominent object using a compass.
7. Determine the back bearing for each prominent object.
8. Plot each back bearing on the topographical map by:
    a. placing the compass on the topographical map, without disturbing the dial setting so that one side of the base plate intersects the symbol of the object and the compass is pointing in the direction of travel;
    b. keeping an edge of the compass base on the symbol of the object, lining up the meridian lines on the compass with the easting lines on the map by rotating the compass and ensuring that the edge of the compass is always in contact with the prominent object;
    c. drawing a line along the edge of the compass that intersects and extending the line from the symbol of the object, in the direction of the back bearing; and
    d. repeating Steps a–c for the second and third prominent objects.
9. The lines should meet in a small triangle. Determine location based on the centre of the triangle created.

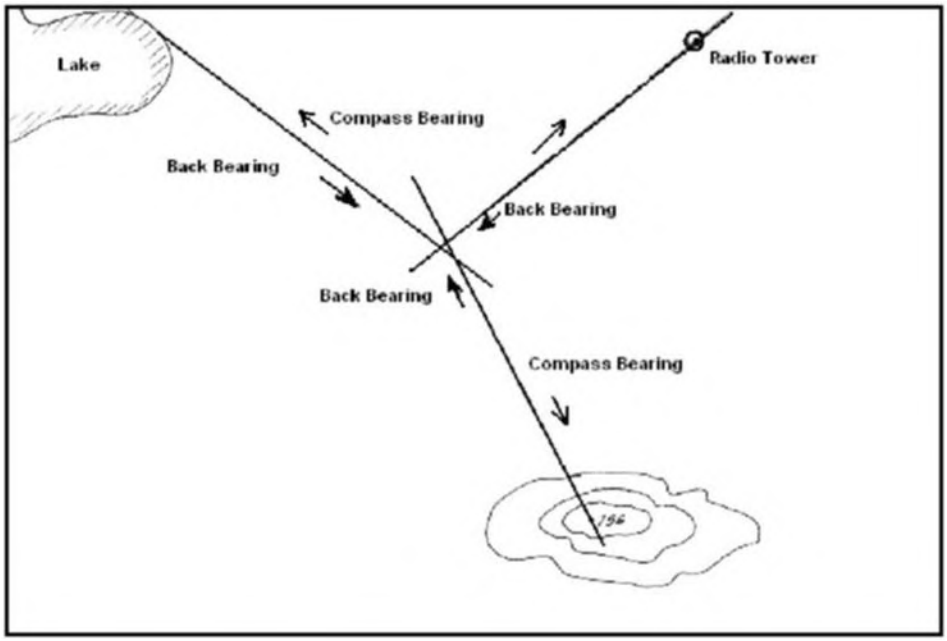

Figure A-1 Three-Point Resection

Note. From *Royal Canadian Army Cadet Reference Book* (p. 5-56), by Director Cadets 3, 2003, Ottawa, ON: Department of National Defence.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 9

EO C422.06 – PRACTICE NAVIGATION AS A MEMBER OF A SMALL GROUP

Total Time: 270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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.

Review the five activity descriptions in TP 1. Select one activity to conduct in the allocated time of 80 minutes. Select a different activity for each session conducted.

Confirm the availability of local resources required for the activity selected and prepare the topographical map of the area and the routes being used, to include grid references (GR) and bearings, prior to delivering this lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A practical activity was chosen for this lesson as it is an interactive way to allow cadets to experience navigation by setting and following a route using a Global Positioning System (GPS) receiver, in a safe and controlled environment. This activity contributes to physical fitness and to the development of navigation skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have practiced navigation as a member of a small group, using a GPS receiver.

IMPORTANCE

It is important for cadets to practice navigation skills using a map, a compass and a GPS receiver. Participation in these activities contributes to the development of navigation skills and knowledge in a fun and challenging setting. Cadets will rely on this skill set throughout navigation and expedition training.

Teaching Point 1 **Have the cadets participate in a navigation activity.**

Time: 80 min Method: Practical Activity

SUPERVISE NAVIGATION

Green / Red Star cadets will be given a map and a compass to conduct a predetermined navigation activity. Green / Red Star cadets will be given directions by a staff member, and the resources required to complete the chosen activity. Gold Star cadets will supervise and assist the Green / Red Star cadets while they participate in a chosen navigation activity. Gold Star cadets will be provided with a GPS receiver to aid in confirming answers, as required.

NAVIGATION BRAIN TEASER

Using a map, a compass and a GPS receiver, Gold Star cadets will navigate to predetermined points on the map. The course will consist of a minimum of four legs, approximately 500–1 000 m in length. Following the clues provided, when each group arrives at the checkpoint, they will record the GR on the GPS receiver (to ensure they were at each checkpoint) and are given clues (magnetic bearing, GR or distance) directing them to another checkpoint. The clues should make the cadets think about and use their navigation skills to find the next checkpoint. The group that locates the most checkpoints and has the fastest time is the winning group.

Input the provided coordinates using a GPS receiver by:

1. confirming that the GPS receiver is set to the correct coordinate system;
2. confirming that the correct map datum is set;
3. marking the start point, using a personalized mark;
4. establishing three Points of Interest (POIs) using a coordinate mark by:
    a. pressing MARK;
    b. moving the arrow joystick to highlight the location field;
    c. pressing ENTER;
    d. using the arrow joystick to adjust the characters in the first line (grid zone designation and 100 000-m square identification) of the location field;
    e. pressing ENTER to move to the second line of the location field;
    f. using the arrow joystick to adjust the characters in the second line (grid reference) of the location field; pressing ENTER;
    g. personalizing the POI, if desired (as detailed in Personalize a Mark, Step 2);
    h. moving the arrow joystick to the save field; and
    i. pressing ENTER;
5. navigating to the main menu screen;
6. scrolling to SELECT A ROUTE;
7. selecting CREATE A NEW ROUTE;

8. adding the POIs;

9. saving the route; and

10. naming the route.

CONSTRUCT A NAVIGATION COURSE

Gold Star cadets will set up a map and compass navigation activity for the Green or Red Star cadets. The navigation activity must allow the cadets an opportunity to practice and review previous navigation lessons and skills.

Gold Star cadets must consider the following guidelines when planning a navigation activity:

- The overall safety of all navigators. Establish clear boundaries for the exercise and give all navigators a safety bearing. A safety bearing will lead them to a safe area like a road or other distinct feature.
- The skill level of the navigators and what skills need to practiced in the navigation activity.
- The type of navigation activity and the resources required for the navigation activity.
- A full reconnaissance of the area should be carried out when planning, ensuring the navigation activity has a start, no more than 10 control points and a finish.
- The first and last controls should be relatively easy to find, as this improves a navigator's confidence and keeps the flow of the course going smoothly.
- Control points must be in a safe location and visible from at least 10 m (33 feet) away.
- Have different routes in and out of a control, as this keeps navigators from finding a control by watching someone else come out of it.
- Set a time limit for the activity to be planned and conducted.
- Position water, first aid and supervisors at key controls in the course. For controls without attending supervisors, establish a method (orienteering punch, sign-up list, etc.) for proving or establishing that a navigator has passed through the control.
- Log the departure and arrival times of navigators so it is known who is still out on the course.
- Brief navigators on safety, rules and safety bearings prior to sending them out on a course. Debrief the navigators after the activity to discover what they learned and how successful the course was.

CATCH A CACHE

Gold Star cadets will be given a map, a compass, a GPS receiver, trinkets and any other information required to navigate to as many geocaches, as they can find in the predetermined time limit. Groups of cadets will seek out the geocaches and upon finding one, fill out the logbook, remove one trinket and replace it with another trinket.

Participate in a geocache search by:

1. receiving all required geocache information for geocaches in the area;

2. setting up the GPS receiver by:

    a. confirming that the correct coordinate system is set; and

    b. confirming the correct map datum is set;

3. creating a POI from a coordinate mark by:
    a. pressing MARK;
    b. moving the arrow joystick to highlight the location field;
    c. pressing ENTER;
    d. using the arrow joystick to adjust the characters in the first line (grid zone designation and 100 000-m square identification) of the location field;
    e. pressing ENTER to move to the second line of the location field;
    f. using the arrow joystick to adjust the characters in the second line (grid reference) of the location field;
    g. pressing ENTER;
    h. personalizing the POI, if desired (as detailed in Personalize a Mark, Step 2);
    i. moving the arrow joystick to the save field; and
    j. pressing ENTER;
4. navigating to the geocache by:
    a. selecting a GOTO route;
    b. choosing the geocache POI;
    c. navigating to the area;
    d. searching the area of the POI for the geocache; and
    e. locating the geocache; and
5. swapping a treasure; and
6. reflecting on the experience as a group.

CREATE OR MAINTAIN A CACHE

Use the Stash a Cache form located at Attachment A of C422.02 (Create a Geocache), when creating each geocache.

Gold Star cadets will either create and setup geocache container(s) by hiding them in the surrounding area and marking their coordinates or maintain an existing geocache. Gold Star cadets will be given a map, a compass and a GPS receiver, trinkets and any other information required to create or maintain the geocaches. If time permits, allow other cadets to seek out the geocaches and upon finding one, fill out the logbook, remove one trinket and replace it with another trinket.

Identify the geocache coordinates by:

1. setting the desired coordinate system;
2. setting the correct datum;

3. recording the coordinates at the location; and
4. describing the geocache's physical location.

Depending on terrain selected and complexity of the navigation instructions, a navigation trail can be as easy or as challenging as you wish to make it.

ACTIVITY

Time: 80 min

OBJECTIVE

The objective of the Supervise Navigation activity is to have the Gold Star cadets supervise and assist the Green / Red Star cadets while they participate in a navigation activity.

RESOURCES

- GPS receiver (one per cadet),
- Whistle (one per cadet), and
- Any other resources required to complete the activity.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a safety briefing, to include an explanation of:
   a. actions to be taken if a cadet becomes lost;
   b. time limits for the activity;
   c. boundaries;
   d. rules and safety procedures for the activity; and
   e. a narrative of the specific activity being conducted.
2. Divide the Gold Star cadets into groups by the number of Green / Red Star cadet groups.
3. Issue each Gold Star group a GPS receiver.
4. Refer to and follow the Green / Red Star cadets' navigation activity instructions for the chosen activity by confirming answers, as required, with a GPS receiver.
5. Have the Gold Star cadets supervise and assist Green / Red Star cadets as they conduct a navigation activity.

6. Conduct a debriefing where the cadets may be asked:

   a. how they felt about the activity;

   b. what they felt they accomplished;

   c. what they would try to improve on if given the opportunity to complete the activity again; and

   d. what they learned about using a GPS with a map.

If available, use an assistant instructor at each checkpoint to answer questions and to prevent groups from following each other or sharing answers.

SAFETY

Cadets shall be briefed on boundaries which must take into account any dangerous obstacles or crossings. If radios are available, each group should be given a radio.

ACTIVITY

Time: 80 min

OBJECTIVE

The objective of the Navigation Brain Teaser activity is to have the cadets, as members of a small group, find as many checkpoints as possible.

RESOURCES

- GPS receiver (one per group),
- Topographical map (one per group),
- Compass (one per group),
- Whistle (one per cadet),
- Paper, and
- A predetermined navigation route with checkpoints.

ACTIVITY LAYOUT

- Clearly mark the start and finish lines.
- Position a clue(s) at each checkpoint to direct the groups to the next checkpoint.

ACTIVITY INSTRUCTIONS

The clues should not be too easy or too hard for the cadets to find each checkpoint. Stagger the clues to prevent groups from following each other or sharing answers.

Examples of this may include:

- having groups enter or leave checkpoints at different directions; and
- having the order of checkpoints different for each group.

1. Conduct a safety briefing, to include an explanation of:
   a. actions to be taken if a cadet becomes lost;
   b. time limits for the activity;
   c. boundaries;
   d. rules and safety procedures for the activity; and
   e. a narrative of the specific activity being conducted.
2. Divide the cadets into groups by the number of GPS receivers available.
3. Issue each group a map, a compass, and a GPS receiver.
4. Give the clue for the first checkpoint to the cadet leading the group.
5. Have the cadet leading the group input their provided coordinates and follow them along a route.
6. Start groups at two-minute intervals and record start times.
7. On a piece of paper, have cadets record clues in the order they complete the checkpoints.
8. Have cadets alternate turns leading the group at least once.
9. Collect sheets and record the finish time for each group.
10. Announce the group that locates the most checkpoints and has the fastest time as the winning group.
11. Conduct a debriefing where the cadets may be asked:
    a. how they felt about the activity;
    b. what they felt they accomplished;
    c. what they would try to improve on if given the opportunity to complete the activity again; and
    d. what they learned about using a GPS with a map.

If available, use an assistant instructor at each checkpoint to give cadets the next clue and answer questions.

SAFETY

Cadets shall be briefed on boundaries which must take into account any dangerous obstacles or crossings. If radios are available each group should be given a radio.

ACTIVITY

Time: 80 min

OBJECTIVE

The objective of the Construct a Course activity is to have the cadets set up a map and compass navigation activity.

RESOURCES

- GPS receiver (one per group),
- Topographical map (one per group),
- Compass (one per group),
- Whistle (one per cadet),
- Any other resources required to complete the activity.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a safety briefing, to include an explanation of:
    a. actions to be taken if a cadet becomes lost;
    b. time limits for the activity;
    c. boundaries;
    d. rules and safety procedures for the activity; and
    e. a narrative of the specific activity being conducted.
2. Have the cadets set up the navigation activity that allows an opportunity to practice and review previous navigation lessons and skills.
3. Conduct the navigation activity, ensuring the guidelines when planning a navigation activity are followed.
4. Conduct a debriefing where the cadets may be asked:
    a. how they felt about the activity;
    b. what they felt they accomplished;
    c. what they would try to improve on if given the opportunity to complete the activity again; and
    d. what they learned about using a GPS with a map.

SAFETY

Cadets shall be briefed on boundaries which must take into account any dangerous obstacles or crossings. If radios are available each group should be given a radio.

ACTIVITY

Time: 80 min

OBJECTIVE

The objective of the Catch a Cache activity is to have the cadets, as members of a small group, locate geocaches.

RESOURCES

- GPS receiver (one per group),
- Geocache coordinates,
- Topographical map of the local area (one per group),
- Whistle (one per cadet),
- Paper, and
- Geocache treasures (eg, pencils, stickers, trinkets).

ACTIVITY LAYOUT

- Identify existing geocaches or create complete geocache containers, hide them in the surrounding area and mark their coordinates.
- Establish a finish time, which may include a point score penalty system for late arrivals.
- Establish a finish location.

ACTIVITY INSTRUCTIONS

To keep things interesting, the difficulty of finding the landmarks should vary.

1. Conduct a safety briefing, to include an explanation of:
   a. actions to be taken if a cadet becomes lost;
   b. time limits for the activity;
   c. boundaries;
   d. rules and safety procedures for the activity; and
   e. a narrative of the specific activity being conducted.

2. Divide the cadets into groups by the number of GPS receivers available.
3. Issue each group the resources required to conduct the activity.
4. Give each group all required geocache information.
5. Have the cadet leading the group input their provided coordinates and navigate to the geocache.
6. Groups may start at the same time or at intervals, depending on the number of groups.
7. On a piece of paper, have cadets record the GR coordinates of each geocache as they find it.
8. Have the cadets alternate leading the group and using the GPS to identify the geocaches.
9. Have the cadets place a trinket in each geocache and record the information in the logbook.
10. Conduct a debriefing where the cadets may be asked:
    a. how they felt about the activity;
    b. what they felt they accomplished;
    c. what they would try to improve on if given the opportunity to complete the activity again; and
    d. what they learned about using a GPS with a map.

SAFETY

Cadets shall be briefed on boundaries which must take into account any dangerous obstacles or crossings. If radios are available each group should be given a radio.

ACTIVITY

Time: 80 min

OBJECTIVE

The objective of the Create a Cache activity is to have the cadets create and set up a geocache(s) or maintain an existing geocache(s).

RESOURCES

- GPS receiver (one per group),
- Compass (one per group),
- Topographical map of the local area (one per group),
- Whistle (one per cadet),
- Paper, and
- Geocache treasures (eg, pencils, stickers, trinkets).

ACTIVITY LAYOUT

- Create complete or maintain existing geocache containers.
- Establish a start and finish location.

ACTIVITY INSTRUCTIONS

1. Conduct a safety briefing, to include an explanation of:
    a. actions to be taken if a cadet becomes lost;
    b. time limits for the activity;
    c. boundaries;
    d. rules and safety procedures for the activity; and
    e. a narrative of the specific activity being conducted.
2. Divide the cadets into groups by the number of GPS receivers and compasses available.
3. Issue each group the resources required to conduct the activity.
4. Have the cadets determine a location for each geocache.
5. Have the cadets record the coordinates of each geocache in their GPS receiver.
6. On a piece of paper, have cadets record the GR coordinates and details of each geocache.
7. Have cadets alternate using the GPS receiver to create or maintain the geocaches, as required.
8. Conduct a debriefing where the cadets may be asked:
    a. how they felt about the activity;
    b. what they felt they accomplished;
    c. what they would try to improve on if given the opportunity to complete the activity again; and
    d. what they learned about using a GPS with a map.

SAFETY

Cadets shall be briefed on boundaries which must take into account any dangerous obstacles or crossings. If radios are available each group should be given a radio.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the navigation activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the navigation activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Navigating using a GPS receiver or a map and compass are skills that can also be used in situations outside the Cadet Program. True proficiency in these skills used during these activities can only be achieved by practicing. These activities allow the cadets the opportunity to develop their navigation skills and knowledge in a fun and challenging setting.

INSTRUCTOR NOTES / REMARKS

If a different GPS receiver is being used for the navigation exercise, refer to the user manual for that receiver.

This EO may be conducted in conjunction with Green and Red Star map and compass practice (eg, EO C122.01 [Practice Navigation as a Member of a Small Group] and EO C222.01 [Practice Navigation Using a Map and Compass]). When the Green and Red Star cadets practice using a map and compass, the Gold Star cadets use the GPS receiver.

This complementary activity can be carried out as nine periods during a supported day or over three sessions of three periods each, to a maximum of nine periods.

If cadets are assigned as team leaders, they will be debriefed on their performance as part of PO 403 (Act as a Team Leader)

Assistant instructors are required for this lesson.

REFERENCES

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 1

EO M424.01 – SHARPEN A SURVIVAL KNIFE

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-704/PG-001, *Gold 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 1–4 to introduce the cadet to a survival knife and how to care for and maintain a survival knife.

A demonstration and performance was chosen for TP 5 as it allows the instructor to explain and demonstrate sharpening a survival knife while providing the cadet the opportunity to practice these skills under supervision.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have sharpened a survival knife with a sharpening stone.

IMPORTANCE

It is important for cadets to know how to sharpen a knife as it is an invaluable asset in the field. In a survival situation, a knife serves a number of purposes such as chopping, cutting, slicing and sawing. Having a sharp knife will allow the cadet to make the necessities they will need to live and thrive in the outdoors.

Teaching Point 1 **Identify types of knives.**

Time: 5 min Method: Interactive Lecture

TYPES OF KNIVES

Knives come in many varieties and serve many purposes, including carving, hunting and survival. This TP will discuss three types of knives that are commonly carried by outdoorsmen.

If possible, have the three types of knives available so the cadet can see the differences between them.

Folding Blade

A folding blade knife connects the blade to the handle through a pivot, allowing the blade to fold into the handle. The blade typically has a locking mechanism to stop the blade from accidentally closing on the user. Some types of locking mechanisms include slip joint, lockback, liner lock, frame lock, and pick lock.

The following are locking mechanisms on a folding blade knife:

- **Slip joint.** Holds the blade in place by a spring device that allows the blade to fold when a certain amount of pressure is applied.
- **Lockback.** Includes a pivoted latch connected to a spring that can be disengaged only by pressing the latch down to release the blade.
- **Liner lock.** Uses a leaf spring-type liner within the groove of the handle that snaps into position under the blade when it is open. The lock is released by pushing the liner to the side, allowing the blade to return to its groove in the handle.
- **Frame lock.** Also known as an integral lock or monolock. This locking mechanism works in a similar manner to the liner lock but uses a partial cut-out of the actual knife handle, rather than a separate liner inside the handle to hold the blade in place.
- **Pick lock.** A round post on the back base of the blade locks into a hole in a spring tab in the handle. To close, manually lift the spring tab off the blade post, or swivel the bolster clockwise to lift the spring tab off the blade post.

Figure 1 Folding Blade

Note. From "R.L. Hammette & Associates", by R. L. Hammette & Associates, 2009, *Lockback Knife*. Copyright 2009 by R.L. Hammette & Associates. Retrieved February 25, 2009, from http://www.hammette.com/knives.htm

Fixed Blade

Tang. The part of the blade that extends into the handle for strength. When the tang of the knife is full, the edge of the entire tang can been seen along the handle. A full tang is a solid piece of steel from tip to butt and is the strongest blade / handle arrangement.

A fixed-blade knife does not fold or slide. The blade is typically stronger due to the tang and lack of moving parts. It is best suited for use as a survival knife. The fixed-blade knife is a simple design; however, custom fixed-blade knives are produced in many different variations.

Figure 2 Fixed Blade

Note. From "Knives Plus Retail Cutlery and Cutlery Accessories Since 1987", by Knives Plus Retail Cutlery Accessories Since 1987, 2008, *Buck Gen 5 Skinner*. Copyright 2001–2008 by Knives Plus, Inc. Retrieved February 26, 2009, from http://www.knivesplus.com/buckknifebu-5rws.html

Multi-purpose

These knives come with many tools that may be useful in a survival situation. Some of these knives have bigger blades making them more suitable as a primary knife. However, these knives may have poor blade locks and small, weak blades, limiting their usefulness as a primary knife.

Figure 3 Multi-purpose Knife

Note. From “Leatherman”, by Leatherman Tool Group, Inc, *Charge ALX*. Copyright 2009 by Leatherman Tool Group, Inc. Retrieved February 26, 2009, from http://www.leatherman.com/multi-tools/full-size-tools/charge-alx.aspx

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CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What three types of knives may be used as a survival knife?

Q2. What type of knife would be best suited as a survival knife?

Q3. What are some of the negative factors that limit the multi-purpose knife as a survival knife?

ANTICIPATED ANSWERS:

A1. Three types of knives that may be used as a survival knife are the folding blade, fixed blade and multi-purpose knives.

A2. The knife that would be best suited as a survival knife is the fixed-blade knife.

A3. A multi-purpose knife can have a small, weak blade combined with a poor blade locking mechanism.

Teaching Point 2 **Describe the parts of a survival knife.**

Time: 5 min Method: Interactive Lecture

During this TP, point out the parts of the survival knife as each one is mentioned.

PARTS OF A KNIFE

A knife is the most common item carried by individuals who enjoy the outdoors and participate in expedition training. Not all knives have all of the parts listed, as it depends on the cost and intended use of the knife. The following parts are listed for a fixed-blade knife:

1. **Blade.** The cutting portion of the knife.
2. **Cutting edge.** The bottom edge of the blade. It can be very sharp and is used to slice, cut and chop.
3. **Tip or point.** Sharp tip of the blade.
4. **Back.** The back edge of the blade, also called the top or spine.
5. **Handle.** Where the user grasps the knife. It is comprised of many components including the bolsters, scales, fittings, sculpting, spacers, pins and tang framework.
6. **Tang.** The piece of the blade that extends into the handle for strength.
7. **Scale or slab.** The material that makes up the knife handle. These can be man-made or natural material such as bone, wood or ivory. Scales are pinned or riveted to the tang.
8. **Butt plate or pommel.** A metal piece at the end or the back of the handle. It is the butt area of the knife.
9. **Pins or rivets.** The hardware that is used to join scale handles to the tang.
10. **Shank.** Consists of the tang and blade. It is the continuous body of the knife.
11. **Spacers.** Material layered between the handle and the hilt or guard of the knife. The spacer is used to adjust the fit of the handle. The material can be any metal, (copper, brass, nickel, silver, or stainless steel) plastic and / or leather.
12. **Hilt.** Can also be referred to as the bolster or guard. It is the cross member attached to the blade and prevents the hand from sliding up onto the blade**.**
13. **Finger grips.** Grooves that are cut or shaped into the handle so that it fits the hand comfortably (as illustrated in Figure 5).
14. **Hollow grind.** The grind of the blade is where the side of the knife is hollowed out. Knives with a hollow grind cut easier, but are not as strong. A hollow grind is also known as the concave bevel (as illustrated in Figure 5).

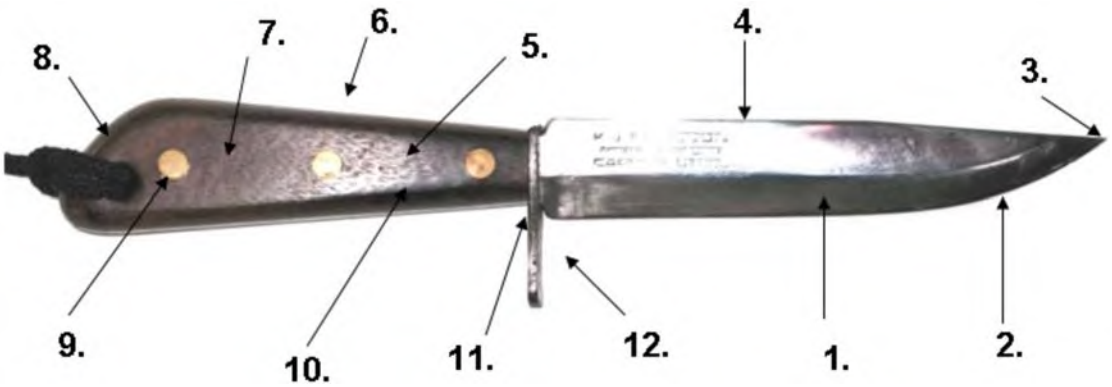

Figure 4 Knife Parts

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Figure 5 Hollow Grind and Finger Grips

Note. From “Foldingknife.com", by Foldingknifepro 2007, *Kalinga Pro*. Copyright 2007 by Foldingknifepro.com. Retrieved March 9, 2009, from http://www.folding knivepro.com/pro1322538.html

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CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. Identify six parts of a survival knife and explain each part.

Q2. What is a shank?

Q3. What is a tang?

ANTICIPATED ANSWERS:

A1. Any six of the following:

- blade,
- cutting edge,
- tip or point,
- back,

- handle,
- tang,
- scale,
- butt plate or pommel,
- pins or rivets,
- shank,
- spacers,
- hilt,
- finger grips, and
- hollow grind.

A2. Shank refers to the tang plus blade, the continuous body of the knife.

A3. Tang refers to the piece of the blade that extends into the handle for strength.

Teaching Point 3 **Describe the characteristics of a survival knife.**

Time: 5 min Method: Interactive Lecture

CHARACTERISTICS OF A SURVIVAL KNIFE

Length of the Blade

The ideal survival knife should have a blade length somewhere between 10–15 cm (4–6 inches). This size of blade offers a good mix of size and control. Anything bigger is bulky and adds to the weight of the survival gear.

Figure 6 Blade Length

Note. From “Knives Plus Retail Cutlery and Cutlery Accessories Since 1987”, by Knives Plus Retail Cutlery Accessories Since 1987, 2008, *Buck Gen 5 Skinner*. Copyright 2001–2008 by Knives Plus, Inc. Retrieved February 26, 2009, from http://www.knivesplus.com/buckknifebu-5rws.html

Width of the Blade

The optimum survival knife will generally have a blade thickness of between 0.4–0.6 cm (5 / 32 to 8 / 32 inches). Any thinner and the blade becomes too flexible; yet thicker blades lack the finesse for the finer work for which survival knives may be used.

Figure 7 Blade Width

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Composition of the Blade

The material of a knife blade will affect the durability and maintenance of the knife. Most blades are made of stainless steel, an alloy that contains chromium to make it corrosion-resistant. Chromium is softer than steel and is blended with stainless steel. Stainless steel blades offer a compromise between rust resistance, edge retention and ease of sharpening.

Numbers marked on the blade (usually a 400 number) indicate the type of alloy used. For example, a marine knife that will be exposed to salt water, salt air and spray is usually made of rust-resistant, high chromium steel such as 420. A blade intended for frequent cutting or food preparation will be harder steel such as 440.

Letters A, B, and C indicate progressively higher levels of carbon and thus harder steel. A harder blade will hold a sharp edge longer, but will be more difficult to sharpen.

The two main types of steel used in making high quality survival knives are:

- **Carbon steel.** Knife blades are tough, can be very sharp, retain their sharp edge fairly well and sharpen with little effort. They have a tendency to be brittle and can break under stress. This blade will rust if not used or cleaned regularly or coated. Carbon steel blades hold an edge better than their stainless steel counterparts.
- **Stainless steel.** Knife blades are rust resistant and work especially well in wet environments. They require less care than the carbon steel knives. Drawbacks to using stainless steel knives are that they tend to be more expensive, are more difficult to sharpen, and may not hold an edge as well.

Some factors a user may want to consider when determining which type of survival knife to use are:

- how the knife will be used;
- how easy it is to sharpen;
- how well it keeps a sharp edge; and
- how susceptible is it to corrosion.

Length of Tang

An optimum survival knife is constructed of one piece of metal (tang) to which there may be slabs of material attached to form a comfortable handle. A full tang is a solid piece of steel from tip to butt and is the strongest blade / handle arrangement. This kind of construction is known in among those who know knives as full tang or narrow tang.

- **Full tang.** The blade merges into the handle (this is the best option and stronger of the two types of tang).
- **Narrow tang.** The size of the blade material is reduced as it enters the handle.

Figure 8 Tang

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Types of Kitchen Knives–Tang*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp#maintaining

Poorly constructed or cheap survival knives are often made so that the metal blade is separate from the handle. This type of construction creates a weak point where the blade and handle may break and separate.

Composition of the Handle

The handle is comprised of many components including:

- bolsters,
- scales,
- fittings,
- spacers,
- pins, and
- tang.

The handle will be made of a specific material such as horn, bone, ivory or some other man-made material(s).

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. What is the recommended blade length for a survival knife?

Q2. What two types of materials make up the composition of the blade?

Q3. What does the letter designation on a blade represent?

ANTICIPATED ANSWERS:

A1. The recommended blade length for a survival knife should be 10–15 cm (4–6 inches).

A2. The two types of material that make up the blade composition are carbon steel and stainless steel.

A3. The letter designation indicates progressively higher levels of carbon and thus harder steel.

Teaching Point 4 **Explain the care and maintenance of a survival knife.**

Time: 5 min Method: Interactive Lecture

CARE AND MAINTENANCE OF A SURVIVAL KNIFE

Practicing Proper Usage

When handling the knife the cadet must practice the following:

- Always cut away from the body, never toward.
- If the knife slips and is dropped, let it fall to the ground. Trying to catch it could cause serious injury.
- Never point or use a knife in the direction of another person.
- Never walk or run around with an open or unsheathed knife.
- Do not throw or place the blade into soil; this will rapidly dull the blade.
- Use the knife in one location and close or sheath the knife before moving.
- Do not use a knife for prying lids open; it may damage the tip of the knife.
- Do not throw a knife to anyone. Hand it to them butt first so the receiver can grasp the handle.

Cleaning

A knife is low maintenance but should be cleaned on a regular basis (using a towel and cotton swabs). If water is used to remove stubborn debris, make sure the knife is completely dry before storage to stop rust from forming. Wiping the knife down with a clean towel and lightly blowing it with a hair dryer, if available, will ensure the knife is completely dry and ready for storage. Lightly wipe the blade with oil two to three times a year to keep rust from forming.

If the knife blade has a blue, grey, or black colour, it is a sign of oxidation and the precursor to rust—clean and oil the knife immediately.

Storing

When storing a knife for a prolonged period of time, keep it in a location that is dry and out of direct sunlight. Ensure the knife is clean before storage and secure it so it will not rub against other items. Do not store in a leather sheath. Leather is a natural material and can harm a blade because it will cause the blade to sweat and attract moisture. The acids soaked into the leather during the tanning process could leach out and damage the knife.

Sharpening

Every knife requires sharpening from time to time. Ideally, a sharpening stone should be used; however, if that is unavailable, any sandstone, such as grey clay, quartz, or granite should be used. Rub two pieces of stone together to make them smooth and follow the sharpening process described later in the lesson.

Never sharpen a knife on a power-driven grinding wheel. This can burn the temper from your blade, which will make the edge brittle and possibly chip or crack.

Figure 9 Sharpening Stone

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Types of Kitchen Knives–Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp#maintaining

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CONFIRMATION OF TEACHING POINT 4

QUESTIONS:

Q1. Identify three guidelines to handling a knife.

Q2. What is a sign that oxidation is beginning to occur on a knife blade?

Q3. How should a knife be stored for a prolonged period?

ANTICIPATED ANSWERS:

A1. Guidelines to handling a knife include:

- Always cut away from the body, never toward.
- If the knife slips and is dropped, let it fall to the ground. Trying to catch it could cause serious injury.
- Never point or use a knife in the direction of another person.
- Never walk or run around with an open or unsheathed knife.
- Do not throw or place the blade into soil; this will rapidly dull the blade.
- Use the knife in one location and close or sheath the knife before moving.
- Do not use a knife for prying lids open; it may damage the tip of the knife.
- Do not throw a knife to anyone. Hand it to them butt first so the receiver can grasp the handle.

A2. If the knife is found to have a blue, grey, or black color, it is a sign of oxidation and the precursor to rust.

A3. When storing a knife for a prolonged period of time, keep it in a location that is dry and out of direct sunlight. Ensure the knife is clean before storage. Do not store a knife in a leather sheath.

Teaching Point 5 **Explain, demonstrate and have the cadets sharpen a survival knife.**

Time: 30 min Method: Demonstration and Performance

For this TP, it is recommended that instruction take the following format:

1. Have the cadets lay out their sharpening stone and knife in front of them.
2. Explain and demonstrate each step to sharpen a survival knife and have the cadets then practice it.
3. Have the cadets continue to sharpen the survival knife after all steps have been observed and practiced.

Note: Assistant instructors may be used to monitor the cadets' performance.

STEPS TO SHARPEN A SURVIVAL KNIFE

For best results use the appropriate sharpening stone. A fine grit stone will be useful for quick touch-ups on blades that are not too dull. For a more thorough sharpening on a blade that is dull, use a heavier coarse grit stone first, then go to the fine grit stone.

1. **Lubricate the sharpening stone.** To prepare the sharpening stone, apply a light-weight oil or water to assist sharpening the blade. The oil or water will allow the knife to glide across the stone with ease and disperse the heat buildup that may affect the temper of the steel. A stone can be used dry but is not recommended.

2. **Lay the sharpening stone on a flat surface.** The sharpening stone should be positioned on a flat surface. This will allow the user to adjust the angle at which they sharpen the knife.

Figure 10 Placement of the Sharpening Stone

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Types of Kitchen Knives–Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

3. **Hold the survival knife by the handle.** Hold the knife firmly by placing the handle in one hand with the index finger on top of the blade and the thumb on the back / spine. The blade should be facing away from the individual. Place the fingers of the other hand along the length of the blade.

Figure 11 Holding the Knife

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Using a Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

4. **Determine the sharpening angle of the knife blade.** Place the edge of the knife on the stone so it is angled at the same bevel (the angle at which the blade is made) as the edge of the knife, which should be at a 20-degree angle. The sharp edge should be facing away from the individual.

Figure 12 Sharpening Angle

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Using a Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

5. **Apply pressure to the blade while pushing it in a circular motion on the sharpening stone.** Start at the tip and grind in a counter-clockwise motion as if cutting a fine sliver off the surface of the stone. Continue to lightly rotate in this circular motion on the stone while gradually moving the length of the blade across the stone, keeping consistent pressure. Grind along the entire length of the blade edge.

   As the knife edge is being sharpened, a slight ridge will form along the edge on the side that is not being sharpened. This ridge indicates that the other side is ready to be sharpened.

Figure 13 Sharpening the Knife

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Using a Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

6. **Turn the survival knife over and sharpen the other side of the knife.** As the knife edge is being sharpened, a slight ridge will form along the edge on the side that is not being sharpened. This ridge indicates that the other side is ready to be sharpened. To detect the ridge, use a fingernail (as illustrated in Figure 14) and run it along the edge of the side of the blade that has not been sharpened. If the fingernail catches the edge, the blade is ready to have the other side sharpened. Be sure to check the ridge in several locations along the length of the blade to ensure the entire blade has been sharpened. If there is a spot that has not been sharpened, go back and sharpen that area again.

Figure 14 Checking the Bevelled Edge

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Using a Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

Once the first side of the knife has been sharpened properly, turn the knife over so the blade edge is facing toward the individual. Hold the knife in the same manner as when sharpening the first side. Now the hand holding the handle will have the forefinger on the spine and the thumb will be on the blade (illustrated in Figure 15).

Begin grinding at the tip in a counter-clockwise direction in the same manner as before. Carefully apply consistent pressure across the blade. When finished grinding the second side, check again for the ridge to have formed. If it has not formed, continue to grind in those areas until the ridge forms.

Figure 15 Sharpening the Reverse Side of the Knife

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Using a Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

7. **Check to ensure the survival knife is sharp.** There are various ways to check the sharpness of the blade, such as:

- rubbing the thumb lightly across the blade perpendicular to the length of the blade;
- cutting a piece of paper, watching to see that the knife slices with ease through the paper—the paper should have a clean cut with no tearing; or
- slicing a piece of fruit—there should be little resistance when slicing the fruit.

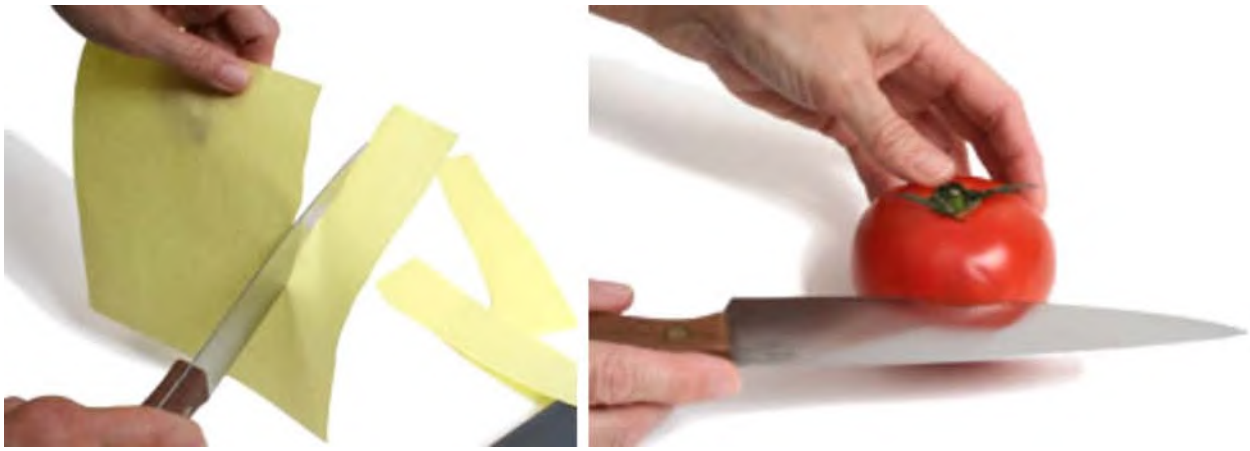

Figure 16 Sharpness Test

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Using a Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

8. **Repeat sharpening on both sides, if required, until desired sharpness is achieved.** Using a fine grit stone, grind the blade edge using the same basic method used with a coarser grit stone. Make four or five counter-clockwise strokes across the stone and turn the blade over and make four or five strokes on the other side. Continue to alternate back and forth in this manner until the blade edge is polished and razor sharp. Repeat until the blade develops the desired sharpness.

9. **Clean the survival knife.** As a knife is sharpened, steel is being filed away, leaving shards or filings on the blade. Once the blade has reached the desired sharpness, wipe or rinse the blade. It is important to remove this leftover material to avoid it from splintering the user's hand or getting into food.

   After the knife is cleaned, wash the sharpening stone(s) with hot soapy water and brush it to remove all debris. Allow the stone to dry completely before storing.

Although using oil is a plausible option, it is suggested to use water when removing dirt and grime from the stone after sharpening is complete.

Figure 17 Cleaning

Note. From "Recipetips.com", by Types of Kitchen Knives, 2009, *Using a Sharpening Stone*. Copyright 2009 by Tecstra Systems. Retrieved February 27, 2009, from http://www.recipetips.com/kitchen-tips/t--1075/types-of-kitchen-knives.asp

CONFIRMATION OF TEACHING POINT 5

The cadets' participation in sharpening a survival knife will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in sharpening a survival knife will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

A survival knife is an important tool. It can help to procure food and materials and help build structures in a survival situation. Prolonged use of a knife will eventually wear down the blade, reducing the blade's ability to cut and slice effectively. Being able to sharpen a survival knife will help create materials in a survival situation.

INSTRUCTOR NOTES / REMARKS

This EO shall be conducted prior to the bivouac field training exercise.

The instructor shall remind the cadet to use the survival knife in a safe manner. Caution the cadet when working the blade on a sharpening stone. If it is dark, make sure a source of light is positioned nearby.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 2

EO M424.02 – EMPLOY THE IMPROVISING PROCESS

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-704/PG-001, *Gold 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.

Select an area that can provide natural items (eg, deadfall, rocks, vines, bushes, cattail, grass) that can be used for improvising.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to review techniques for survival and to generate interest.

A practical activity was chosen for TP 2 as it is an interactive way to introduce cadets to the improvising process. This activity contributes to the development of survival skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have employed the improvising process.

IMPORTANCE

It is important for cadets to learn how to improvise items when in a survival situation. When a cadet determines they are lost, the ability to stop and inspect their immediate surroundings can provide the necessities to improvise items that will allow them to survive while awaiting help. Improvising items can increase the chances of survival.

Teaching Point 1 **Review techniques for survival.**

Time: 5 min Method: Interactive Lecture

Briefly review the survival techniques cadets have learned throughout the Cadet Program—STOP, five elements of survival and the seven enemies of survival.

These techniques will help guide them in a survival situation when applying the improvising process to determine what items should first be created.

THE STOP PROCEDURE

A person can become lost simply by leaving a tent to go to the washroom or by following an incorrect compass bearing on a hike. Once it is determined that one is lost, the best thing to do is to stay in one place, keep calm and try to gather information to determine one's location. It is extremely important to concentrate on making good decisions.

Sit. Sit where you are! Do not panic. Many lost people waste valuable energy and risk injury by panicking—running aimlessly, continuing to travel after dark, or walking in circles. If a lost person decides to wander in an attempt to find their location, in most cases they will move further away, increasing the distance between the known points of their course. This will only increase the size of the search area, increasing the time it will take for a rescue team to locate an individual. During the first 30 minutes of being lost is when people tend to make their biggest mistakes. Making good decisions about the situation involves thinking through options without panicking.

Think. Think about immediate and future dangers and the factors involved in the situation. Consider the time of day, personal physical condition, and the last time water or food was consumed. Try to list the options that are available.

Observe. Observe and listen for the signals of rescuers. Study the immediate environment, determining weather, terrain and resources available. Check the immediate area for a shelter location, fresh drinking water, and for clues of the current location.

Plan. Plan the best course of action. It could be close to dark and consideration should be given to setting up shelter, finding water or starting a fire. A safety bearing could have been provided prior to beginning the activity and consideration should be given to use it or not. Include in the plan how to signal rescuers.

FIVE ELEMENTS OF SURVIVAL

After successfully completing the STOP action and recognizing a survival situation, the lost individual shall take inventory of all the food and equipment on hand and proceed to implement the five elements of survival. These are listed in order of priority.

Attitude. Maintaining a positive attitude is essential. One can survive by staying calm, using all available resources, and prioritizing personal needs.

Shelter. Designed to provide protection from the weather and, depending on the conditions, protect a person from either hot or cold temperatures. Hypothermia and hyperthermia are two of the greatest dangers in a survival situation. A proper shelter can help prevent these from occurring. In a desert scenario, for example, the goal is to stay under a shelter, shaded from the effects of the sun. In cold weather situations, the shelter will provide insulation.

Water. The most essential nutrient for the human body. Even when thirst is not extreme it can dull your mind. Lack of water will slowly degrade the ability to survive. With adequate shelter and water you can survive for weeks.

Fire. In a survival situation, fire provides heat and light, and signals to rescuers. Cold weather not only lowers the ability to think, but it also lowers one's will to do anything. Even a few degrees drop in body temperature can affect the ability to make reasonable decisions.

Food. Individuals in good physical condition can go for many days or even weeks without food. Your goal in a wilderness survival situation is to be located in the shortest time possible, so in most cases you will be located long before food becomes a survival issue. However it is always important to prepare for the worst and find ways to supply the body with substance, through berries, fish, animals, birds, etc.

SEVEN ENEMIES OF SURVIVAL

Cold. More of a threat than most people think. Cold lowers the ability to think and distracts people from doing much more than thinking about getting warm. Because cold slows the body down, it is easy to feel the need to sleep. Cold numbs the mind, the body and the will. Stay moving to try to get warm.

Pain. Nature's way of letting the mind know that something is wrong. The mind can postpone the feeling of pain, if the mind and body are distracted doing something else. Once the mind recognizes pain, it can weaken the drive to survive. It can become overwhelming, even if it is not serious or prolonged. Keep spirits up to postpone the feeling of pain.

Thirst. The hidden enemy of survival. Even when someone has a mild thirst, the mind can feel dull. Like pain and cold, if attention is drawn to it, it can lower the drive to survive. Remember to drink water if it is available and safe. The feeling of thirst can fog the mind. One can become dehydrated even when water is available because they forget to drink or do not force themself to drink. Lack of water leads to dehydration as well as headaches and nausea.

Hunger. The feeling of hunger can affect a person's rational thought. Thirst and hunger can increase the chances of weakening to the effects of cold, pain and fear. This is especially true after three days, when the stomach shrinks and reduces its desire for food.

Fatigue. Even a small amount of fatigue (tiredness) can reduce mental ability. It is easy to become lazy and adopt a careless attitude. Fatigue is one of the biggest dangers to wilderness survival and may be responsible for some deaths. Although there is a real danger of over-exertion, fatigue may be caused by a feeling of hopelessness or frustration. Sleep allows someone to escape from a situation they feel may be too difficult to handle.

Boredom and loneliness. Boredom and loneliness are two of the toughest enemies of survival because they are unexpected. When there is nothing to do, feelings of boredom and loneliness may creep up. Try to find some way to keep occupied. Working on a plan allows one to be constructive while staying busy. Building amenities for the site or something as simple as singing and talking can keep the cadet's mind occupied.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. When stressed about being in a survival situation, what do some people forget to use?

Q2. What are the seven enemies of survival?

Q3. What are the five elements of survival?

ANTICIPATED ANSWERS:

A1. When stressed about being in a survival situation, some people forget to use their common sense.

A2. The seven enemies of survival are cold, pain, thirst, hunger, fatigue and boredom and loneliness.

A3. The five elements of survival are attitude, shelter, water, fire and food.

Teaching Point 2 **Conduct a scenario-based activity where the cadets will employ the improvising process.**

Time: 20 min Method: Practical Activity

BACKGROUND KNOWLEDGE

IMPROVISING PROCESS

Being lost and unaware of one's surroundings can be an uncomfortable and scary situation. It can happen at any time. Even when leaving a campsite to go to the washroom, a person can easily take a wrong turn and find themselves wandering aimlessly in the forest. Improvising can turn an uncomfortable survival situation into one that is more comfortable. With creativity and imagination, anyone can improvise the basic survival necessities, gather food, make shelter and create a source of heat. The only limiting factor is the imagination. This is all possible, it just requires the person to stop, think and follow the improvising process. When working through the improvising process, the following steps will help in making the best choices:

1. **Determine items needed for survival.** When in a survival situation, determine what is required to survive from the most to least important (eg, shelter, food, fire, water).

2. **Identify available resources.** Take inventory of available resources, to include two types of materials—natural and man-made. Man-made items can be anything from a survival knife to the laces in footwear and even the clothes on oneself. Natural items include resources found in the area such as trees, branches, leaves, cattails, etc.

3. **Consider options available.** Think about that what options are available to meet the needs of the situation by remembering the five elements of survival and determining priorities. If there is an injury, the first thing would be to tend to the wound, (eg, a broken or sprained ankle may need to be splinted) to allow one to continue about the site.

4. **Select a survival item to improvise.** Particular factors determine the practicality of an item to improvise. The factors that influence the type of survival item to be improvised include:

    a. **Time.** How much time will be consumed constructing the item? Time is important to survival. As time passes the remaining hours of sunlight diminish. If time is assessed correctly, many improvised items can be created to help prolong survival until help arrives. In the big picture, if an item will take a considerable amount of time to construct, the question needs to be asked: will this benefit the situation?

    b. **Energy.** Will the item benefit the situation if a lot of energy was expended creating it? Choosing to construct an item that consumes considerable amounts of energy without having a source of food to replenish that energy can threaten the chances of survival.

    c. **Materials.** Will the item require man-made or natural materials? These materials may be limited depending on area. Could the materials be put to better use and are the materials being used in an appropriate fashion? This must be considered.

5. **Construct the survival item.** Once it is determined that the item is viable and required, the person can continue with the construction, ensuring that the final product is safe and durable.

Some survival items do not need to be constructed (eg, using a rock as a hammer).

6. **Repeating the process for other survival items.** The process can be repeated to create more survival items. This should continue until found; an idle mind can be devastating to survival.

Items that are common to improvise include:

- bed / layer of comfortable material to rest on,
- cordage,
- cutlery,
- shelters,
- tools,
- traps,
- water carrying devices,
- weapons for hunting, and
- wind and heat reflectors.

ACTIVITY

Time: 20 min

OBJECTIVE

The objective of this activity is to have the cadets employ the improvising process.

RESOURCES

- Natural and man-made items found in the surrounding area, and
- River Folly scenario located at Attachment A.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing to include an explanation of:
   a. the objectives and importance of the activity,
   b. the resources that may be required to perform the activity, and
   c. any safety guidelines that must be followed while performing the activity.

2. Divide the cadets into pairs.
3. Read the River Folly scenario located at Attachment A to the cadets.
4. In pairs, based on the scenario, have the cadets:
   a. determine items needed for survival from most to least important;
   b. identify available resources in the immediate area, to include:
      (1) man-made, and
      (2) natural;
   c. consider options available by:
      (1) referring to the five elements of survival,
      (2) determining what should be improvised first to assist the survival situation;
   d. select a survival item to improvise;
   e. construct the survival item if time permits; and
   f. repeat the process for other survival items.
5. Conduct a debriefing of the activity.

The items improvised should be small and simple given the amount of time available.

SAFETY

Cadets shall be briefed on any boundaries for this activity.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the improvising activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the improvising activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

The improvising process is a method a person can use to help determine a requirement and provide basic constructed materials to aid in a survival situation. This process allows the one to weigh the pros and cons of a particular item before committing materials and resources. Creating improvised items can increase the chances of survival.

INSTRUCTOR NOTES / REMARKS

This EO shall be conducted during the allocated bivouac field training exercise.

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RIVER FOLLY

The cadet corps has planned a three-day canoe trip for senior cadets. The trip covers a total distance of 53 km and includes travel across many lakes, including portages and some white water canoeing. It is late August, the weather at this time of year has normal daytime temperatures between 18–23 degrees Celsius and temperatures overnight between 8–13 degrees Celsius.

It is Day Two, early afternoon of the canoe trip and the group has travelled by canoe on flatwater. The final leg of the day takes the group down a fast moving river with a few Class 2 rapids. The group is required to travel 2 km down the river and complete a final portage to that evening's campsite. All groups are directed to follow the lead canoe, giving ample distance between canoes in case of accidental capsizing.

You and your partner are the third canoe in the chain. As you follow the lead canoes ahead, you see they are turning and rafting in an eddy. Just past the eddy is what appears to be an area of Class 3 rapids—larger rapids than what this group expected today. As you approach the lead canoes, you are directed to raft up in the eddy. However, when turning into the eddy something goes wrong. You feel a sudden rush of cold water engulf your body and you are stunned, as the rushing current pulls you downstream.

You awaken face down on a small rocky beach, pebbles are in your mouth, your face is covered in mud and half your body is still in the water. You feel a slight headache and have a rather sizable lump on your forehead. You instantly assume you must have been knocked unconscious when the canoe capsized and have no idea where you are on the river. You remember in the briefing the instructor informed everyone that this river is over a 100 km long and runs directly into the ocean—you could be anywhere.

Climbing out of the river and to higher ground, you gather your thoughts and assess the situation. You realize you are only left with your personal flotation device (PFD), a wet suit and a knife on your belt. Everything else is missing, including your shoes, helmet and survival kit.

Thinking back to your training, you remember that stern looking warrant officer teaching you about survival factors who told you that if you get lost the first thing you should consider are the techniques for survival including STOP, five elements of survival and the seven enemies of survival.

Well you are lost, you are wet, you have a headache and it is going to be dark in four or five hours. What items can you improvise to help you survive the night while you wait for help?

Scan the surrounding area to see what available natural resources may be employed.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 3

EO M424.03 – WEAVE CORDAGE

INTRODUCTION

OBJECTIVES

By the end of this lesson the cadet shall have weaved cordage from raw materials.

IMPORTANCE

It is important for cadets to be able to weave cordage from natural resources. Possessing this skill makes it easier for the cadet to survive in a survival situation. Cordage has multiple uses that can assist the cadet with combating the seven enemies of survival.

Teaching Point 1	**Identify the uses of cordage.**

Cordage (cord). A long thin flexible material made from several twisted strands—usually thicker than string and finer than rope.

Cordage may be used in many different ways to combat the seven enemies of survival.

USES FOR CORDAGE

One of the most indispensable items in a survival situation is cordage. Some of its common uses include:

- lashing materials together;
- binding materials;
- making snares;
- hanging food;
- hanging items;
- constructing water carrying devices;
- making shelter;
- constructing clothing; and
- sewing items together.

Teaching Point 2	**Identify the characteristics of cordage materials.**

Cordage may be used in a multitude of ways. It is important to ensure that the materials selected meet some basic characteristics. This makes it easier to construct the cordage and to ensure that the final product is of high quality.

CHARACTERISTICS OF CORDAGE MATERIALS

The following characteristics must be considered when selecting cordage materials:

Length of the fibre. The longer the fibre being used, the easier it is to work with. Longer fibres also make cordage stronger as there are fewer weak areas in the cordage where smaller pieces are joined together.

Strength of the fibre. The fibres must be strong enough that they may be pulled apart without breaking. This ensures that when the cordage is being constructed, pieces do not break apart.

Pliability of the fibre. The fibre should be pliable enough to be tied into a knot without breaking.

Pliable. Bending easily / supple.

Availability of grip on the fibre. To assist with making cordage, the fibre should have some grip that allows it to bite into (dig into) other pieces when twisted together. This grip may be caused by ridges on the surface, jagged edges, etc.

The stronger the fibre, the stronger the cordage will be. Some stiff fibres, such as vines, may be made more pliable by steaming or warming them in warm water.

Teaching Point 3	**Explain, demonstrate and have the cadets select cordage materials.**

It is important to understand that it is not the actual raw material—bark, root, vine—that makes it a good selection for making cordage. It is the fibres that make up / come from that piece of raw material.

Think about the fabric that makes up a silk shirt. The fabric is constructed from hundreds of silk fibres that are woven together to make string. The pieces of string are constructed from the leaves of a silk plant that have been separated.

CORDAGE MATERIALS

The following is a list of raw materials that can be used to make cordage:

- trees,
- stalks,
- leaves,
- roots, and

miscellaneous materials, to include:

- rushes / sedges / grasses,
- animal sinew, and
- animal hair.

Trees

The dried inner bark of just about any tree supplies workable material to construct cordage. Some of the best bark comes from the following trees:

- basswood,
- elm,
- walnut,
- cherry,
- aspen,
- cottonwood,
- maple, and
- cedar.

When collecting bark to use for cordage, it is best to look for dead, rather than live trees. The fibrous, inner bark should be pulled off the dead tree in strips that are as long as possible. If there are no dead trees in the area, live trees can be used by stripping the inner bark off the tree and then letting it dry out before use.

Figure 1 Bark Fibres

Note. From "Wildwood Survival", *Cordage*, Copyright 2008 by Walter Muma. Retrieved April 23, 2009, from http://www.wildwoodsurvival.com/survival/cordage/basswood/index.html

If a tree has been down a long time, it may have decayed. Test the fibres to ensure they are not too brittle.

Stalks

The dried inner portion of the stalk of fibrous plants can also be useful in making cordage. Examples include:

- dogbane,
- milkweed,
- velvet leaf,
- wild hemp,
- evening primrose,
- stinging nettles,
- fireweed,
- sagebrush,
- thistle, and
- yucca.

When using stalks to make cordage, the fibrous material can be extracted:

A pithy plant has a spongy inner core, while a non-pithy plant has a hard inner core.

- from pithy plants (eg, dogbane, milkweed, thistle) by pulling off the outside of the stalk in long ribbons (when wet) or when dry by crushing and opening up the stalk, breaking off sections of the woody inner core to get long ribbons of fibres; and

Figure 2 Pulling off the Outside Stalk of a Dogbane

Note. From "Wildwood Survival", *Cordage*, Copyright 2008 by Walter Muma. Retrieved April 23, 2009, from http://www.wildwoodsurvival.com/survival/cordage/dogbane/index.html

- from non-pithy (eg, nettles) plants by soaking the long stems in water for 24 hours, laying them on a piece of wood, pounding them with a smooth stone to shred the outer surface, exposing the fibrous centre and drying the fibrous centre.

Figure 3 Extracting Fibres From the Yucca Stalk

Note. From "Wildwood Survival", *Cordage*, Copyright 2008 by Walter Muma. Retrieved April 23, 2009, from http://www.wildwoodsurvival.com/survival/cordage/syucca/index.html

When selecting plants, look for ones that grow very tall. This makes constructing cordage from the collected fibrous material much easier.

Leaves

The leaves of some plants / trees are very fibrous and may be used to make cordage. Examples include the:

- lily,
- aloe,
- palm,
- cattails, and
- yucca.

When using leaves to make cordage, it is important that the leaves are soaked to remove the flesh, however, leave the fibrous portion.

A leaf may be tested to see if it is fibrous by tearing it apart to see if it separates into stringy layers.

Roots

The surface roots of many trees can be used to make very strong cordage. Roots that run just above or just under the surface of the ground are often the most pliable and strong. The thinner the root, the better it is. Examples of trees with good roots are:

- cedar,
- pine,
- juniper,
- tamarack, and
- spruce.

It is best to gather roots from dead trees. If this is not possible, cut only small sections of root from a variety of trees in the area. This limits damage to trees.

Figure 4 Roots

Note. From "Wildwood Survival", *Cordage*, Copyright 2008 by Walter Muma. Retrieved April 23, 2009, from http://www.wildwoodsurvival.com/survival/cordage/roots/index.html

Miscellaneous Materials

There are a number of other sources of fibrous materials to make cordage. They include:

Rushes / sedges / grasses. These types of items can be found anywhere. They should be used while still green and it is important to remember that as they dry out, their strength diminishes. When selecting rushes, sedges and grasses, choose the longest pieces first.

A sedge is a grasslike plant that grows in wet areas.

Animal sinew. Animal sinew (tendons, ligaments) can be used to create exceptionally strong cordage. The longest sinew is found in the white cords that run along either side of an animal's backbone or attached to muscles and bones. The sinew is cut out, removed from its protective sheath, cleaned, dried, separated into fibres and then placed in hot water just before use to make it pliable.

Animal hair. Animal hair provides an excellent and easy to use source for making cordage—if it can be found. Large amounts, the longer the better, are required to ensure the cordage is strong. Animal hair can be found on trees, the ground and on the carcass of a dead animals.

Teaching Point 4	**Explain, demonstrate and have the cadet construct cordage from the selected materials by wrapping the raw materials into a 1-m (3-foot) long continuous cord.**

The first step in making cordage is to wrap the raw materials that have been gathered into long single strands. To do this:

1. Collect and prepare raw materials, as required (completed in TP 3).

Figure 5 Collecting Raw Materials

Note. From *Tom Brown's Field Guide: Wilderness Survival* (p. 245), by T. Brown, Jr., and Morgan, B., 1983, New York, NY: Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

It is important to ensure the raw material is broken down completely and as much of the fibre as possible is separated from the non-fibrous materials. This can be done by rolling the raw material between the palms of the hands.

2. Decide on the desired width and length of the cordage to be constructed.

For this TP cadets will be required to construct a 1-m (3-foot) long continuous cord.

3. Collect the required amount of raw materials to achieve the width and length desired.

4. Select a bundle of fibres (enough to cover the palm of the hand).

A larger bundle of fibres will not necessarily make the piece of cordage stronger. Stronger cordage is made by combining multiple pieces of wrapped strands.

5. Place the bundle on the top of the upper thigh.

6. Roll the bundle on the thigh, in one direction, using the palm of the hand to wrap the fibres.

Figure 6 Rolling Fibres on the Thigh

Note. From "Wildwood Survival", *Cordage*, Copyright 2008 by Walter Muma. Retrieved April 23, 2009, from http://www.wildwoodsurvival.com/survival/cordage/men79/index.html

It is sometimes easier to wrap fibres when the thigh is damp.

7. Add additional fibres, in small staggered bundles, to one end by spreading and fitting the fibres into each other to create a continuous piece of cordage the desired length.

The rolling wraps the fibres together. The staggering of the new fibres ensures they bind at different intervals along the piece of cordage—making it stronger.

Teaching Point 5	**Explain, demonstrate and have the cadet weave cordage into a 0.5-m (1.5-foot) one-strand braid (simple wrap).**

Once the piece(s) of long continuous cordage has been constructed, the next step in the process is to weave the cordage together. There are multiple ways to weave cordage together—the more strands that are weaved together, the stronger the end product is going to be. The chosen method of weaving will therefore depend on what the cordage is going to be used for. The following weaves, in order of strength with strongest being listed last, can be completed:

- one-strand braid (simple wrap),
- two-strand braid (reverse wrap),
- three-strand braid, and
- four-strand braid.

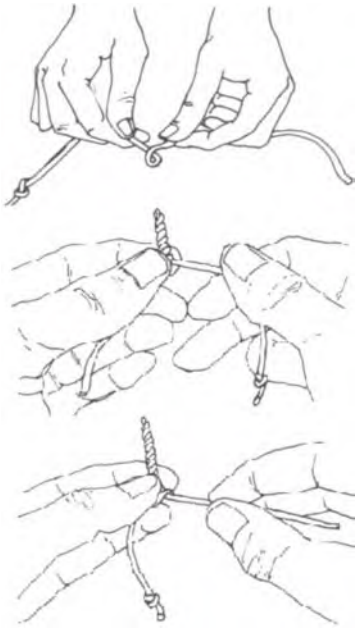

Figure 7 Two-Strand Braid (Reverse Wrap)

Note. From *Tom Brown's Field Guide: Wilderness Survival* (p. 243), by T. Brown, Jr., and Morgan, B., 1983, New York, NY: Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

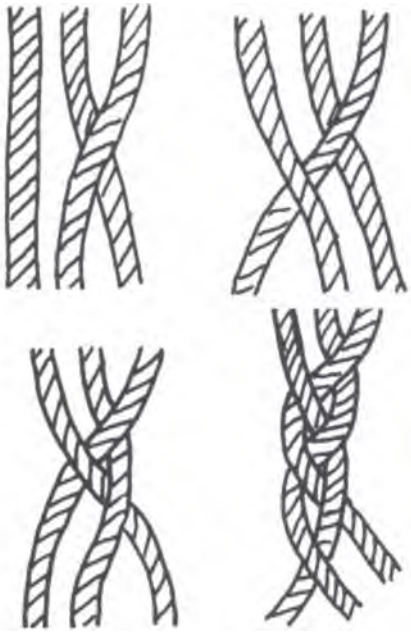

Figure 8 Three-Strand Braid

Note. From *Wilderness Survival* (p. 271), by J. Davenport, 2006, Mechanicsburg, PA: Stackpole Books. Copyright 2006 by Gregory J. Davenport.

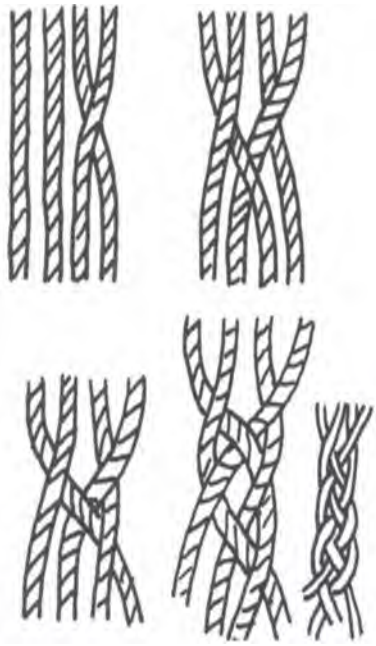

Figure 9 Four-Strand Braid

Note. From *Wilderness Survival* (p. 272), by J. Davenport, 2006, Mechanicsburg, PA: Stackpole Books. Copyright 2006 by Gregory J. Davenport.

The one-strand braid (single wrap) is a quick and easy way to weave cordage that can be used in many different applications where strength is not the primary concern. To execute a one-strand braid (single wrap) use the following process:

1. Hold one end of the cordage between the thumb and forefinger of the non-dominant hand.
2. Roll the cordage with the palm of the dominant hand in one direction on the thigh until tight.

Steps 1 and 2 are the same as Steps 5 and 6 in constructing cordage.

3. Grasp the other end of the cordage.
4. Place the middle of the cordage between the teeth.

Figure 10 Placing Middle of Cordage Between Teeth

Note. From *Tom Brown's Field Guide: Wilderness Survival* (p. 245), by T. Brown, Jr., and Morgan, B., 1983, New York, NY: Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

It is important to ensure that cordage being used was not constructed from poisonous raw materials when placing cordage into mouth.

5. Bring both ends of the cordage tightly together.
6. Hold the ends of the cordage tightly together in one hand.
7. Release the doubled cordage from between the teeth to create the braid (wrap).

Releasing the cordage allows for it to naturally twist around itself to form the braid.

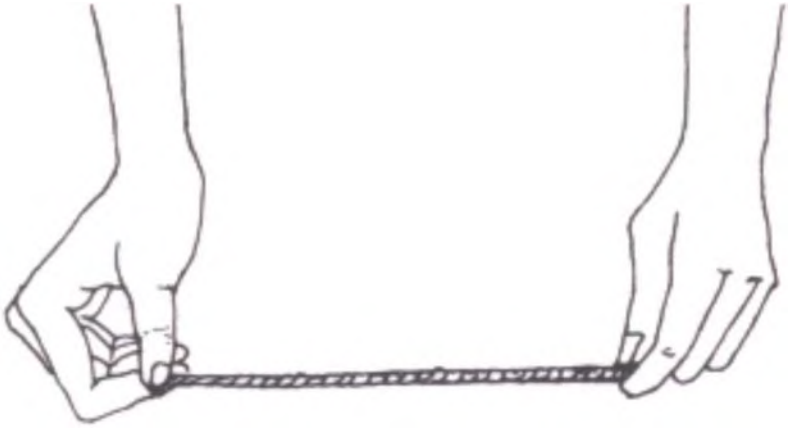

Figure 11 Doubled Cordage

Note. From *Tom Brown's Field Guide: Wilderness Survival* (p. 245), by T. Brown, Jr., and Morgan, B., 1983, New York, NY: Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

8. Tighten the braid (wrap) by twisting it and adjusting the cordage.

Figure 12 Example of Good Braid (Top) and Bad Braid (Bottom)

Note. From *Wilderness Survival* (p. 270), by J. Davenport, 2006, Mechanicsburg, PA: Stackpole Books. Copyright 2006 by Gregory J. Davenport.

9. Tie an overhand knot at the end of the cordage.

Once the braid (wrap) is completed, the length of the cordage has shrunk by at least half. This must be taken into consideration to ensure the length of the final product meets what is required.

Figure 13 Examples of Completed Cordage—Burdock and Hemp

Note. From "Wildwood Survival", *Cordage*, Copyright 2008 by Walter Muma. Retrieved April 23, 2009, from http://www.wildwoodsurvival.com/survival/cordage/finishedcordage.html

CONCLUSION

CLOSING STATEMENT

Being able to weave cordage from raw materials is a skill that will assist a cadet in survival when lost. Cordage may be used in so many different ways, that it is an integral item to have in a survival situation. Applying this skill assists in combating the seven enemies of survival.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 4

EO C424.01 – WHITTLE WOOD

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-704/PG-001, *Gold 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.

Select an area where natural resources for whittling wood may be found.

Collect sticks that are 11–12 cm long for each cadet.

Collect branches and complete Step 1 on the Whittle a Whistle handout located at Attachment A for each cadet.

PRE-LESSON ASSIGNMENT

Nil

APPROACH

An interactive lecture was chosen for TPs 1 and 3 as it introduces the cadet to the craft of whittling wood using a survival knife.

A group discussion was chosen for TP 2 as it allows the cadet to interact with their peers and share their knowledge, experiences, opinions and feelings on the many survival items that may be crafted by whittling wood using a survival knife. Sharing in the discussion encourages the cadet to examine their own thoughts and may prompt them to re-think their previously held ideas. Participating in a group discussion improves the cadet's listening skills and team development.

A practical activity was chosen for TP 4 as it is an interactive way to allow the cadet to whittle wood in a safe and controlled environment. This activity contributes to the development of survival skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have whittled wood.

IMPORTANCE

It is important for cadets to whittle wood so they can learn how to manipulate a survival knife to create useful items. Whittling wood can help a cadet procure food, water and shelter in a survival situation. Whittling wood also keeps the mind occupied while being alone in an environment awaiting rescue.

Teaching Point 1 **Define whittling.**

Time: 5 min Method: Interactive Lecture

To engage the cadets and develop an interest in the topic, present the cadets with the following questions:

1. What is whittling?
2. Who has whittled before? What did you whittle?

WHITTLING

Whittling is described as the art of changing the shape of a piece of wood with the removal of shavings or the cutting of small amounts of wood using a knife or small wedge-edged tool.

To whittle wood:

- hold the survival knife in the dominant hand;
- secure the piece of wood with the non-dominant arm;
- make small precise strokes to remove excess wood and shape the object; and
- adhere to safe knife usage.

Whittling requires no special tools, no special circumstance or any specific type of working environment; just a piece of wood and a knife. True whittling is very simple, the objects are very easily identified, as the knife strokes are plainly visible.

Materials used to whittle are small branches or twigs; however, depending on the size of the item that is desired, a larger piece of wood may be required.

If immediate access to good branches for whittling are unavailable, milled scraps of wood are a fine alternative. Make sure the milled lumber is straight-grained, without knots.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. Define whittling.

Q2. What tools are required to whittle wood?

Q3. What is the main raw material used to whittle?

ANTICIPATED ANSWERS:

A1. Whittling is described as the art of changing the shape of a piece of wood with the removal of shavings or the cutting of small amounts by using a knife or smaller wedge-edged tool.

A2. Whittling does not require any special tools. All that is required is a piece of wood and a knife.

A3. The main raw material to whittle is wood.

Teaching Point 2 **Discuss items that can be whittled out of wood.**

Time: 10 min Method: Group Discussion

The point of the group discussion is to draw the following information from the group using the tips for answering / facilitating discussion and the suggested questions provided.

BACKGROUND KNOWLEDGE

ITEMS THAT CAN BE WHITTLED OUT OF WOOD

There are a number of items that can be whittled out of wood. Imagination and determination are the driving forces and the ideas one comes up with are only limited to a persons creativity. When lost, many items can be created with the survival knife to help with survival. Items that can be whittled out of wood include:

- a walking stick,
- a splint,
- a hunting spear,
- a sling shot,
- a fire poker,
- a whistle, and
- utensils, such as:
    - spoon,
    - spreader,
    - fork, and
    - knife.

TIPS FOR ANSWERING / FACILITATING DISCUSSION:

- Establish ground rules for discussion, eg, everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

SUGGESTED QUESTIONS:

Q1. What purpose does whittling serve in a survival situation?

Q2. What items do you think could be whittled out of wood?

Q3. Of those items considered, what items do you think could be beneficial in a survival situation?

Other questions and answers will develop throughout the group discussion. The group discussion should not be limited to only those suggested.

Reinforce those answers given and comments made during the group discussion, ensuring the teaching points have been covered.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the group discussion will serve as the confirmation of this TP.

Teaching Point 3 **Explain how to whittle wood using a survival knife.**

Time: 10 min Method: Interactive Lecture

Before a cadet can whittle an item, they must first learn how to perform basic cutting strokes.

For basic cutting strokes it is recommended that instruction take the following format:

1. Explain and demonstrate the basic cutting strokes.
2. Explain and demonstrate each step required to complete the strokes.
3. Monitor the cadets' performance as they practice each stroke.

Note: Assistant instructors may be used to monitor the cadets' performance and safety.

IDENTIFY BASIC CUTTING STROKES

The following are ways to cut with a knife:

Straightaway cut. Good for removing a lot of wood or bark quickly. Hold the wood in the non-dominant hand, and using long, firm strokes, cut away from the body with the dominant hand. The dominant hand wrist is locked, and does not bend during the stroke.

Figure 1 Straightaway Cut

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Draw cut. Involves placing the wood in the non-dominant hand and the knife in the dominant hand. Cut toward the body (similar to peeling an apple) with short strokes, using the dominant hand thumb as a brace against the wood. Be sure to keep some wood between the blade and the thumb. It is safer to keep the dominant hand thumb braced on the other thumb, not on top of the wood itself. This decreases the risk of the blade moving into the thumb on its follow-through when it clears the wood.

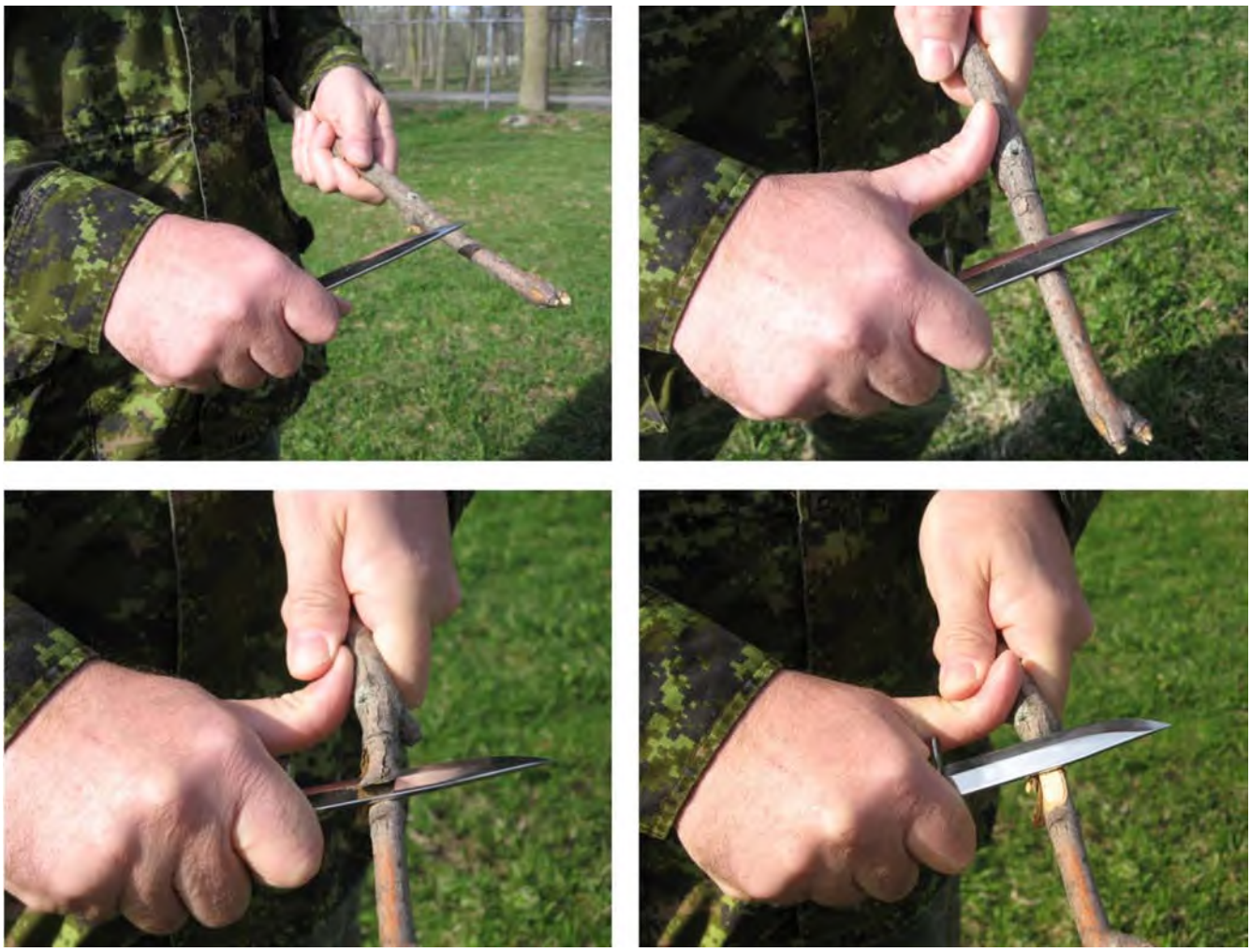

Figure 2 Draw Cut

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Thumb push. Practical for small cuts where precise control is needed and limited cutting is required. Hold the wood in the four fingers of the non-dominant hand, leaving the thumb free. Grip the knife in the dominant hand, keeping the thumb against the back of the blade. With the non-dominant hand thumb, push either the back of the blade or the back of the dominant hand thumb.

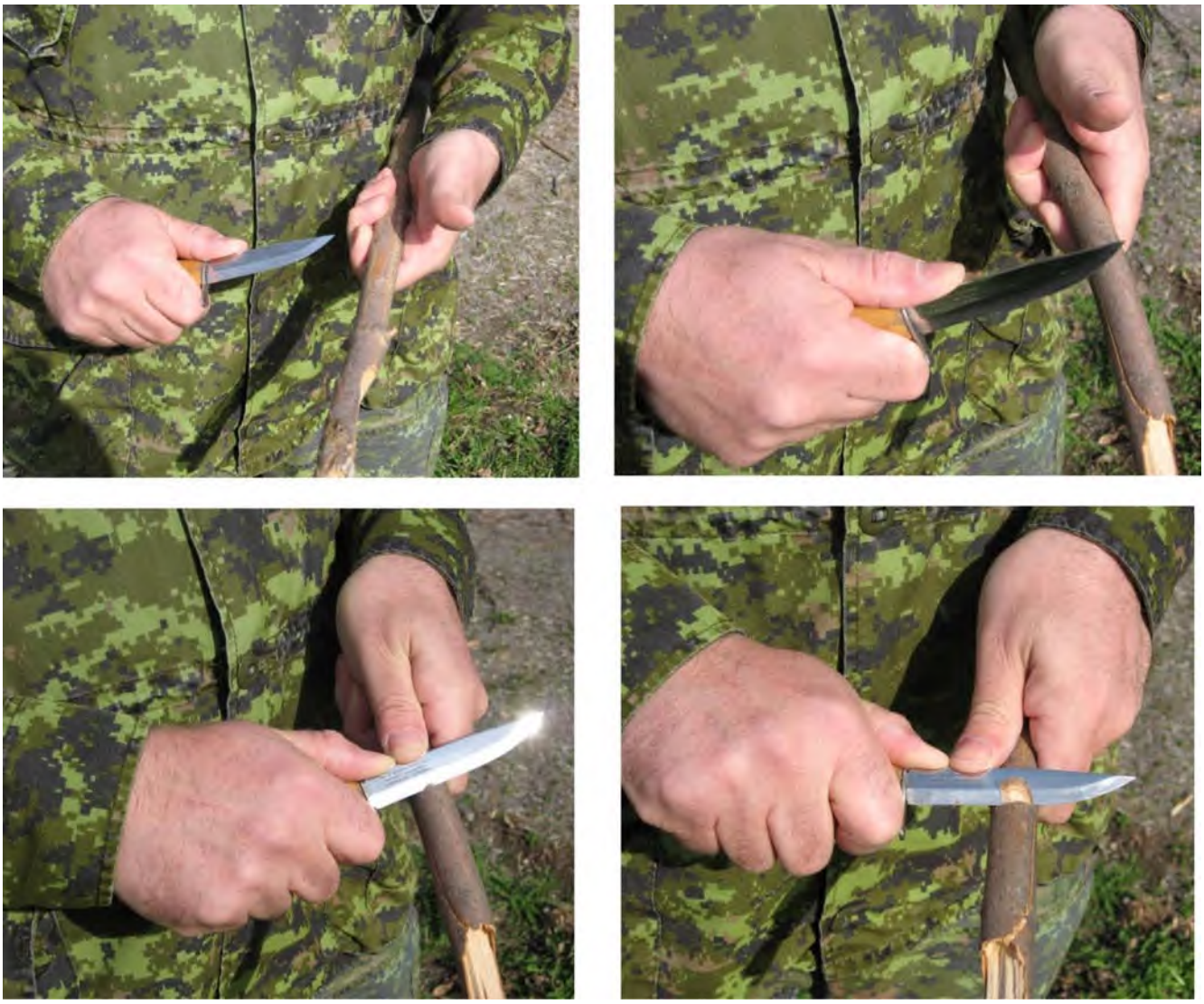

Figure 3 Thumb Push

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Shoulder and latissimus pull. This stroke is among the most powerful, because it slices away from the body and does not require a safety stop to protect the user from the blade. The knife is held in the dominant hand and the wood in the non-dominant hand. The arms are held close to the body so when the two objects meet, the chest provides a leverage point. The knife is held at an angle in the hand such that the stroke leads with the handle and the tip of the blade trails. The slice is powered by the shoulders and the back, but the leverage against the chest also helps power it.

Figure 4 Shoulder and Latissimus Pull

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

IDENTIFY THE WHITTLING PROCESS

To whittle wood, there are specific steps to follow to successfully create an object. Use the following steps when whittling:

In a survival situation, choose an object that is relatively easy to whittle. A difficult object with many curves and angles requires a meticulous approach, increasing the time required to complete the item.

1. **Determine an object to whittle.** The object selected to whittle are determined based on the needs of the individual in the survival situation. When survival items are limited, the survivor will first determine what to whittle based on priority of needs.

Many whittlers believe that a piece of wood will speak to the whittler—that the object already exists imprisoned deep within the wood, and that it is the whittler's job to let it out.

2. **Select a piece of wood.** The piece of wood should be big enough to whittle down, yet small enough to hold comfortably (depending on the object being whittled).

3. **Ensure the survival knife is sharp.** The knife should be extremely sharp. The sharp blade allows the knife to easily slice and cut away pieces of wood. The actions of the blade are predictable with each stroke. A dull blade requires greater amounts of force and can glance off or move suddenly causing an undesired result or injury. Sharpen if necessary.

4. **Mark the outline, if required.** The item to be whittled may require an outline of the design drawn on the piece of wood to be whittled. The outline guides the cadet to cut and chip the correct areas. This is only required on items that may be more difficult or require a precise design to follow. To mark an outline, use a pencil or pen. If those items are not available scrape the outline on the piece of wood.

5. **Whittle the wood into the object.** Once the design is determined, whittle the item out of the wood.

Teaching Point 4 **Explain, demonstrate and have the cadets whittle a whistle using a survival knife.**

Time: 55 min Method: Practical Activity

The whistle is a simple item to whittle out of wood and is a good platform to practice many of the basic cutting strokes, while learning how a simple item can be made from minimal resources. Also, if lost, a whistle could be a key to becoming located by rescuers. This type of whistle would not be chosen in a survival situation, since a drill and wood glue are required.

Provide the cadets with the Whittle a Whistle handout located at Attachment A.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets whittle a whistle.

RESOURCES

- Survival knife (one per cadet),
- One piece of seasoned (dry) wood, approximately 11–12 cm long with the thickness of a broom handle (one per cadet),
- One piece of wood matching the diameter of the drilled hole (one per cadet),

- Wood glue, and
- Whittle a Whistle handout located at Attachment A.

ACTIVITY LAYOUT

Select an area where natural resources for whittling wood may be found.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing to include an explanation of:
   a. the objectives and importance of the activity;
   b. the resources that may be required to perform the activity; and
   c. any safety guidelines that must be followed while performing the activity.
2. Distribute the Whittle a Whistle handout and resources to each cadet.
3. Have cadets whittle a whistle, following the handout procedures step by step.
4. Have the cadets test the whistle.
5. Conduct a debriefing of the activity.

SAFETY

Remind cadets to use the survival knife in a safe manner when whittling wood and avoid whittling toward oneself or in close proximity to others.

CONFIRMATION OF TEACHING POINT 4

The cadets' whittling a whistle will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' whittling a whistle will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Practicing whittling wood with a survival knife in a supervised environment provides an unskilled user with appropriate practices and methods. The survival knife can be a dangerous tool if used incorrectly. Inexperience can cause a serious injury that may threaten survival. Having the skills to manipulate wood keeps one busy in a survival situation, while at the same time creating a useful product.

INSTRUCTOR NOTES / REMARKS

Select an area where natural resources for whittling wood may be found.

The instructor shall remind the cadet to use the survival knife in a safe manner when whittling wood and avoid whittling toward oneself or in close proximity to others.

REFERENCES

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C2-257 ISBN 0-918804-53-1 (1986). *Fine wood working on hand tools*. Newtown, CT: The Taunton Press, Inc.

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WHITTLE A WHISTLE

The following instructions describe how to whittle a whistle from two pieces of wood. Step 1 shall be completed by the instructional staff prior to this lesson. However, this step is provided for the purpose of understanding how the whittling of a whistle is completed.

Resources

- a stick or branch that is approximately 11–12 cm long with the thickness of a broom handle, and
- a stick or branch that is smaller in diameter than that of the previous; however has the diameter slightly greater than the diameter of the drill bit used to drill the hole in the first branch.

Instructions

1. Drill a hole in the thick branch. The branch should be approximately 11–12 cm long with the thickness of a broom handle. Stop before reaching the end, as seen in Figures A-1 and A-2.

Figure A-1 Drill a Hole

Note. From *The Little Book of Whittling*, (p. 90), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

Figure A-2 Drill a Hole

Note. From *The Little Book of Whittling*, (p. 90), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

2. Remove the bark halfway around the hole end of the whistle, as seen in Figure A-3.

Figure A-3 Remove Bark

Note. From *The Little Book of Whittling*, (p. 90), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

3. Round and smooth the end, as seen in Figure A-4.

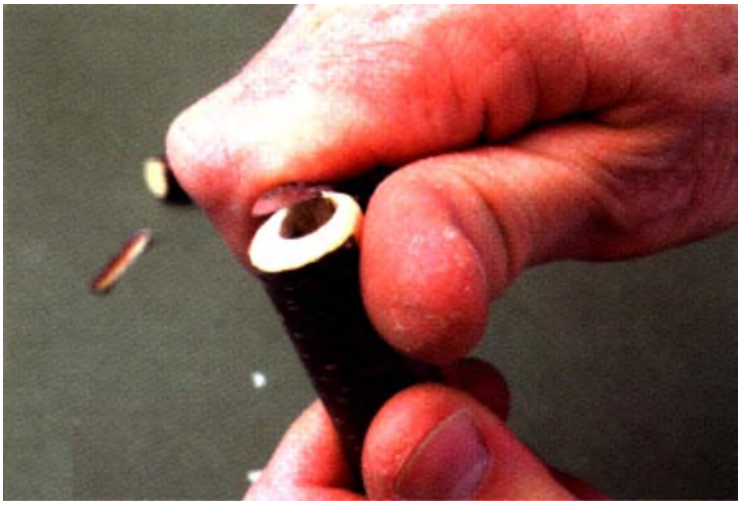

Figure A-4 Rounding

Note. From *The Little Book of Whittling*, (p. 90), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

4. Notch the barked side of the branch with repeated straight and diagonal cuts until about halfway through the drilled hole, as seen in Figure A-5.

Figure A-5 Notching the Stick

Note. From *The Little Book of Whittling*, (p. 91), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

5. Select a smaller branch that has a diameter slightly greater than the diameter of the hole.

Figure A-6 Selecting a Smaller Branch

Note. From *The Little Book of Whittling*, (p. 91), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

6. De-bark the end of the little branch, as seen in Figure A-7.

Figure A-7 Whittling a Dowel

Note. From *The Little Book of Whittling*, (p. 91), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

7. Make the smaller branch end into a small dowel that flattens slightly on one side, as seen in Figure A-8.

Figure A-8 Fitting the Dowel

Note. From *The Little Book of Whittling*, (p. 92), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

8. Fit the dowel piece into the hole, flat side up and reaching to the edge of the hole, as seen in Figure A-9.

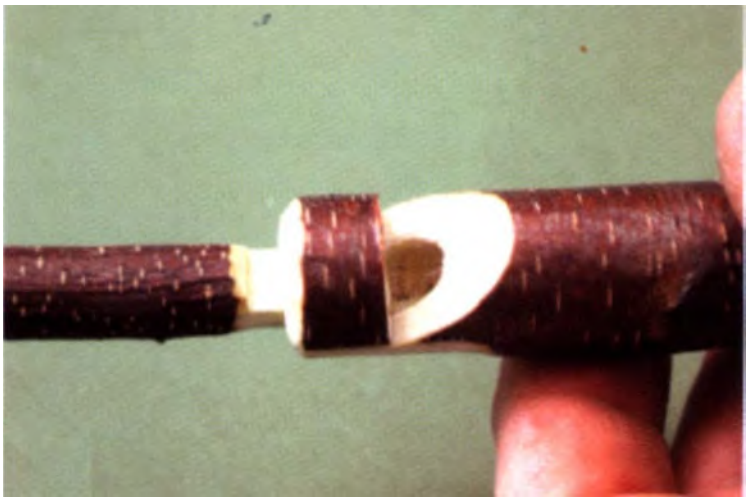

Figure A-9 Fitting the Dowel

Note. From *The Little Book of Whittling*, (p. 92), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

9. Cut the dowel piece flush with the mouthpiece of the whistle, as seen in Figure A-10.

Figure A-10 Cut Dowel

Note. From *The Little Book of Whittling*, (p. 92), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

10. Fill in any cracks with wood glue. Let the glue dry. Once the whistle is dry, test it by blowing the whistle. If the hole is smooth and clean, it should work. Sometimes, the wood may need to dry longer before it will "whistle".

Figure A-11 Glue Cracks

Note. From *The Little Book of Whittling*, (p. 92), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

11. Ensure the whistle looks similar to Figure A-12 and produces a sound when air is blown through the end.

Figure A-12 Finished Whistle

Note. From *The Little Book of Whittling*, (p. 89), by C. Lubkemann, 2005, East Petersburg, PA: Fox Chapel Publishing, Inc. Copyright 2005 by Fox Chapel Publishing Company, Inc.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 5

EO C424.02 – BOIL WATER USING HEATED ROCKS

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-704/PG-001, *Gold 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.

Prepare and light a fire(s) to use in TP 3 a minimum of one hour prior to instructing this lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A group discussion was chosen for TP 1 as it allows the cadets to interact with their peers and share their knowledge, experiences, opinions and feelings on uses of rocks in a survival situation. Sharing in the discussion encourages the cadets to examine their own thoughts and may prompt them to re-think their previously held ideas. Participating in a group discussion improves the cadets' listening skills and team development.

An interactive lecture was chosen for TP 2 as it introduces the cadets to types of rocks and their heating properties.

A practical activity was chosen for TP 3 as it is an interactive way for the cadets to develop skills and knowledge about boiling water using heated rocks in a safe and controlled environment. This activity contributes to the development of survival skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have boiled water using heated rocks.

IMPORTANCE

It is important for cadets to know how natural resources can be used in a survival situation. Rocks can be used in a variety of ways. There are different types of rocks—some of which are more useful than others. Knowing how to boil water using rocks is an extremely beneficial skill, especially when in a survival situation.

Teaching Point 1 **Discuss the uses of rocks in a survival situation.**

Time: 5 min Method: Group Discussion

BACKGROUND KNOWLEDGE

The point of the group discussion is to draw the following information from the group using the tips for answering / facilitating discussion and the suggested questions provided.

USES OF ROCKS IN A SURVIVAL SITUATION

When in a survival situation, there are many uses for rocks.

Insulation

Rocks are able to hold heat very well and can keep a person warm for a long period of time. Placing a heated rock anywhere near the body will help keep it warm during cold days and nights.

One can keep warm while sleeping on the ground by making a rock bed. To make a rock bed, place large, dry, flat stones in a fire pit. Once the stones are hot, remove them and place them in the ground. Cover the area with soil and enjoy. To avoid getting wet, allow time for moisture to evaporate from the ground.

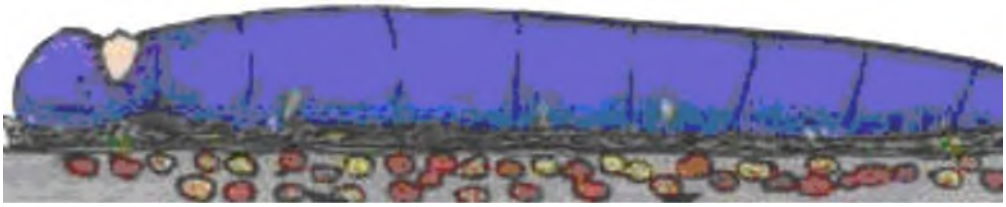

Figure 1 Rock Bed

Note. From *Camping and Wilderness Survival* (p. 417), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

Cooking

Rocks can be used to cook in a variety of ways. A flat rock can be used in much the same way as a grill and hot rocks can be used (along with grass) to steam food. Small game can be cooked by stuffing it with hot stones. It is also possible to bake food in the ground using rocks. They can also be used to cook or heat food.

Figure 2 Stone Grill

Note. From *Camping and Wilderness Survival* (p. 442), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

Figure 3 Baking in the Ground

Note. From *Camping and Wilderness Survival* (p. 451), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

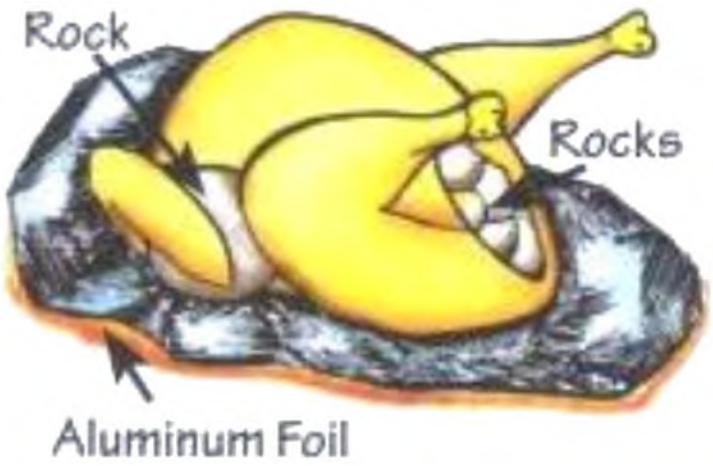

Figure 4 Hot Stone Cooking

Note. From *Camping and Wilderness Survival* (p. 445), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

Trapping Wildlife for Food

Traps are a way to catch food in the field. They should only be used in a survival situation. There are many different types of traps requiring the use of rocks.

Figure 5 Trap Using Rock—Example 1

Note. From *Tom Brown's Field Guide: Wilderness Survival* (p. 179) by T. Brown, Jr. & B. Morgan, 1983, New York, NY: The Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

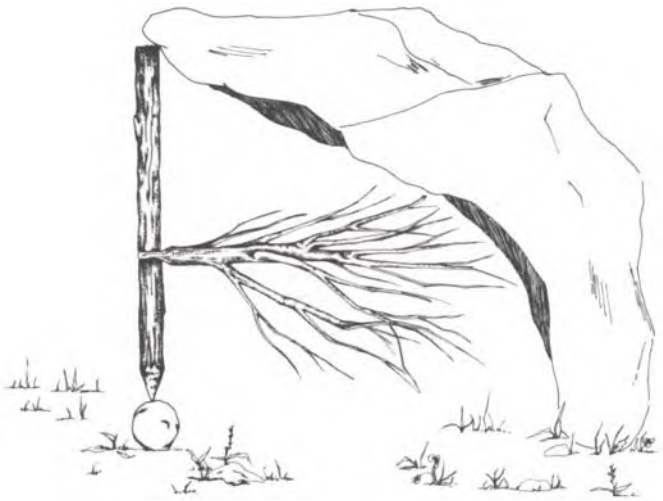

Figure 6 Trap Using Rock—Example 2

Note. From *Tom Brown's Field Guide: Wilderness Survival* (p. 183) by T. Brown, Jr. & B. Morgan, 1983, New York, NY: The Berkley Publishing Group. Copyright 1983 by Tom Brown, Jr.

Building Shelter

A big rock (eg, a cave) will provide a permanent shelter. To increase the height and size of a shelter, as well as keep out rain and wind, build a stone barrier. Rocks can also be used to add weight to a shelter made with a groundsheet or tarp as a way to ensure wind, rain and animals do not enter.

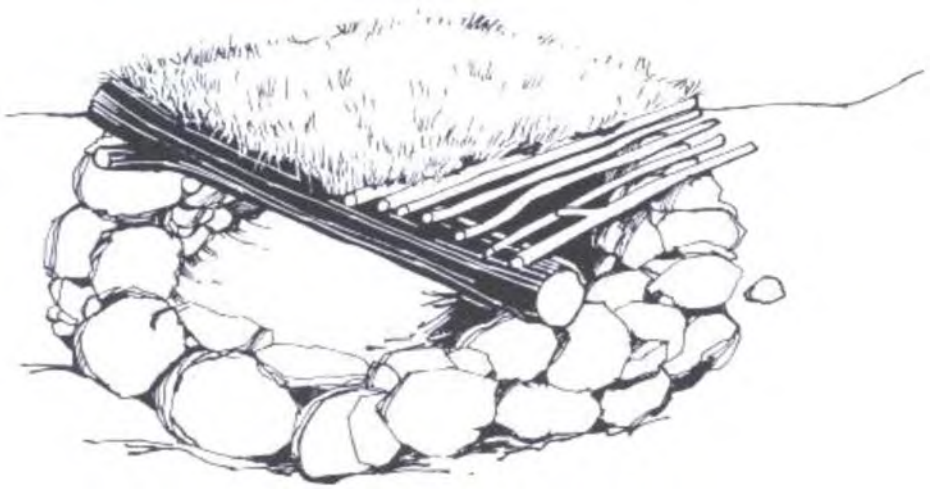

Figure 7 Stone Barrier

Note. From *The SAS Survival Handbook* (p. 246), by J. Wiseman, 1999, Hammersmith, London: HarperCollins Publishers. Copyright 1986 by John Wiseman.

Figure 8 Adding Weight to a Groundsheet

Note. From *The SAS Survival Handbook* (p. 247), by J. Wiseman, 1999, Hammersmith, London: HarperCollins Publishers. Copyright 1986 by John Wiseman.

Tools

Rocks can be used as tools in a variety of ways, such as hammers, knives, carvers, scrapers and sanders. Certain types of rocks can even be used to shape other rocks.

Figure 9 Rock Tools

Note. From *Tom Brown's Field Guide: Living With the Earth* (p. 102) by T. Brown, Jr. & B. Morgan, 1984, New York, NY: The Berkley Publishing Group. Copyright 1984 by Tom Brown, Jr.

GROUP DISCUSSION

TIPS FOR ANSWERING / FACILITATING DISCUSSION:

- Establish ground rules for discussion, eg, everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

SUGGESTED QUESTIONS:

Q1. What can rocks be used for in a survival situation?

Q2. How can a rock be used as a tool?

Q3. How can rocks be used to cook?

Q4. If you were in a survival situation, how could rocks be used to make your shelter more comfortable?

Other questions and answers will develop throughout the group discussion. The group discussion should not be limited to only those suggested.

Reinforce those answers given and comments made during the group discussion, ensuring the teaching point has been covered.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the group discussion will serve as the confirmation of this TP.

Teaching Point 2 **Identify types of rocks.**

Time: 5 min Method: Interactive Lecture

Boiling water with heated rocks requires that the rocks be heated to extreme temperatures—which can cause some types of rocks to explode. Some rocks hold heat better than others and are therefore a better choice.

When selecting rocks to heat, **NEVER** pick rocks that are next to a water source (eg, river, swamp, moss, bottom of a hill). Rocks that have moisture inside are likely to explode. Go to higher land to find dry rocks.

TYPES OF ROCKS

Geologists classify rocks into three groups according to the major Earth processes that formed them. The classification system will assist in finding types, but many rocks overlap between categories. The types of rocks are igneous, sedimentary and metamorphic.

Rocks are groups of different minerals pushed together and combined. They are a continuous spectrum of colour, content, form and composition.

Igneous rocks. Formed from magma (molten rock) that has cooled and then solidified. The majority of these rocks formed beneath the Earth's crust. Some examples of igneous rock are granite, pumice, rhyolite and basalt.

Basalt rocks hold heat very well.

Figure 10 Granite

Note. From "Geology.com", 2009, *Igneous Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Figure 11 Pumice

Note. From "Geology.com", 2009, *Igneous Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Figure 12 Rhyolite

Note. From "Geology.com", 2009, *Igneous Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Figure 13 Basalt

Note. From "Geology.com", 2009, *Igneous Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/igneous-rocks.shtml

Sedimentary rocks. Formed in layers near the Earth's surface. They are composed of grains that have been compacted loosely under low pressure. They are normally loose and not very strong. Some examples of sedimentary rocks are coal, iron ore, shale and limestone.

When selecting rocks to heat, sedimentary rocks are generally a poor choice.

Figure 14 Coal

Note. From "Geology.com", 2009, *Sedimentary Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Figure 15 Iron Ore

Note. From "Geology.com", 2009, *Sedimentary Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Figure 16 Shale

Note. From "Geology.com", 2009, *Sedimentary Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Figure 17 Limestone

Note. From "Geology.com", 2009, *Sedimentary Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/sedimentary-rocks.shtml

Metamorphic rocks. Created by heat / pressure, which changed the rock from one type to another. Since these rocks were created by heat / pressure, they are usually found deep beneath the Earth's surface. Some examples of metamorphic rock are phyllite, slate, hornfels and quartzite.

Slate rocks hold heat very well.

Figure 18 Phyllite

Note. From "Geology.com", 2009, *Metamorphic Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

Figure 19 Slate

Note. From "Geology.com", 2009, *Metamorphic Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

Figure 20 Hornfels

Note. From "Geology.com", 2009, *Metamorphic Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

Figure 21 Quartzite

Note. From "Geology.com", 2009, *Metamorphic Rocks*, Copyright 2005–2009 by Geology.com. Retrieved March 13, 2009, from http://geology.com/rocks/metamorphic-rocks.shtml

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. What are the three types of rocks?

Q2. When selecting rocks to heat, which type of rock is a poor selection?

Q3. Which rocks hold heat well?

ANTICIPATED ANSWERS:

A1. The three types of rocks are igneous, sedimentary and metamorphic.

A2. Sedimentary rocks are a poor selection.

A3. Basalt and slate.

Teaching Point 3 **Have the cadets, in a group of no more than three, boil water using heated rocks.**

Time: 40 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in groups of no more than three, boil water using heated rocks.

RESOURCES

- Water container (one per group),
- Controlled fire (one per group)

- Fire safety equipment, and
- 1 L of water (per group).

ACTIVITY LAYOUT

- Select an area with ample small rocks available for selection.
- Have a fire(s) prepared.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than three.
2. Distribute a water container to each group and place each group at a fire.
3. Have each cadet select a minimum of six rocks about the size of a golf ball.

Due to the time it will take the rocks to heat, encourage the cadets to pick small rocks.

4. Have the cadets place their rocks in the fire.
5. While the rocks are heating:
   a. have each cadet create a method to remove the rocks from the fire (eg, tongs); and
   b. have each group place 1 L of water in their container.
6. After the rocks have been in the fire for a minimum of 25 minutes, have each group place two rocks in the water container.
7. Once the rocks have cooled (1–2 minutes), have each group add two more rocks.
8. Have the groups continue adding rocks until the water boils.
9. Have the groups extinguish their fire.

When in a survival situation where a container is not available, boiling can be done in a hollowed log, a rock depression, clay, rawhide, etc.

SAFETY

- Supervisory staff shall have fire safety equipment available in case of emergency.
- Rocks will be extremely hot; use extreme caution.

NEVER pick rocks that are next to a water source (eg, river, swamp, moss, bottom of a hill). Rocks that have moisture inside are likely to explode. Go to higher land when looking for rocks.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in boiling water using heated rocks will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Rocks are virtually everywhere and have a variety of uses in survival situations. There are different types of rocks—some of which are more useful than others. Understanding the applications of different types of rocks could help an individual when they find themselves in a survival situation. Boiling is not the only option when cooking with rocks. Experiment and have fun!

INSTRUCTOR NOTES / REMARKS

Select an area where the natural resources required may be found.

The instructor shall have prepared a fire(s) for the cadets to use.

REFERENCES

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 6

EO C424.03 – EMPLOY CATTAILS

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-704/PG-001, *Gold 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.

The cadets will be required to choose one way to employ cattails in TP 3. Some methods will require preparation prior to conducting the lesson (eg, leaves picked and dried for weaving / making cordage, food) and some ways will require resources (eg, fires will require tinder, kindling, fuel, matches, fire safety equipment). Where required, limit or make the initial preparations for the way(s) the cadets will employ cattails. In the case of basket weaving, the cadets could select leaves to use during this lesson and construct the basket on their own time or collect leaves a day before the activity to let them dry.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TPs 1 and 2 as it introduces the cadet to the many possible ways that cattails may be employed.

A practical activity was chosen for TP 3 as it is an interactive way for the cadets to employ cattails in a safe and controlled environment.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have employed cattails.

IMPORTANCE

It is important for cadets to know how to employ cattails as they are abundant throughout North America and have numerous uses. In a survival situation, knowing how to employ cattails could prove to be extremely beneficial. They can be eaten, woven, used for insulation, burnt, and used to treat common ailments.

Teaching Point 1 **Identify a cattail and its environment.**

Time: 5 min Method: Interactive Lecture

A cattail (from the genus typha) is a tall, straight plant with sword-like leaves, topped with a cylindrical, sausage-like head. As a cattail matures, it turns from green to brown. In the spring, two green flower heads form at the top of the stalk—the male above and the female below. The sausage-like head is actually the female flower. The male flower grows above the female and disappears once fertilization has been completed.

A cattail can be found in marshes, ditches, wetlands, swamps and stagnant water (fresh or salt) throughout North America. When growing in thick settlements, they can grow up to nine feet tall.

The main parts of a cattail are described in Figure 3.

Finding cattails is a sure sign of nearby water. Military survival specialist and author Tom Squier once found them completely out of their environment, in a dry, sandy pine forest. A short search revealed an open manhole from an abandoned storm sewer system, full of water.

Figure 1 Cattail with Distinct Male and Female Flowers

Note. From "Roger Troy Peterson Institute of Natural History: Electronic Naturalist", *Cattails*, Copyright 2009 by John Wiessinger. Retrieved March 24, 2009, from http://www.enaturalist.org/units/308/img/Cattailyg1.jpg

Figure 2 Head of a Cattail

Note. From "Ontario Wildflowers", *Ontario Wildflowers*. Retrieved March 25, 2009, from http://www.wildflowersofontario.ca/cattail.jpg

In Figure 3, the parts of a cattail are as follows:

- 1 = the female flower,
- 2 = the stem,
- 3 = a leaf, and
- 4 = rootstock.

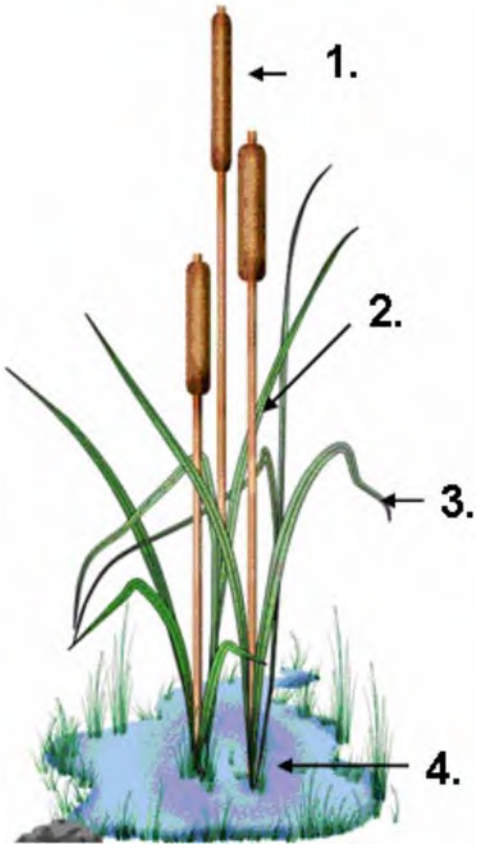

Figure 3 Cattail

Note. From "Pymatuning Cottages" by J. Weigel and K. Danessa. Retrieved March 25, 2009, from http://www.pymatuningcottages.com/NewFiles/cat-tail.gif

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CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. Describe a cattail.

Q2. Where are cattails found?

Q3. How tall can a cattail grow?

ANTICIPATED ANSWERS:

A1. A cattail (from the genus typha) is a tall, straight plant with sword-like leaves, topped with a cylindrical, sausage-like head.

A2. A cattail can be found in marshes, ditches, wetlands, swamps and stagnant water (fresh or briny) throughout North America.

A3. When growing in thick settlements, they can grow up to nine feet tall.

Teaching Point 2 **Identify ways to employ cattails.**

Time: 15 min Method: Interactive Lecture

COOKING

Cattails have many delicious and edible parts. It is not an acquired taste, as with many wild edible plants, and will usually please fussy eaters. No matter what time of the year, there is always something edible and nutritious. It is one plant that, when found, can be depended on in a survival situation.

Edible parts of a cattail differ depending on the time of year.

Cattails have so many edible parts that they could be considered a wilderness supermarket.

The rootstock and stem of a cattail are edible raw or boiled. The plant can be pulled up by grasping it at the base. The leaves will disconnect easily from the rootstock. Once the green leaves are pulled back, there will be a white core. This soft core is commonly referred to as "Cossack's asparagus." It is similar to a mild cucumber-like vegetable. For those who like soft vegetables, the rootstock / stem can be boiled for 15 minutes.

Rootstalks are an excellent source of starch. They can be crushed, dissolved in cold water and made into flour after draining and drying. Once thoroughly dried, this flour can be stored and used the same way as store-bought flour.

The pollen from a mature male flower can be gathered from the yellow spikes. It can then be laid in the sun to dry and mixed with water to make dough, which can be baked or cooked. It can also be mixed half-and-half with flour and used as a thickener for foods such as stew or gravy.

Green male flower heads can be husked, boiled and eaten much the same as corn.

Cattail can be used in numerous recipes, which can be found through search engines on the Internet. Some recipes that can be found include:

- cattail pollen pancakes,
- cattail pollen biscuits, and
- cattail wild rice pilaf.

Figure 4 Cattail Pollen

Note. From "Heatlhlines", *Alaskan Flower Essences—Cattail Pollen*. Retrieved March 25, 2009, from http://www.healthlines.co.uk/FLOWER_ESSENCES/Alaskan_Essences/Alas_Images1/Cattail_Pollen.jpg

WEAVING

Leaves of the cattail can be collected (when green) and woven into mats for flooring or walls. They can also be woven to make baskets.

The stems can be bundled and tied together to form thick sleeping mats.

Figure 5 Cattail Basket

Note. From "North House Folk School", 2009, *Basketry Courses*, Copyright 2009 by North House Folk School. Retrieved March 25, 2009, from http://www.northhousefolkschool.com/images/Basketry/CattailBasket-035.jpg

Cattails should only be woven when they are green—usually in the late summer or early fall.

To prepare cattails for weaving:

1. Wear waterproof boots and heavy gloves.
2. Use a long, sharp knife to cut the cattail at the base. Get a large bundle as they will shrink to about a quarter of their original size when dried.
3. Dry the leaves under shade, out of direct sunlight. They could also be laid out on something flat. Air should be able to circulate, so they may need to be flipped occasionally.

In most weaving there are two important elements—the warp and the weft (as illustrated in Figure 6). The warp consists of all the vertical strands and the weft consists of all the horizontal strands. The warp and the weft are interwoven at right angles to each other. To weave a basket with cattails:

1. Lay the leaves on a flat surface.
2. Tightly weave the weft leaves in and out of the warp leaves.
3. Once the bottom of the basket has been formed, bend the sides upward and continue tightly weaving in the leaves.
4. If an extension is needed, overlap a leaf 5–8 cm (2–3 inches) into the leaf that requires an extension and continue weaving.
5. Once the final weft has been woven, there should be about 5 cm (2 inches) of warp leaves sticking up (if there is more, cut the excess off).
6. Bend the warp leaves inward and tuck them tightly between the second or third last weft. The leaves may need to be soaked in order for them to bend.

Note. This type of basket is commonly referred to as a plaited basket.

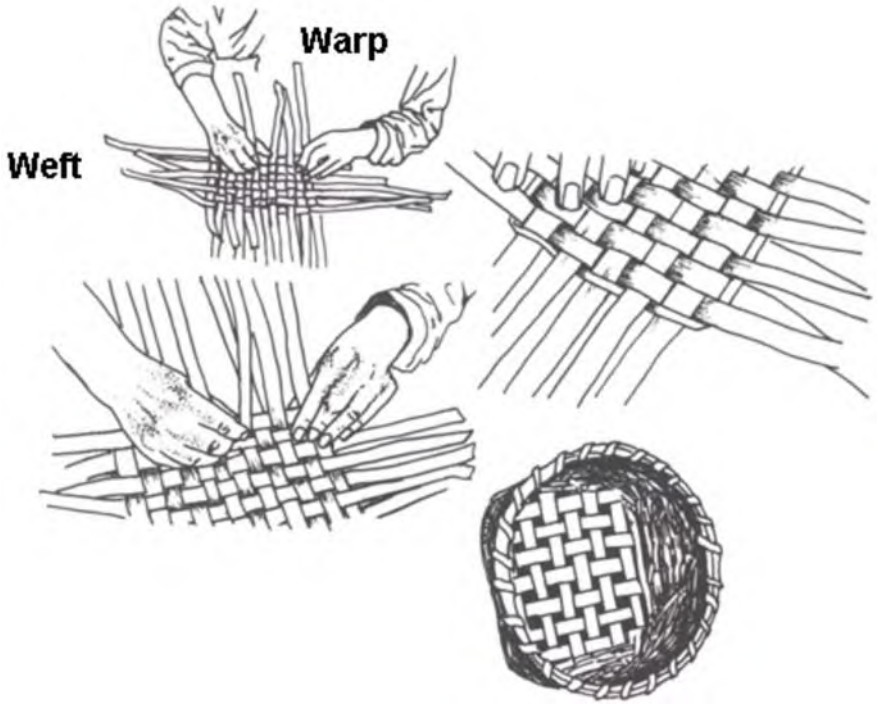

Figure 6 Basket Weaving

Note. From *Tom Brown's Field Guide: Living With the Earth*, p. 90, by T. Brown & B. Morgan, New York, NY: The Berkley Publishing Group. Copyright 1984 by Tom Brown, Jr.

MAKING CORDAGE

Cattail leaves can be used to make cordage. The leaves need to be cut and dried. Once dried, the leaves are split into strips, then dampened and twisted or braided into cordage.

Further information on the process for making cordage can be found in EO M424.04 (Weave Cordage).

INSULATING

Cattails can have fuzzy seeds on the outside or inside, which provide great insulation. Once the insulation has been removed from the cattail head, it can be stuffed into clothing to act as insulation in cold weather. It can also be used to make blankets, sleeping bags or pillows.

Figure 7 Insulation Outside a Cattail—Seed Head

Note. From *Camping and Wilderness Survival: The Ultimate Outdoors Book* (2nd ed.), (p. 331), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

Figure 8 Insulation Inside a Cattail

Note. From Bioimages, *Plant Features: Fruit and Seed Dispersal*, Copyright 2002 by Steve Baskauf. Retrieved March 25, 2009, from http://www.cas.vanderbilt.edu/bioimages/t/wtyla--frinfruct17156.jpg

BURNING

A cattail head dipped in oil or animal fat can be used as a torch.

The fuzzy seeds from the inside / outside of a cattail can be used as tinder to start a fire.

Figure 9 Cattail Torch

Note. From *Camping and Wilderness Survival: The Ultimate Outdoors Book* (2nd ed.), (p. 437), by P. Tawrell, 2006, Lebanon, NH: Author. Copyright 2006 by Leonard Paul Tawrell.

TREATING COMMON AILMENTS

Ripe cattail flowers can be mashed and used to soothe cuts and burns.

There is a sticky juice between the leaves that makes a great styptic, antiseptic and anesthetic. It will even numb an aching tooth if rubbed on the gums.

Two to three teaspoons of rootstock flour can be added to one cup of hot water to make an effective remedy to control diarrhea. The usual dosage is two cups a day.

The root contains a pasty starch that has a soothing effect on poison ivy and burns.

Boiled leaves make good external skin wash for rashes and skin irritations.

Pollen can help control bleeding when placed directly on a cut. It can also help relieve pain and can be used as a hair conditioner.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. What parts of a cattail can be eaten?

Q2. How can a cattail insulate?

Q3. What part of a cattail makes a great styptic, antiseptic and anesthetic?

ANTICIPATED ANSWERS:

A1. The rootstock, stem, pollen, flower head and seeds can all be eaten.

A2. The fuzzy seeds can be stuffed into clothing to act as insulation in cold weather. It can also be used to make blankets, sleeping bags or pillows.

A3. The sticky juice between the leaves.

Teaching Point 3 **Have the cadets, in groups of no more than three, employ cattails.**

Time: 30 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in groups of no more than three, employ cattails by:

- cooking;
- weaving;
- making cordage;
- insulating;
- burning; or
- treating common ailments.

RESOURCES

- Cattails,
- Survival knife, and
- Resources will vary, as per selection.

ACTIVITY LAYOUT

- Select an area where cattails can be found.
- If fires will be used, the area must conform to fire safety regulations.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than three.
2. Have the groups select a way to employ cattails.

Where basket weaving is selected, the cadets will have to collect leaves either before or during this lesson. If the leaves are being selected during this lesson, have the cadets bring their basket to the following week's parade night.

3. Have the groups employ cattails.

4. Once completed, have the groups share their results with the other groups.

SAFETY

- Fire safety equipment shall be present if fires are being lit.
- Enforce boundaries for the activity.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in employing cattails will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Cattails are abundant throughout North America and have numerous important uses. Knowing what can be done with a cattail, as well as how to do it could be extremely beneficial if ever in a survival situation.

INSTRUCTOR NOTES / REMARKS

Select an area where cattails can be found.

Permission may need to be granted before employing cattails.

REFERENCES

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 7

EO C424.04 – PREPARE REMEDIES FOR COMMON AILMENTS USING MEDICINAL PLANTS

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-704/PG-001, *Gold 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.

This instructional guide is to be used as a guideline. Refer to the reference book, approved by the Regional Cadet Support Unit, specific to the local area for further information on locating, identifying and processing plants, preparing remedies and treating common ailments.

This lesson shall be instructed by a guest speaker with specialist knowledge in preparing remedies.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A practical activity was chosen for this lesson as it is an interactive way to allow the cadet to prepare a remedy using medicinal plants in a safe and controlled environment. This activity contributes to the development of survival skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have prepared a remedy using a medicinal plant.

IMPORTANCE

It is important for cadets to know how to identify medicinal plants that are safe and some that may be poisonous. In a survival situation, some plants can be prepared to make a remedy for a common ailment that may aid in the overall health and survival of a person.

Teaching Point 1 **Have the cadets, in pairs, prepare a remedy.**

Time: 50 min Method: Practical Activity

BACKGROUND KNOWLEDGE

This TP is intended to describe the many common ailments that may be treated with medicinal plants.

Ensure the cadets exercise extreme caution when identifying and preparing medicinal plants as some plants are poisonous.

Refer to the approved reference book that is specific to the local area for further information on identifying plants, preparing remedies and treating common ailments.

DESCRIBE MEDICINAL PLANTS

Natural Remedies

When it comes to medicine, natural medications and remedies can be better for the human body than their synthetic counterparts, which may cause side effects.

Natural plant remedies are available for treating many human illnesses and ailments; however, it is important to know what medicinal plant to look for, as well as where to find it. Although many plants grow in abundance across the country, there are some areas where a particular plant will not flourish.

Historical Practices

For thousands of years, drugs and treatments have been derived from various herbs, plants and natural substances. Many of the drugs still in use today are derived from plant sources. However, extracting the required remedy from some plants is not very easy.

Ancient herbalists did not just randomly mix a concoction and give it to patient—herbology is an exact science. The gathering, preparing and storing of medicinal plants had to be precise and the mixing of the final remedy had to be exact. Herbology science is exactly matched to the patient's lifestyle, body condition, size and need.

Herbalist. A person who specializes in the use of medicinal herbs to treat disease.

Herbology. The use of herbs to treat disease.

DESCRIBE HOW TO TREAT COMMON AILMENTS USING MEDICINAL PLANTS

Infuse. Steep herbs in liquid to extract the content.

Decoction. A process of boiling down so as to extract some essence.

Poultice. A soft medicated heated mass applied to the body and kept in place for relieving soreness and inflammation.

Express. Squeeze out liquid.

Consider the following when preparing medicinal plants for a common illness or ailment:

- To make an infusion, cut and crush the specific part of the plant so that the juices and oils are readily available. Mix with boiling water, stir, let cool and either drink or apply to the affected area.
- To make a decoction, cut, scrape and mash the specific parts of the plant, soak them in water and then boil. Consume as a hot drink.
- To make a poultice, mash the roots or leaves into a flat pad. Apply to the affected area and bind in position.
- To express juice, reduce the plant into a juicy mush. Squeeze the juice into the wound, spread the pulp around the infected area and keep it in place with a leaf and bind.

The following is a list of some of the medicinal plants and treatment(s) for common ailments.

Cold and Flu

Fever. These plants will induce perspiration to break a fever:

- camomile: Infusion of leaves and flowers.
- elder: Infusion of flowers and fruit.
- elm: Decoction of bark.
- feverfew: Infusion of whole plant, except bark.

Headache. These plants can be taken internally:

- willow: Leaves and bark make a decoction containing Salicin, an ingredient in Aspirin.
- elderberry: Infusion of flowers.
- wintergreen: Help with treating headaches.

Aches and pains. These plants can be taken internally:

- balm: Infusion of leaves.
- birch: Infusion of leaves.
- Borage: Infusion of whole plant, except roots.
- burdock: Decoction of roots.
- cattail: Infusion of leaves.
- chickweed: Infusion of whole plant, except roots.
- cowberry: Infusion of leaves and fruits.
- elm: Infusion of bark.
- horsehound: Expressed juice or leaves applied to earache.
- poplar: Infusion of leaf buds.

- solomon's seal: Decoction of roots, to be used externally.
- willow: Decoction of bark.

An example of preparing a cattail for a toothache is to rub the sticky juice between the leaves on the gums.

Colds and sore throats. These plants can be taken internally:

- agrimony: Infusion of whole plant, except roots.
- bilberry: Infusion of leaves and fruits.
- bistort: Infusion of whole plant, except roots.
- borage: Infusion of whole plant, except roots.
- burdock: Decoction of roots.
- camomile: Infusion of flower, to be used as a gargle.
- colt's foot: Infusion of leaves and flowers.
- comfrey: Infusion of whole plant.
- great mullein: Infusion of whole plant, except roots and decoction of roots as a gargle.
- horsehound: Infusion of whole plant, except roots.
- lungwort: Infusion of whole plant, except roots.
- mallow: Infusion of flowers and leaves.
- marsh mallow: Decoction of roots and infusion of leaves and flowers.
- mint: Infusion of whole plant, except roots.
- mountain avens: Infusion of whole plant, to be used as a gargle.
- nettle: Infusion of leaves.
- oak: Decoction of bark, to be used as a gargle.
- plantain: Infusion of leaves and stems.
- poplars: Infusion of leaf buds.
- roses: Decoction of hips.
- sanicle: Infusion of whole plant, except roots.
- self-heal: Infusion of whole plant, except roots, to be used as a gargle.
- St. John's wort: Infusion of flowers and shoots.
- thyme: Infusion of leaves and flowers.
- willow: Decoction of bark.
- yarrow: Infusion of whole plant, except roots, to be used as an inhalant.

Skin Ailments

Bleeding. These plants are to be used externally:

- dove's foot crane's bill: Expressed juice.
- giant puffball: Packed as poultice.
- periwinkle: Expressed juice of leaves.
- plantains: Pounded leaves as poultice.
- self-heal: Expressed juice.
- stork's bill: Expressed juice of leaves.
- woundwort: Expressed juice.

Sores and wounds. These plants can be used externally to bathe the skin or taken internally:

- bulrush: Pounded acorns as poultice.
- camomile: Expressed juice of flowers or as poultice, applied to swelling.
- cattail: Pounded flowers as poultice.
- chickweed: Expressed juice of leaves.
- cleavers: Infusion of whole plant, except roots.
- comfrey: Decoction of roots or as poultice, applied to swelling.
- dead-nettle: Infusion of flowers and roots.
- dock: Crushed leaves applied to bruises.
- dove's foot crane's bill: Infusion of whole plant, except roots, applied to swelling.
- elder: Expressed juice of leaves.
- elm: Infusion of bark.
- figwort: Decoction of whole plant, except roots, to be used externally to draw bruises.
- garlic: Expressed juice applied to swelling.
- horsehound: Infusion of whole plant, except roots.
- horseradish: Decoction of roots.
- mallow: Infusion of leaves and flowers or decoction of leaves and flowers as poultice.
- marsh mallow: Decoction of roots and infusion of flowers and leaves as poultice.
- oak: Decoction of bark.
- plantain: Pounded leaves as poultice.
- sanicle: Infusion of whole plant, except roots.
- scurvey grass: Crushed leaves.

- shepard's purse: Infusion of whole plant, except roots, as poultice.
- spicebrush: Pounded as a poultice.
- solomon's seal: Decoction of roots as poultice.
- sorrel: Crushed leaves applied to bruises.
- St. John's wort: Infusion of flowers and shoots applied to bruises.
- tansy: Crushed leaves applied to bruises.
- thyme: Infusion of leaves and flowers.
- watercress: Expressed juice.
- woundwort: Infusion of whole plant, except roots.
- yarrow: Infusion of whole plant, except roots.

An example of preparing a cattail for cuts and burns is to mash ripe cattail flowers and apply to the skin to soothe cuts and burns.

Itching and stings. These plants are to be used externally:

- amaranth: Infusion of leaves.
- birch: Infusion of twigs and applied to area.
- black alder: Infusion of bark and applied to area.
- bunchberry: Pounded berries as poultice.
- burdock: Decoction of roots crushed raw and salt for some animal bites.
- cattail: Pasty starch of the root has a soothing effect on poison ivy.
- chicory: Pounded leaves and flowers as poultice.
- colt's foot: Infusion of leaves and applied to area.
- goldenrod: Infusion of flowers and applied to area.
- jewelweed: Pounded leaves and stems as poultice.
- reed: Pounded roots as poultice.
- sumac: Pounded seed heads and leaves as poultice.
- thistle: Pounded roots as poultice.

Digestive Ailments

Constipation. These plants can be used externally or internally:

- agrimony: Infusion of whole plant, except roots.
- barberry: Expressed juice of fruit.
- common cleavers: Infusion of whole plant, except roots.

- couch grass: Decoction of root.
- dandelion: Infusion of whole plant.
- elder: Expressed juice of fruit.
- feverfew: Infusion of leaves and flowers.
- rowan: Expressed juice of fruit.
- roses: Decoction of hips.
- walnut: Decoction of bark.

Diarrhea. Most remedies are to be taken two or three times daily, until symptoms subside.

- amaranth: Infusion of leaves.
- bilberry: Decoction of fruit.
- bistort: Infusion of whole plant, except roots.
- bramble: Infusion of leaves or decoction of fruit.
- cattail: Infusion of root.
- cowberry: Decoction of fruit.
- elm: Infusion of bark.
- elderberry: Infusion of flowers
- great burnet: Infusion of leaves and shoots.
- hazel: Infusion of leaves.
- hemlock: Infusion of inner bark.
- marsh mallow: Infusion of leaves and flowers or decoction of roots.
- mint: Infusion of whole plant, except roots.
- mountain avens: Infusion of whole plant, except roots.
- mulberry: Infusion of rootbark.
- oak: Decoction of bark.
- plantain: Infusion of leaves and stems.
- periwinkle: Infusion of leaves.
- silverweed: Infusion of whole plant, except roots.
- sweet fern: Infusion of leaves.

Gas and cramps. These plants can be used externally or internally:

- balm: Infusion of leaves.
- bilberry: Decoction of fruit.

- bracken: Infusion of leaves.
- bramble: Infusion of leaves.
- comfrey: Infusion of roots.
- dandelion: Decoction of whole plant.
- evening primrose: Infusion of leaves.
- horseradish: Infusion of root.
- mint: Infusion of whole plant, except roots, with crushed charcoal.
- mullein: Infusion of flowers.
- solomon's seal: Decoction of root.
- sanicle: Infusion of root.
- yarrow: Infusion of leaves and flowers.

An example of preparing a dandelion for stomach cramps is to steep a small amount of the plant into a cup of hot water. One-half cup in the morning and one-half cup in the evening will aid in digestion and the relieving of stomach cramps.

ACTIVITY

Time: 50 min

OBJECTIVE

The objective of this activity is to have the cadets, in pairs, prepare a remedy by locating and processing a medicinal plant.

RESOURCES

- Survival knife (one per cadet),
- Pots (one per group),
- Bowls (one per group),
- Stone mortar and pestle (one per group),
- Fire safety equipment, and
- Approved reference book for resources required.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a safety briefing.
2. Divide the cadets into pairs.

3. Describe ways to treat common ailments using medicinal plants.
4. Have the cadets, in pairs, locate one medicinal plant.
5. Inspect the chosen plant(s).
6. Issue each pair resources required to process their plant.
7. Have the cadets process the medicinal plant by:
    a. making an infusion;
    b. making a decoction;
    c. making a poultice; or
    d. expressing juice.
8. Ensure each pair refers to the approved reference book when preparing their remedy.
9. Circulate and assist the cadets as necessary, offering suggestions and advice.
10. Conduct a debriefing.

The cadets shall not use their remedy.

SAFETY

As some remedies call for boiling water, ensure the local fire regulations are followed when constructing a fire.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' preparation of a remedy using a medicinal plant will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Being able to prepare medicinal plants within the surrounding environment is essential when looking for a remedy for an illness or ailment in a survival situation. This knowledge will provide a better understanding of the many remedies that can be prepared and how to prepare each plant.

INSTRUCTOR NOTES / REMARKS

This lesson shall be instructed by a guest speaker with specialist knowledge in preparing remedies using medicinal plants.

Select an area where the natural resources required are easily accessible.

When locating and processing medicinal plants, a reference book specific to the area shall be used. This book shall be approved by the Regional Cadet Support Unit.

Fire safety equipment to prepare, light, maintain and extinguish a fire includes the following:

1. 4-lb axe (36-inch handle),
2. 24-inch bow saw,
3. shovel,
4. pail filled with sand or water,
5. tinder, and
6. kindling.

REFERENCES

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 1

EO M425.01 – ESTABLISH EXPEDITION PARAMETERS

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-704/PG-001, *Gold 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.

Photocopy Section 1 of the Expedition Planning Booklet located at Attachment A for each cadet.

Photocopy the Expedition Parameters Information Sheet located at Attachment B for each cadet.

Photocopy the Silver Star Expedition Information Sheet located at Attachment C for each cadet.

Review the completed Section 1 of the Expedition Planning Booklet located at Attachment D.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A group discussion was chosen for TP 1 as it allows the cadets to interact with their peers and share their knowledge and opinions about the reasons for conducting expeditions. Sharing in the discussion encourages the cadets to examine their own thoughts and feelings and may prompt them to re-examine their previously held ideas. Participating in a group discussion improves the cadets' listening skills and team development.

An interactive lecture was chosen for TP 2 to orient the cadets to expedition objectives and generate interest.

An in-class activity was chosen for TP 3 as it is an interactive way to provoke thought and stimulate interest in planning an expedition.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have established expedition parameters by determining the corresponding goals, objectives and guidelines.

IMPORTANCE

It is important for cadets to establish the parameters for an expedition as this knowledge is a critical first step in the process of planning an expedition. Identifying objectives and guidelines provides the basis to develop all other aspects of the expedition plan. The process for establishing expedition parameters can also be applied to planning other types of activities.

Teaching Point 1 **Discuss reasons for conducting expeditions.**

Time: 5 min Method: Group Discussion

BACKGROUND KNOWLEDGE

The point of the group discussion is to draw the following information from the group using the tips for answering / facilitating discussion and the suggested questions provided.

The *Canadian Oxford Dictionary* defines expedition as an organized voyage or journey across land or water, with a specific goal.

REASONS FOR CONDUCTING EXPEDITIONS

Organizations conduct expeditions for a variety of reasons. In most cases, expeditions are conducted to allow participants to meet the specific outcomes of the organization. Examples include:

- challenging participants;
- developing hard and soft skills;
- providing leadership opportunities;
- increasing physical fitness levels; and
- providing opportunities to earn qualifications.

ARMY CADET EXPEDITION PHILOSOPHY

Army cadet expedition training combines many historical army-related field skills with adventure training to create one of the most challenging and rewarding aspects of army cadet training. Army cadet expedition training evolved from a common vision by stakeholders in 1998 and was refined over the course of a decade.

Expeditions provide an excellent platform for army cadets to achieve the aims and participant outcomes of the cadet program. Expeditions:

- allow army cadets to participate in adventurous activities as part of mandatory training;
- promote recruiting and retention;
- develop leadership skills while enhancing self-reliance, self-confidence, self-esteem, and self- discipline; and
- promote and raise the profile of the Army Cadet Program.

OUTWARD BOUND EXPEDITION PHILOSOPHY

The Outward Bound organization was founded in 1941 by Kurt Hahn in Wales. Hahn claimed that challenge-based outdoor training would benefit the personal development of students. Outward Bound provides students an opportunity to participate in a wilderness expedition that places challenge at the forefront of all activities, thereby allowing for personal growth in self-reliance, physical fitness, craftsmanship, and community service and compassion.

Outward Bound, an outdoor leadership school, uses expeditions as a medium to 'teach' their students about goal setting, teamwork and leadership through practical experiences. These experiences allow for character development in a way that cannot be experienced in a classroom setting or without the inherent struggles and challenges experienced on an expedition. By facing real problems, solving them with newly-learned skills, and making decisions that matter, Outward Bound believes that their students will emerge more aware of their strengths and able to use them in a variety of situations.

GROUP DISCUSSION

TIPS FOR ANSWERING / FACILITATING DISCUSSION:

- Establish ground rules for discussion, eg, everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

SUGGESTED QUESTIONS:

Q1. What is an expedition?

Q2. How does expedition training differ from training conducted on a field training exercise?

Q3. Where does expedition training fit within the Army Cadet Program?

Q4. Using experiences from the Silver Star expedition as a guideline, what are some reasons that expeditions are conducted?

Other questions and answers will develop throughout the group discussion. The group discussion should not be limited to only those suggested.

Reinforce those answers given and comments made during the group discussion, ensuring the teaching point has been covered.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the group discussion will serve as the confirmation of this TP.

Teaching Point 2 **Discuss expedition goals and objectives.**

Time: 10 min Method: Interactive Lecture

The purpose of this TP is to introduce cadets to the concept of expedition goals and objectives. Encourage cadets to use their own expedition experience(s) to add to the material.

Distribute to each cadet:

- the Expedition Parameters Information Sheet located at Attachment B, and
- a Duo-Tang.

Discuss the Expedition Planning Booklet, by informing cadets that:

- the Expedition Planning Booklet will be used to simulate the planning of an expedition in each of the EOs in PO 425 (Develop an Expedition Plan);
- the Expedition Planning Booklet is divided into sections which mirror the expedition planning process;
- sections of the Expedition Planning Booklet will be completed, during the lesson and as homework, using a Silver Star expedition scenario; and
- each section will be distributed in the corresponding EO and should be placed in a provided Duo-Tang.

The development of sound goals and objectives provides guidance to individuals as they plan an expedition. The foundation of an effective trip plan is well-defined program goals and objectives. Goals and objectives can be divided into two categories:

- trip, and
- program.

Trip goals and objectives can only be developed in conjunction with program goals and objectives. Likewise, program goals and objectives must be developed in conjunction with the overall philosophy of the organization conducting the expedition.

Figure 1 Goals and Objectives Hierarchy

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

Remind cadets of the organization philosophy of army cadet expeditions discussed in TP 1 as it relates to the goals and objectives hierarchy.

Goals. Goals represent broad, intended outcomes to be experienced as a result of participating in the expedition. Goals provide direction for leaders and participants as they engage in the expedition experience.

Objectives. Objectives are the targeted outcomes used to assess the accomplishment of each identified goal.

Well-written goals and objectives serve the same purpose as a good map—they provide leaders with a specific path to follow as they create and execute the expedition. Goals and objectives will also assist leaders to make decisions while on the expedition. For example, if a primary goal of developing participants' canoeing skills in Class II moving water was not being met, leaders could choose to cut out a day of hiking to spend an additional day canoeing.

Creating Goals and Objectives

Leaders must put thought and time into the purpose of the expedition when creating goals and objectives. It is important to make goals and objectives:

Specific. Goals and objectives should be specific yet remain flexible from a programming standpoint to allow for differences in group abilities and experiences.

Measurable. Goals and objectives must represent measurable outcomes. For example, ride a mountain bike on familiarization trails, not to exceed Level 3, for 30–40 km.

Achievable. Goals and objectives must be realistic and all required resources must be accessible / available.

Relevant. Goals and objectives must be worthwhile for all individuals involved. It is inadvisable to create a goal and subsequent objectives that affect only certain members of an expedition team.

Timed. Goals and objectives must be able to be completed within the timeframe of the expedition.

Review the purpose for conducting the expedition and the goals and objectives for the Silver Star Expedition as detailed in the Expedition Parameters information sheet. Cadets will be required to transfer that information into Section 1 of the Expedition Planning Booklet.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. Into what two categories are goals and objectives divided?

Q2. What are the differences between goals and objectives?

Q3. When created, goals and objectives must meet what criteria?

ANTICIPATED ANSWERS:

A1. Goals and objectives are divided into the categories of trip and program.

A2. Goals represent broad, intended outcomes to be experienced as a result of participating in the expedition. Goals provide direction for leaders and participants as they engage in the expedition experience. Objectives are the targeted outcomes used to assess the accomplishment of each identified goal.

A3. Goals and objectives must be:

- specific,
- measurable,
- achievable,
- relevant, and
- timed.

Teaching Point 3 **Have the cadets, in groups of no more than three, identify expedition guidelines and record information in the Expedition Planning Booklet.**

Time: 10 min Method: In-Class Activity

The information included in the Completed Section 1 of the Expedition Planning Booklet, located at Attachment A, was designed as a sample for use in this EO and all subsequent EOs in this PO. In their groups, cadets can develop their own guidelines as long as they meet the expectations of the expedition. If cadets experience difficulties developing guidelines, provide them assistance using information included in the completed Section 1. The guidelines that each group establishes shall be carried forward for all other aspects of the expedition planning process.

The Silver Star Expedition Information Sheet is included to provide cadets with a general idea of the purpose and delivery of the Silver Star expedition. Not all information required to establish the expedition guidelines is included in the information sheet. Cadets will have to work with their group to develop the specific guidelines.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in groups of no more than three, identify expedition guidelines and record the information in the Expedition Planning Booklet.

RESOURCES

- Section 1 of the Expedition Planning Booklet located at Attachment A (one per cadet),
- Expedition Parameters Information Sheet located at Attachment B (one per cadet), and
- Silver Star Expedition Information Sheet located at Attachment C (one per cadet).

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than three.
2. Distribute to each cadet:
   a. Section 1 of the Expedition Planning Booklet, and
   b. the Silver Star Expedition Information Sheet.
3. Have each group turn to the page on expedition guidelines in the Expedition Planning Booklet.
4. Introduce the expedition guidelines, to include:
   a. time of year the expedition is taking place,
   b. number of days,

c. number of participants,

d. participant experience level,

e. budget, if applicable, and

f. mode(s) of travel, to include:

(1) distance, and

(2) terrain.

5. Have the groups read through the Silver Star Expedition Information Sheet.

6. Have the groups fill in the expedition guidelines in Section 1 of the Expedition Planning Booklet using personal experience and information gathered from the Silver Star Expedition Information Sheet.

7. Have the groups share their answers.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 3

The cadet's participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

QUESTIONS:

Q1. Identify two reasons for conducting expeditions.

Q2. What is the purpose of creating goals and objectives?

Q3. What are two guidelines that must be established when planning an expedition?

ANTICIPATED ANSWERS:

A1. Expeditions are conducted for the following reasons:

- to challenge participants;
- to develop hard and soft skills;
- to provide leadership opportunities;
- to increase physical fitness levels; and / or
- to provide opportunities to receive qualifications.

A2. Goals and objectives serve the same purpose as a good map—they provide leaders with a specific path to follow as they create and execute the expedition. Goals and objectives will also assist leaders in making decisions while out on the expedition.

A3. The following guidelines must be established when planning an expedition:

- time of year expedition is taking place,
- number of days,
- number of participants,
- participant experience level,
- budget, if applicable, and
- mode(s) of travel, to include:
  - distance, and
  - terrain.

CONCLUSION

HOMEWORK / READING / PRACTICE

Complete Section 1 of the Expedition Planning Booklet.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 425 PC.

CLOSING STATEMENT

A well-planned expedition is one in which the planners have spent ample time developing a succinct set of goals and objectives that adhere to both the trip and program expectations. Once goals and objectives have been established, the planners will then have what they require to develop the remaining components of the expedition plan. Expedition planning is a multi-purpose skill that can be applied to planning other activities.

INSTRUCTOR NOTES / REMARKS

Nil.

REFERENCES

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C2-034 ISBN 0-87322-637-2 Priest, S., & Gass, M. (2005). *Effective leadership in adventure programming* (2nd ed.). Windsor, ON: Human Kinetics Publishing Inc.

C2-153 ISBN 0-7360-5731-5 Martin, B., Cashel, C., Wagstaff, M., & Breunig, M. (2006). *Outdoor leadership: Theory and practice*. Windsor, ON: Human Kinetics Publishing Inc.

C2-208 ISBN 978-1-59485-033-2 Raynolds, J., Lodato, A., Gordon, R., Blair-Smith, C., Welsh, J., & Gerzon, M. (2007). *Leadership the outward bound way*. Seattle, WA: The Mountaineers Books.

EXPEDITION PLANNING BOOKLET

Cadet Name: _____

SECTION 1 – EXPEDITION PARAMETERS

IDENTIFY THE PURPOSE FOR CONDUCTING THE EXPEDITION

_____

_____

_____

_____

_____

ESTABLISH EXPEDITION GOALS AND OBJECTIVES:

Goals represent broad, intended outcomes to be experienced as a result of participating in the expedition. Goals provide direction for leaders and participants as they engage in the expedition experience. Objectives are the targeted outcomes used to assess the accomplishment of each identified goal.

When creating goals and objectives it is important to ensure that they follow the SMART (specific, measurable, achievable, relevant and timed) philosophy.

Goal 1

Objective 1:	
Objective 2:	
Objective 3:	

Goal 2

Objective 1:	
Objective 2:	
Objective 3:	

Goal 3

Objective 1:	
Objective 2:	
Objective 3:	

Goal 4

Objective 1:	
Objective 2:	
Objective 3:	

IDENTIFY EXPEDITION GUIDELINES

Time of Year	
Number of Days	
Number of Participants	
Participant Information: • **age,** • **gender,** • **physical fitness level,** • **health, and** • **prior experience.**	

Budget (if applicable)	

	1	2	3 (if applicable)
Mode of Travel			
Distance			
Terrain			

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EXPEDITION PARAMETERS INFORMATION SHEET

IDENTIFY THE PURPOSE FOR CONDUCTING THE EXPEDITION

Silver Star expedition training is designed to provide the Silver Star cadet with the opportunity to develop expedition skills in a structured environment under the supervision and instruction of highly qualified staff.

ESTABLISH EXPEDITION GOALS AND OBJECTIVES

Goal 1

To provide challenging activities that promote the development of expedition skills, using an experiential approach.	
Objective 1:	Provide cadets with the opportunity to develop their personal expedition skills in at least two of the following modes of travel—mountain biking, canoeing and hiking.
Objective 2:	Develop an expedition route that incorporates the selected modes of travel and requires cadets to employ newly-learned skills.
Objective 3:	Require cadets to lead at least one leg of the expedition route to assess their ability to successfully navigate from point A to point B.

Goal 2

To provide a variety of opportunities for the cadets to complete daily expedition activities to promote the development of a well-rounded expedition team member.	
Objective 1:	Provide cadets with the opportunity to practice campsite set-up and departure routine by changing campsite locations.
Objective 2:	Require cadets to perform campsite routine activities such as meal preparation, water purification and food storage.
Objective 3:	Require cadets to become familiar with de-kitting procedures associated with expedition training.

Goal 3

To facilitate positive group experiences that enhance character development through social interactions.	
Objective 1:	Facilitate formal team briefings at the end of each day of training to discuss team concerns.
Objective 2:	Encourage cadets to share their personal experiences with the rest of the team to promote empathy and tolerance for diversity.
Objective 3:	Integrate games and team-building activities throughout the expedition to enhance positive social interactions.

Goal 4

To provide a variety of opportunities for personal reflection in order to promote the formation of self-identity.	
Objective 1:	Require each cadet to maintain a personal journal throughout the expedition weekend.
Objective 2:	Provide a minimum of 15 minutes for cadets to be alone for personal reflection and journal time.
Objective 3:	Provide an opportunity for each cadet to have a personal interview with their Team Instructor (TI) at the end of the expedition to discuss their own personal growth and discoveries as a result of the experience.

SILVER STAR EXPEDITION INFORMATION SHEET

Expedition centre training has been designed to provide the Silver Star cadet with the opportunity to develop expedition skills in a structured environment under the supervision and instruction of highly qualified staff using a weekend format where the cadets will arrive Friday evening and depart Sunday afternoon (2 nights, 3 days).

The expedition centre will provide training through an experiential approach, which will allow the cadet to develop skills such as mountain biking and hiking through direct experience at a personal level. Each cadet will be given the opportunity to examine what they saw, felt and thought during the weekend, and consider how it related to what they already learned as well as how it will relate to future expedition experiences.

Expedition centres will select and train at least two of the following dynamic modes of travel:

a. canoeing,

b. mountain biking, or

c. hiking.

The following are the training expectations for each dynamic mode of travel:

- **Canoeing.** The cadet shall paddle a tandem canoe on flatwater for a distance between 8–10 km.
- **Mountain biking.** The cadet shall ride a mountain bike on familiarization mountain bike trails for a distance between 35–40 km.
- **Hiking.** The cadet shall hike along a route consisting of a combination of Class 1, 2 and 3 terrain for a distance between 8–10 km. At least one third of the route must be Class 3 terrain.

When developing a training schedule, expedition centres may choose to incorporate additional Army Cadet Adventure Training Activities (ACATA) as outlined in A-CR-CCP-951/PT-002, *Royal Canadian Army Cadet Adventure Training Safety Standards*, as long as this does not impede the cadets' ability to meet mandatory training requirements.

All training will be conducted based on a small group model. The cadet will be placed into teams of no more than nine cadets upon arrival Friday evening. An expedition centre Team Instructor (TI) will be assigned to each team and will remain with the team for the duration of the weekend. These team sizes take into account the instructor / cadet training ratios.

All equipment required for the expedition is located at the expedition centre. Models and types of equipment are dependent on the availability of resources within the region and the modes of travel selected. Personal equipment required by cadets is detailed in the cadet joining instructions.

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COMPLETED SECTION 1 OF THE EXPEDITION PLANNING BOOKLET

IDENTIFY THE PURPOSE FOR CONDUCTING THE EXPEDITION

Silver Star expedition training is designed to provide the Silver Star cadet with the opportunity to develop expedition skills in a structured environment under the supervision and instruction of highly qualified staff.

ESTABLISH EXPEDITION GOALS AND OBJECTIVES

Goal 1

To provide challenging activities that promote the development of expedition skills, using an experiential approach.	
Objective 1:	Provide cadets with the opportunity to develop their personal expedition skills in at least two of the following modes of travel—mountain biking, canoeing and hiking.
Objective 2:	Develop an expedition route that incorporates the selected modes of travel and requires cadets to employ newly-learned skills.
Objective 3:	Require cadets to lead at least one leg of the expedition route to assess their ability to successfully navigate from point A to point B.

Goal 2

To provide a variety of opportunities for the cadets to complete daily expedition activities to promote the development of a well-rounded expedition team member.	
Objective 1:	Provide cadets with the opportunity to practice campsite set-up and departure routine by changing campsite locations.
Objective 2:	Require cadets to perform campsite routine activities such as meal preparation, water purification and food storage.
Objective 3:	Require cadets to become familiar with de-kitting procedures associated with expedition training.

Goal 3

To facilitate positive group experiences that enhance character development through social interactions.	
Objective 1:	Facilitate formal team briefings at the end of each day of training to discuss team concerns.
Objective 2:	Encourage cadets to share their personal experiences with the rest of the team to promote empathy and tolerance for diversity.
Objective 3:	Integrate games and team-building activities throughout the expedition to enhance positive social interactions.

Goal 4

To provide a variety of opportunities for personal reflection in order to promote the formation of self-identity.	
Objective 1:	Require each cadet to maintain a personal journal throughout the expedition weekend.
Objective 2:	Provide a minimum of 15 minutes for cadets to be alone for personal reflection and journal time.
Objective 3:	Provide an opportunity for each cadet to have a personal interview with their Team Instructor (TI) at the end of the expedition to discuss their own personal growth and discoveries as a result of the experience.

IDENTIFY EXPEDITION GUIDELINES

Time of Year	Spring (April–May) / Fall (September–October).
Number of Days	2 nights, 3 days (arrive Friday evening, depart Sunday afternoon).
Number of Participants	36 cadets (12 females, 24 males), 8 staff (5 male, 3 female) = 44 total participants
Participant Information: • **age,** • **gender,** • **physical fitness level,** • **health, and** • **prior experience.**	• Cadets are 14–16 years old. • There is a mix of male and female cadets (1/3 female). • The physical fitness level of each participant is unknown (will be identified upon cadet's arrival at expedition centre). • Cadets are either training Silver Star or Silver Star qualified. • Some cadets will have completed Basic Expedition.
Budget (if applicable)	Not applicable.

	1	2	3 (if applicable)
Mode of Travel	Canoeing	Mountain Biking	
Distance	between 8–10 km	between 35–40 km	
Terrain	flatwater	familiarization trails	

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 2

EO M425.02 – PLAN AN EXPEDITION ROUTE

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-704/PG-001, *Gold 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.

Have the cadets bring their Expedition Duo-Tang.

Gather examples of expedition route planning resources from the local area for TP 1.

Photocopy Section 2 of the Expedition Planning Booklet located at Attachment A for each cadet.

Decide if cadets will develop an expedition route using the area and information provided or an alternate area.

If using the area and information provided:

1. Photocopy the Expedition Route Planning Information handout located at Attachment B for each cadet.
2. Photocopy the resource materials required to complete TPs 4 and 6 located at Attachments C–G for each group.
3. Photocopy on 11 x 17 inch paper the topographical maps located at Attachment I for each group.
4. Review the Completed Section 2 of the Expedition Planning Booklet located at Attachment H.

If an alternate area is selected:

1. Gather, organize and photocopy (if required) the resource materials associated with the area for each group.
2. Create and photocopy the Expedition Planning Information handout for each cadet.
3. Complete the sample Section 2 of the Expedition Planning Booklet located at Attachment A.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A group discussion was chosen for TP 1 as it allows the cadets to interact with their peers and share their knowledge and opinions about identifying different types of expedition resource materials. Sharing in the

discussion encourages the cadets to examine their own thoughts and feelings and may prompt them to re-examine their previously held ideas. Participating in a group discussion improves the cadets' listening skills and team development.

An interactive lecture was chosen for TPs 2, 3 and 5 to introduce the cadets to factors that should be considered when planning an expedition route and to provide an introduction to expedition route cards.

An in-class activity was chosen for TPs 4 and 6 as it is an interactive way to provoke thought and stimulate interest in planning an expedition route and preparing a route card.

INTRODUCTION

REVIEW

The review for this lesson is from EO M425.01 (Establish Expedition Parameters).

QUESTIONS:

Q1. Identify two reasons for conducting expeditions.

Q2. What is the purpose of creating goals and objectives?

Q3. What are two guidelines that must be established when planning an expedition?

ANTICIPATED ANSWERS:

A1. Expeditions are conducted for the following reasons:

- to challenge participants;
- to develop hard and soft skills;
- to provide leadership opportunities;
- to increase physical fitness levels; and / or
- to provide opportunities to receive qualifications.

A2. Goals and objectives serve the same purpose as a good map—they provide leaders with a specific path to follow as they create and execute the expedition. Goals and objectives will also assist leaders in making decisions while on the expedition.

A3. The following guidelines must be established when planning an expedition:

- time of year expedition is taking place,
- number of days,
- number of participants,
- participant experience level,
- budget, if applicable, and
- mode(s) of travel, to include:
    - distance, and
    - terrain.

OBJECTIVES

By the end of this lesson the cadet shall have planned an expedition route.

IMPORTANCE

It is important for cadets to plan an expedition route as it provides cadets with a tool that can be applied to planning a variety of different activities. Expedition route selection requires cadets to complete research and identify factors in order to choose the best location / route. This process will help to build the cadets' analytical skills in a very practical manner.

Teaching Point 1 **Identify expedition route planning resources.**

Time: 10 min Method: Group Discussion

BACKGROUND KNOWLEDGE

The point of the group discussion is to draw the following information from the group using the tips for answering / facilitating discussion and the suggested questions provided.

EXPEDITION ROUTE PLANNING RESOURCES

Reference Material

Information on expedition routes can be gathered from a variety of reference materials—print and web-based. Availability of reference material differs from one province / territory to another. Possible sources include:

- topographical maps,
- recreation maps,
- trail maps,
- river maps,
- guidebooks,
- outdoors clubs' newsletters,
- magazines,
- books, and
- websites.

Organizations / Authorities

Within Canada, there are a number of organizations / authorities that can be consulted when planning an expedition route. Depending on the scope of the organization / authority, they can provide information on terrain, trails, campsites, amenities, etc. In some situations, they can also assist with the planning of the route, utilizing their experience with the area to select the best possible route that meets the purpose, goals and objectives of the expedition. As with reference material, organizations and authorities differ greatly from one province / territory to another. Possible organizations / authorities include:

- Parks Canada,
- provincial / territorial parks,
- conservation authorities,
- municipal offices,
- local river / lake authorities,
- outdoors clubs,

- local trail authorities, and
- private property owners.

GROUP DISCUSSION

TIPS FOR ANSWERING / FACILITATING DISCUSSION:

- Establish ground rules for discussion, eg, everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

SCENARIO

Consider the following scenario:

The Gold Star cadets have been chosen to plan the Silver Star expedition training weekend. Some of the initial planning for the expedition has been completed—goals and objectives have been established, and expedition guidelines have been identified—but no location has been selected. It is the responsibility of the Gold Star cadets to identify and research possible locations and then plan a route once all factors have been considered.

SUGGESTED QUESTIONS:

Q1. Where do expeditions usually occur?

Q2. What stands out in your mind about the location where you completed the Silver Star expedition last year?

Q3. What types of reference materials do you think were consulted when the planners of the Silver Star expedition were researching a possible location?

Q4. What types of organizations / authorities could have been approached to find out information on a specific areas / canoe routes / trail systems / campsites?

Other questions and answers will develop throughout the group discussion. The group discussion should not be limited to only those suggested.

Reinforce those answers given and comments made during the group discussion, ensuring the teaching point has been covered.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the group discussion will serve as the confirmation of this TP.

Teaching Point 2 **Identify factors to consider when selecting an expedition location.**

Time: 10 min Method: Interactive Lecture

Have cadets review the expedition goals, objectives and guidelines they previously recorded in Section 1 of their Expedition Planning Booklets.

Distribute Section 2 of the Expedition Planning Booklet located at Attachment A to each cadet and have them place it in their Duo-Tang.

Distribute the Expedition Route Planning Information handout located at Attachment B to each cadet. If using an alternate area distribute the Expedition Route Planning Information handout created for that area.

Have the cadets turn to the expedition location comparison chart found in the Expedition Route Planning Information handout. Explain that the comparison chart is a tool that can be used to compare expedition locations to select the best possible location.

Review the information detailed in the expedition location comparison chart with the cadets. Have the cadets choose a location and provide at least two reasons why they think it best meets the goals, objectives and guidelines of the expedition.

FACTORS TO CONSIDER WHEN SELECTING AN EXPEDITION LOCATION

Selecting an expedition location is the first step in planning an expedition route. Choosing a location is dependent on a number of factors that can be identified through research of resource materials, such as topographical maps, guidebooks, websites, books and provincial parks. Expedition locations should be selected to meet the established expedition goals, objectives and guidelines.

The most effective way to select an expedition location is to identify a number of possible locations and compare and contrast each location based on the following factors:

- the distance and time needed to travel to and from the location,

- the distance and time needed to obtain emergency services, including:
    - communication, and
    - evacuation routes;
- the ability to conduct the selected modes of travel, including:
    - distance (per mode of travel and total distance), and
    - terrain (eg, availability of familiarization trails / flatwater);
- the availability of campsites / rest stops,
- the ease and cost of obtaining permission to use the area, and
- the ability to comply with established land management practices, including:
    - fire restrictions,
    - group size limit,
    - restricted camping areas, and
    - closed trails.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. Where could an expedition planner go to find information on possible expedition locations?

Q2. When selecting an expedition location, what is the primary consideration?

Q3. When assessing a location's compatibility with the selected modes of travel, the expedition planner should consider what two factors?

ANTICIPATED ANSWERS:

A1. Expedition planners can consult the following resources to find information on possible expedition locations:

- topographical maps,
- guidebooks,
- websites,
- books, and
- provincial parks.

A2. Expedition locations should be selected to meet the established expedition goals, objectives and guidelines.

A3. The expedition planner should consider if the location meets the mode of travel distance requirements (per mode and total distance) and the terrain requirements (eg, availability of familiarization trails / flatwater).

Teaching Point 3 **Identify the elements of an expedition route.**

Time: 10 min Method: Interactive Lecture

Information in this TP can be presented using a "Think, Pair, and Share" format. This will allow cadets to consider and discuss the elements included in an expedition route based on personal experience. A "Think, Pair and Share" is conducted using the following format:

1. Cadets individually think about the elements included in an expedition route for no more than one minute.
2. Cadets pair up and discuss their ideas for no more than two minutes.
3. Cadets share their ideas with the rest of the class for no more than three minutes.

Record the cadets' answers on flip chart paper. Add elements the cadets missed to the list once all pairs have shared their ideas. Ensure all keys points have been presented.

ELEMENTS OF AN EXPEDITION ROUTE

Once the possible expedition location(s) have been identified, the next step in the process is to plan the expedition route. Like location(s), expedition routes are designed to accommodate the goals, objectives and guidelines. It is important that the expedition planner take the time to review the maps and guidebooks associated with the location prior to settling on one specific route. It is advisable to select two to three possible route combinations and assess the validity of each option to meet the requirements of the expedition.

The elements of an expedition route will have some flexibility depending on the location selected. It is the responsibility of the expedition planner to identify the required elements and organize them into an exciting and challenging route. The following are examples of elements that may be incorporated to form the expedition route:

Number of days to complete the expedition. Found in the expedition guidelines and identified in the first step of the expedition planning process.

Pick-up and drop-off points. Ensure that there is enough space at the location for buses and other transportation vehicles. In most cases, pick-up and drop-off points will co-locate with the campsites for the first and last nights.

Campsites. The number of campsites required will be dependant on the number of days of the expedition and whether or not the expedition is linear or circular in design. A linear route will require different campsites every day, whereas the group may arrive back to a site when travelling a circular route. If the area allows for it, it is advisable to choose a primary and secondary campsite for each night. Campsite availability will somewhat dictate the expedition route so campsites should be identified and selected early on in the route planning process.

Modes of travel. Found in the expedition guidelines and identified in the first step of the expedition planning process. The expedition route must be designed so it incorporates the selected modes of travel in a fun, challenging and exciting manner.

Terrain requirements. Found in the expedition guidelines and identified in the first step of the expedition planning process. Identifying the level of terrain for an area / trail / river being used can be done by looking through the resource materials being used to plan the expedition, such as guidebooks or maps.

Distance requirements. Found in the expedition guidelines and identified in the first step of the expedition planning process. The expedition planner must ensure that the expedition route meets the established distance

requirements by measuring the distances for each mode of travel on the topographical map. It is acceptable for there to be minor variances in distance requirements.

Mode(s) of travel change points. Some expedition routes will require multiple modes of travel on the same day. For example, a group may canoe for the morning and then hike to their campsite in the afternoon. If this is the case, it is important that mode of travel change points are identified. These points, like pick-up and drop-off points, require ample room for the delivery and pick-up of equipment.

Lunch locations. Depending on the type of expedition, if participants are carrying their own meals or meals are being provided for them, there may be a requirement for a specified lunch location. Select more than one possible location along the route to allow for variances in speed of participants. When choosing lunch locations consider the availability of water, space, shade, suitable eating area, washroom facilities, etc.

Rest stop / resupply locations. There will always be a requirement to have designated locations along the route where the expedition participants can take a break and resupply items such as water and snacks. There should be at least two per half day of the expedition; however, both do not necessarily have to provide road access. When choosing rest-stop locations consider the availability of water, space, shade, suitable eating area, washroom facilities, etc.

Evacuation routes. When developing an expedition route, it is important to identify evacuation routes to the nearest hospital. This should include the grid reference (GR) of the hospital and then a trace of the route to the hospital. Participants are continuously moving, so planners need to provide route details based on identified starting points and main roads.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. How many possible route combinations should be identified and assessed when planning an expedition route?

Q2. Where is information relating to modes of travel, terrain requirements and distance requirements found?

Q3. When are mode of travel change points required?

ANTICIPATED ANSWERS:

A1. When planning an expedition route, planners should identify and assess two to three possible route combinations.

A2. Information relating to modes of travel, terrain requirements and distance requirements is found in the first step of the expedition planning process under expedition guidelines.

A3. Mode of travel change points are required when the expedition route requires participants to switch from one mode of travel to another on the same day.

Teaching Point 4 **Explain and have the cadets, in groups of three, plan an expedition route.**

Time: 30 min Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is for the cadets, in groups of three, to plan an expedition route.

RESOURCES

- Section 2 of the Expedition Planning Booklet located at Attachment A (one per cadet),
- Expedition Route Planning Information handout located at Attachment B or the Expedition Route Planning Information handout created for the alternate area (one per cadet),
- Resource Materials located at Attachments C–G and I or the identified resources for the alternate area (one per group),
- Sample Section 2 of the Expedition Planning Booklet located at Attachment H,
- Expedition Duo-Tang,
- Compass (two per group), and
- Pencil (three per group).

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of three.
2. Ensure each cadet has an Expedition Route Planning Information handout.
3. Distribute resource materials to each group, to include:
    a. Maps located at Attachment C or maps for the alternate area selected,
    b. Campground Information located at Attachment D or campground information for the alternate area selected,
    c. Mountain Bike Trails Information located at Attachment E or mountain bike information for the alternate area selected,
    d. Canoe Route Information located at Attachment F or canoe route information for the alternate area selected, and
    e. Hospital Information located at Attachment G or hospital information for the alternate area selected.
    f. Topographical maps located at Attachment I or topographical maps for the alternate area selected.
4. Brief the cadets on the resource materials provided to ensure they are aware of what is available for them to use to complete the activity.
5. Have groups turn to the page on developing an expedition route in their Expedition Planning Booklet and review the content with the cadets.
6. Have the groups plan two possible expedition routes, using the provided resource materials by:
    a. completing the Develop an Expedition Route section of their Expedition Planning Booklet, to include:
        (1) identifying the number of days to complete the expedition;
        (2) selecting drop-off and pick-up points;

(3) selecting a primary and possibly a secondary campsite for each night of the expedition;

(4) incorporating the selected modes of travel ensuring that:

(a) terrain requirements are met, and

(b) distance requirements are met;

(5) selecting mode of travel change point(s), if required;

(6) identifying possible lunch locations for each day;

(7) identifying at least two possible rest stop / resupply locations along the route; and

(8) identifying evacuation routes to the nearest hospital; and

b. plotting the routes on the topographical map, to include:

(1) drop-off and pick-up points,

(2) campsites,

(3) mode of travel number one route,

(4) mode of travel number two route,

(5) mode of travel change points,

(6) lunch locations,

(7) rest stop / resupply locations, and

(8) evacuation routes.

7. Have each group compare the two expedition routes and rate them—first choice and second choice—based on compatibility with expedition goals, objectives and guidelines.

Explain that the next step in the process is to conduct a reconnaissance of the most compatible route and then, if required, conduct a reconnaissance of the other route in order to make the final route selection.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in the activity will serve as the confirmation of this TP.

Teaching Point 5 **Describe expedition route cards.**

Time: 10 min Method: Interactive Lecture

This TP is intended to introduce the cadet to creating an expedition route card.

Cadets will remain seated with their groups from the previous TP.

Cadets will be required to complete a schedule (individually) in their Expedition Planning Booklet on their own time. The schedule is included in Section 2 of the Expedition Planning Booklet.

An expedition schedule is usually completed in conjunction with the expedition route card. Schedules vary in both detail and length. They can be a detailed, daily schedule organized by time or a broad overview of activities on a daily basis without time constraints. The schedule guides cadets through the expedition.

PURPOSE OF AN EXPEDITION ROUTE CARD

Expedition route cards are sometimes referred to as time control plans. For the purpose of this TP, they will be identified as expedition route cards.

Every expedition plan must include an expedition route card. Expedition route cards are a critical component of the expedition plan. They provide insight into the terrain, direction of travel, potential dangers, and amount of time required to complete the specific route. The expedition route card is developed to match the goals and ability level of the expedition participants. It provides the participants of the expedition with all the information they need to complete the expedition.

When using expedition route cards, a route is referred to as the entire expedition and each smaller section is referred to as a leg.

On an expedition route card, the entire route is divided into legs with a number of locations identified for rest stops / campsites / mode of travel change points, etc. Once the expedition route card is prepared, the route is planned.

A topographical / trail / river map(s) of the area of travel is required to use in conjunction with the expedition route card.

COMPONENTS OF AN EXPEDITION ROUTE CARD

Have the cadets turn to the Sample Route Card located in the Expedition Route Planning Information handout at Attachment B.

The information included on an expedition route card will vary, depending on the activity(s) being completed during the expedition and the resource material being used to plan the expedition. For example, if the expedition route follows a marked trail system there will be no requirement to include GRs or bearings. In this case, the route description would detail all required information.
It is the responsibility of the expedition planner to identify the key components and develop them in order to create a workable expedition route card.

The following is a list of possible components:

Mode of travel. Modes of travel may include hiking, mountain biking, canoeing, voyageur canoeing or kayaking.

GRs. When GRs are used, there are two for each leg of the route (a "from GR" and a "to GR"). Each should be accompanied by a description (eg, 456 789 Parking Lot).

Bearing. A bearing is determined for each leg of the expedition route once the start and finish GRs have been plotted. In some cases, a bearing is not required.

When bearings are not being used, the route description is filled out in detail for each leg of the route.

Distance. Distance is measured in metres or kilometres, depending on the length of the leg of the route.

Elevation. Elevation for each leg is measured in metres. There are two elevation figures on the expedition route card, one for the start point of the leg and one for the end point of the leg. Rate of travel will differ, depending on elevation.

Including the elevation on the expedition route card provides additional information about the shape and the height of the ground.

Time. The time required to complete a leg of a route can initially be calculated using the law of averages.

Rates of travel will differ, depending on factors such as the group, equipment, terrain, elevation above sea level, etc. On average:

- A person walks 4 km per hour, 1 km per 15 minutes or 100 m per 1.5 minutes.
- Off trail in open terrain, a person can be expected to travel on foot 3 km per hour.
- On rough, difficult terrain, a person can be expected to travel on foot 1–1.5 km per hour.
- When gaining elevation, there should be an extra allowance of 1 hour per every 300 m. When above 3 000 m, the rate of travel will greatly decrease.
- When losing elevation, up to a half an hour can be added for every 1 000 m lost depending on terrain.
- Canoeists paddle 4–5 km per hour in favourable conditions (mild wind, few waves). Speed is also affected by current, paddling experience and time of day.
- The speed of a mountain biker is highly influenced by the types of trail they are riding on and their experience as a mountain biker. The general speed is between 15–25 km per hour.

There should be 10 minutes of rest allowed for every hour of travel.

Route description. The route description is a short but detailed written explanation that has been developed by studying the features of the map between the start and end point of each leg of the expedition route. It is an account of terrain, prominent objects and catching features that should be passed along the leg (eg, follow the path north to a wooden bridge, cross the bridge, and then take the left path west until out of the woods). A description of the end point of the leg should also be recorded (eg, road junction or intersection).

A leg will usually end at a major change in direction or an obvious point.

Group detail. The size, fitness level, knowledge and experience of the group and the equipment that is being carried are factors to consider and may need to be noted on the expedition route card.

Date:	20 Oct 07 / Day 1	**Platoon / Team:**	Wild Horses	**Location:**	Frontenac Provincial Park
Start Time:	0800 hrs	**Est. Finish Time:**	1600 hrs	**Starting Elevation:**	260 m

LEG	MODE OF TRAVEL	FROM GR	TO GR	BEARING	DISTANCE	ELEVATION	TIME	ROUTE DESCRIPTION
1	Hike	255 981	265 931	6350 mils	4 km	S – 260 m F – 290 m	60 min	Follow flat terrain, wide paths north, stop at intersection.
2	Hike	265 931	267 911	6100 mils	4 km	S – 290 m F – 330 m	90 min	Steep hills, narrow paths, continue north.
3	Mountain Bike	267 911	315 966	1550 mils	10 km	S – 330 m F – 350 m	90 min	Some hills, wide gravel road. Go right at fork in the road after last tree.
4	Mountain Bike	315 966	330 976		2 km	S – 350 m F – 300 m	30 min	Many hills, narrow and rocky paths with obstacles, stop at bridge
5	Canoe	330 976	354 970		1.5 km	No change	30 min	Flatwater. Stay river left of small island.
6	Canoe	354 970	358 982		1 km	No change	60 min	Flatwater. Land at third campsite on river left.
7	Hike	358 982	384 001		3.5 km	S – 300 m F – 250 m	90 min	Some hills, narrow path, finish at main parking lot.

Group Details:	Team has eight members–four females and four males–who all possess a high level of physical fitness. Three members completed Basic Expedition and two members completed Expedition Instructor.

Figure 1 Sample Route Card

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

CONFIRMATION OF TEACHING POINT 5

QUESTIONS:

Q1. What is the purpose of an expedition route card?

Q2. On an expedition route card, the entire route in divided into what smaller sections?

Q3. How should the time required to complete the route be calculated?

ANTICIPATED ANSWERS:

A1. An expedition route card is a critical component of the expedition plan. It provides insight into the terrain, direction of travel, potential dangers, and amount of time required to complete the specific route.

A2. On an expedition route card, the entire route is divided into legs with a number of locations identified for rest stops / campsites / mode of travel change points, etc.

A3. The time required can be calculated by the average speed of a person (the average person walks 4 km per hour). This gives the time for 1 km as 15 minutes for each 100 m as approximately 1.5 minutes.

Teaching Point 6 **Explain and have the cadets, in groups of three, prepare an expedition route card.**

Time: 10 min Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadet, in groups of three, prepare an expedition route card.

RESOURCES

- Section 2 of the Expedition Planning Booklet located at Attachment A (one per cadet),
- Expedition Route Planning Information handout located at Attachment B or the Expedition Route Planning Information handout created for the alternate area (one per cadet),
- Resource Materials located at Attachments C–G and I or the identified resources for the alternate area (one per group),
- Sample Section 2 of the Expedition Planning Booklet located at Attachment H,
- Expedition Duo-Tang,
- Compass (two per group), and
- Pencil (three per group).

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Ensure each group has:
   a. resource materials, and
   b. the Expedition Route Planning Information handout.
2. Distribute to each group:
   a. pencils, and
   b. compasses.

3. Have the groups turn to the Prepare an Expedition Route Card section of the Expedition Planning Booklet.

4. Have the groups prepare an expedition route card, for their selected route, in their Expedition Planning Booklet by:

    a. recording:

        (1) the date of the expedition,

        (2) expedition location,

        (3) start time,

        (4) estimated finish time,

        (5) starting elevation, and

        (6) group details; and

    b. filling in the following components:

        (1) mode of travel,

        (2) from GR and to GR (if required),

        (3) bearing (if required),

        (4) distance,

        (5) elevation,

        (6) time, and

        (7) route description.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 6

The cadets' participation in preparing a route card will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in planning an expedition route and preparing an expedition route card will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Cadets must ensure that all of Section 2 of the Expedition Planning Booklet are completed prior to EO M425.03 (Develop an Expedition Equipment List).

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 425 PC.

CLOSING STATEMENT

Planning an expedition route that satisfies the expedition goals, objectives and guidelines is a critical component of expedition planning. The key to a successful expedition is a well planned expedition route. Once the route has been established, the preparation of the expedition route card will ensure that all participating members are aware of all facets of the trip. A prepared, well-organized and detailed expedition route card will effectively guide participants along the route.

INSTRUCTOR NOTES / REMARKS

Nil.

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SECTION 2 – PLAN AN EXPEDITON ROUTE

IDENTIFY EXPEDITION ROUTE PLANNING RESOURCES

When planning an expedition route, there are a variety of reference materials and organizations / authorities that can assist the expedition planner.

Listing the planning resources that have been consulted or contacted is beneficial not only in planning the current expedition but for future expedition planning as well.

Reference Materials	Organizations / Authorities

IDENTIFY FACTORS TO CONSIDER WHEN SELECTING AN EXPEDITION ROUTE

Choosing an expedition location is dependent on a number of factors that can be identified through research of resource materials. Expedition locations should be selected to meet the established expedition goals, objectives and guidelines.

The most effective way to select an expedition location is to identify a number of possible locations and compare and contrast the suitability of each location.

Selecting an Expedition Location Comparison Chart

	Location #1	Location #2	Location #3
What is the distance to and from the location?			
How long does it take to travel to and from the location?			
How long will it take to get to or receive emergency services?			
Is there adequate space at start and end points for drop-off of personnel and equipment?			
Can the distance requirements for mode of travel #1 be met? **Can the terrain requirements for mode of travel #1 be met?**			
Can the distance requirements for mode of travel #2 be met? **Can the terrain requirements for mode of travel #2 be met?**			

	Location #1	Location #2	Location #3
Are there a number of campsites / rest stops available in the area?			
What are the associated costs of using the area?			
What are the procedures to gain access to use the area?			
Are there any limitations on group sizes?			
Are there any restricted camping areas?			

An expedition location must now be chosen. In some cases, it is difficult to select a location from the comparison alone. The expedition planner may have to conduct a physical reconnaissance of the areas to assist in the selection process.

Chosen location: _____

_____

Reasons for choosing location: _____

_____

DEVELOP AN EXPEDITION ROUTE

Like the location(s), expedition routes should be designed to accommodate the goals, objectives and guidelines of the expedition. A detailed review of the maps and guidebooks associated with the location must now take place before a specific route is selected. Two to three possible route combinations should be developed and assessed for their ability to meet the requirements of the expedition.

The expedition route is penciled in on the topographical map of the area. The expedition planner uses conventional signs to identify the key elements of the expedition route on the topographical map. If possible, GRs and location identifiers should be recorded.

Length of the expedition: _____

	Route #1	Route #2
Drop-off point and campsite.		
Mode(s) of travel for day #1.		
Mode of travel change point(s) for day #1, if required.		
Possible lunch locations for day #1.		

	Route #1	Route #2
Possible rest-stop / resupply locations for day #1.		
Evacuation route(s) for day #1.		
Possible campsite(s) for night.		
Mode(s) of travel for day #2.		
Mode of travel change point(s) for day #2, if required.		
Possible lunch locations for day #2.		
Possible rest-stop / resupply locations for day #2.		

	Route #1	Route #2
Evacuation route(s) for day #2.		
Pick-up point.		
Rate routes based on their ability to comply with the goals, objectives and guidelines of the expedition.		

PREPARING AN EXPEDITION ROUTE CARD

Expedition route cards are a critical component of the expedition plan that provide insight into the terrain, direction of travel, potential dangers, and amount of time required to complete the specific route. A well developed expedition route card provides the participants of the expedition with all the information they need to complete the expedition.

The information included on an expedition route card varies depending on the activity(s) being completed during the expedition and the resource material being used to plan the expedition. For example, if the expedition route follows a marked trail system there is no requirement to include GRs or bearings. In this case, the route description details all required information.

Route Card–Day _____

Date:		**Team:**		**Location:**	
Start Time:		**Estimated Finish Time:**		**Starting Elevation:**	

Leg	Mode of Travel	From GR	To GR	Bearing	Distance	Elevation	Time	Route Description
1								
2								
3								
4								
5								
6								
7								

Group Details:	

Route Card–Day _____

Date:		**Team:**		**Location:**	
Start Time:		**Estimated Finish Time:**		**Starting Elevation:**	

Leg	Mode of Travel	From GR	To GR	Bearing	Distance	Elevation	Time	Route Description
1								
2								
3								
4								
5								
6								
7								

Group Details:	

CREATE AN EXPEDITION SCHEDULE

An expedition schedule is usually completed in conjunction with the expedition route card. Schedules vary in both detail and length. They can be a detailed, daily schedule organized by time or a broad overview of daily activities without time constraints. The schedule guides participants through the expedition.

Day _____		
Timings	**Tasks / Activity**	**Remarks**

Day _____		
Timings	**Tasks / Activity**	**Remarks**

Timings	Tasks / Activity	Remarks

Day _____		
Timings	**Tasks / Activity**	**Remarks**

Timings	Tasks / Activity	Remarks

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EXPEDITION ROUTE PLANNING INFORMATION HANDOUT

Identify Expedition Route Planning Resources

Reference Materials	Organizations / Authorities
Ontario Recreation Map	Ontario Parks
Topographical maps–Markdale, Collingwood, Goderich, Lucknow, Wingham, Chesley, Walkerton and Wiarton	Saugeen Valley Conservation Authority
Canadian Canoe Routes–www.myccr.com	Grey Sauble Conservation Authority
Ontario Trails Council–www.ontariotrails.on.ca	Bruce Trail Association
Backroad Map Book–Southwestern Ontario	Maitland Conservation Authority
A Paddlers Guide to Wilderness Weekend Adventures by Kevin Callan	
A Paddlers Guide to The Rivers of Ontario and Quebec by Kevin Callan	
MapQuest	

Select an Expedition Location Comparison Chart

	Location #1	Location #2	Location #3
	Walkerton	**Wingham**	**Thornbury**
What is the distance to and from the location?	Niagara Falls–231 km Windsor–346.45 km	Niagara Falls–228.07 km Windsor–313 km	Niagara Falls–256.84 km Windsor–444.02 km
How long does it take to travel to and from the location?	Niagara Falls–3.15 hours Windsor–4.46 hours	Niagara Falls–3 hours Windsor–4.10 hours	Niagara Falls–3.17 hours Windsor–5.35 hours
How long will it take to get to or receive emergency services?	Hospitals located in Chesley, Walkerton and Hanover. Furthest distance is 15 km. Call 911.	Hospitals located in Wingham and Goderich. Furthest distance is 20 km. Call 911.	Hospitals located in Markdale, Collingwood and Meaford. Furthest distance is 25 km. Call 911.
Is there adequate space at start and end points for drop-off of personnel and equipment?	Yes. Various points in area for start and end points.	Yes. Various points in area for start and end points.	Yes. Various points in area for start and end points.
Can the distance requirements for mode of travel #1 be met?	Saugeen River—Walkerton to Paisley–39 km—earlier take-out points available.	Maitland River—Wingham to Auburn–25 km— earlier take-out points available.	Beaver River— Kimberly to Heathcote–25 km— earlier take-out points available.
Can the terrain requirements for mode of travel #1 be met?	Mostly flatwater, some swifts depending on time of year, lift-overs and sweepers.	Flatwater, some swifts depending on time of year, lift-overs.	Flatwater.
Can the distance requirements for mode of travel #2 be met?	Brant Tract Trail System— over 25 km of trails. Roads leading to Brant Tract increase distance.	Carrick Tract Trail System— over 13 km of trails. Roads leading to Carrick Tract increase distance.	Kolapore Uplands Wilderness Ski Trails— over 30 km of trails. Roads leading to Kolapore Ski Trails increase distance.

	Location #1	Location #2	Location #3
Can the terrain requirements for mode of travel #2 be met?	Novice double- and single- track trails, intermediate single-track trails, dirt roads and paved roads.	Novice double- and single-track trails, intermediate single-track trails, dirt roads and paved roads.	Novice double- and single-track trails, intermediate single-track trails, dirt roads and paved roads.
Are there a number of campsites / rest stops available in the area?	Two Conservation Area campgrounds and three privately owned campgrounds.	Four privately owned campsites and one Conservation Area campground	Two privately owned campgrounds.
What are the associated costs of using the area?	Costs for campsites are between $15 and $30 per night. Group rates are available.	Costs for campsites are between $12 and $30 per night. Group rates are available.	Costs for campsites are between $10 and $25 per night. Group rates are available.
What are the procedures to gain access to use the area?	Contact Grey Bruce Conservation Authority.	Contact Maitland Valley Conservation Authority and Grey Bruce Conservation Authority.	Contact Grey Sable Conservation Authority.
Are there any limitations on group sizes?	No limits—just dependent on availability of campsites.	No limits—just dependent on availability of campsites.	No limits—just dependent on availability of campsites.
Are there any restricted camping areas?	Can only camp in designated campgrounds. Rest stops can occur at campgrounds, conservation areas and crown land. No stopping on private land.	Can only camp in designated campgrounds. Rest stops can occur at campgrounds, conservation areas and crown land. No stopping on private land.	Can only camp in designated campgrounds. Rest stops can occur at campgrounds, conservation areas and crown land. No stopping on private land.

Chosen location: _____

_____

Reasons for choosing location: _____

_____

Date:	20 Oct 07 / Day 1	**Platoon / Team:**	Wild Horses	**Location:**	Frontenac Provincial Park
Start Time:	0800 hrs	**Est. Finish Time:**	1600 hrs	**Starting Elevation:**	260 m

LEG	MODE OF TRAVEL	FROM GR	TO GR	BEARING	DISTANCE	ELEVATION	TIME	ROUTE DESCRIPTION
1	Hike	255 981	265 931	6350 mils	4 km	S – 260 m F – 290 m	60 min	Follow flat terrain, wide paths north, stop at intersection.
2	Hike	265 931	267 911	6100 mils	4 km	S – 290 m F – 330 m	90 min	Steep hills, narrow paths, continue north.
3	Mountain Bike	267 911	315 966	1550 mils	10 km	S – 330 m F – 350 m	90 min	Some hills, wide gravel road. Go right at fork in the road after last tree.
4	Mountain Bike	315 966	330 976		2 km	S – 350 m F – 300 m	30 min	Many hills, narrow and rocky paths with obstacles, stop at bridge
5	Canoe	330 976	354 970		1.5 km	No change	30 min	Flatwater. Stay river left of small island.
6	Canoe	354 970	358 982		1 km	No change	60 min	Flatwater. Land at third campsite on river left.
7	Hike	358 982	384 001		3.5 km	S – 300 m F – 250 m	90 min	Some hills, narrow path, finish at main parking lot.

Group Details:	Team has eight members–four females and four males–who all possess a high level of physical fitness. Three members completed Basic Expedition and two members completed Expedition Instructor.

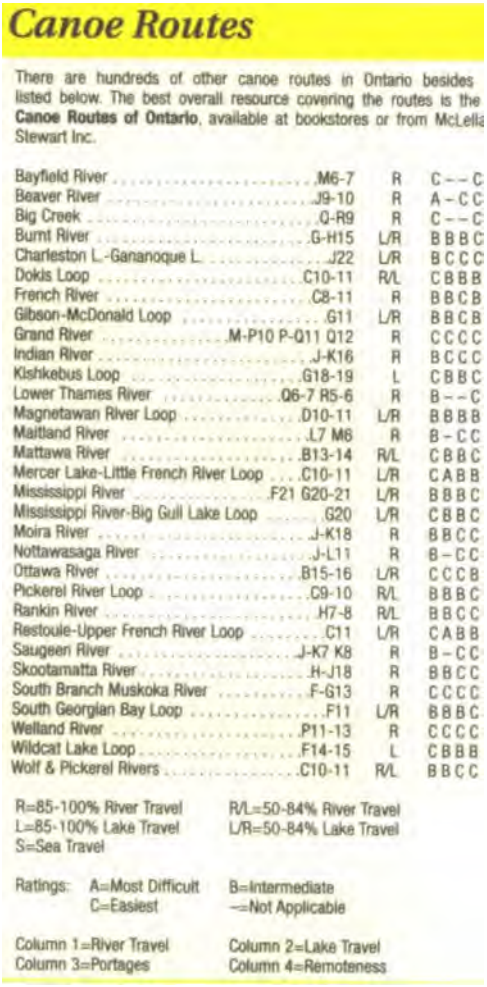
Figure B-1 Sample Route Card

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

MAPS

Figure C-1 Recreation Map–Saugeen River Canoe Route

Note. From *Ontario Recreation Map*, by MapArt Publishing Corporation, 2005, Oshawa, ON: Peter Heiler Ltd. Copyright 2005 by Mapmedia Corp.



Canoe Routes

There are hundreds of other canoe routes in Ontario besides listed below. The best overall resource covering the routes is the **Canoe Routes of Ontario**, available at bookstores or from McLella Stewart Inc.

Bayfield River	M6-7	R	C – – C
Beaver River	J9-10	R	A – C C
Big Creek	Q-R9	R	C – – C
Burnt River	G-H15	L/R	B B B C
Charleston L.-Gananoque L.	J22	L/R	B C C C
Dokis Loop	C10-11	R/L	C B B B
French River	C8-11	R	B B C B
Gibson-McDonald Loop	G11	L/R	B B C B
Grand River	M-P10 P-Q11 Q12	R	C C C C
Indian River	J-K16	R	B C C C
Kishkebus Loop	G18-19	L	C B B C
Lower Thames River	Q6-7 R5-6	R	B – – C
Magnetawan River Loop	D10-11	L/R	B B B B
Maitland River	L7 M6	R	B – C C
Mattawa River	B13-14	R/L	C B B C
Mercer Lake-Little French River Loop	C10-11	L/R	C A B B
Mississippi River	F21 G20-21	L/R	B B B C
Mississippi River-Big Gull Lake Loop	G20	L/R	C B B C
Moira River	J-K18	R	B B C C
Nottawasaga River	J-L11	R	B – C C
Ottawa River	B15-16	L/R	C C C B
Pickerel River Loop	C9-10	R/L	B B B C
Rankin River	H7-8	R/L	B B C C
Restoule-Upper French River Loop	C11	L/R	C A B B
Saugeen River	J-K7 K8	R	B – C C
Skootamatta River	H-J18	R	B B C C
South Branch Muskoka River	F-G13	R	C C C C
South Georgian Bay Loop	F11	L/R	B B B C
Welland River	P11-13	R	C C C C
Wildcat Lake Loop	F14-15	L	C B B B
Wolf & Pickerel Rivers	C10-11	R/L	B B C C

R=85-100% River Travel
L=85-100% Lake Travel
S=Sea Travel
R/L=50-84% River Travel
L/R=50-84% Lake Travel

Ratings: A=Most Difficult
C=Easiest
B=Intermediate
–=Not Applicable

Column 1=River Travel
Column 2=Lake Travel
Column 3=Portages
Column 4=Remoteness

Figure C-2 Recreation Map– Canoe Route Information

Note. From *Ontario Recreation Map*, by MapArt Publishing Corporation, 2005, Oshawa, ON: Peter Heiler Ltd. Copyright 2005 by Mapmedia Corp.

Conservation Areas

10	A.W. Campbell	Q6	519-847-5357	✔	✔	✘	✘	✔	✘
61	Ainslie Wood	H9	519-376-3076	✘	✘	✘	✘	✔	✘
69	Albion Hills	L11	905-880-4855	✔	✔	✔	✘	✔	✘
52	Allan Park	K8	519-364-1255	✘	✘	✔	✘	✘	✘
26	Backus Heritage	R9-10	519-586-2201	✔	✔	✔	✘	✔	✘
67	Bail's Falls	P13	905-778-3135	✔	✔	✔	✘	✔	✘
147	Baxter	F23	613-692-3571	✘	✘	✔	✘	✔	✘
81	Belfountain	L11	519-927-5838	✘	✘	✔	✘	✔	✘
43	Belwood Lake	M10	519-843-2979	✘	✘	✔	✘	✔	✘
5	Big Bend	R6	519-354-7310	✔	✘	✔	✘	✘	✔
64	Binbrook	P11	905-692-3228	✘	✘	✔	✘	✔	✘
93	Black Creek Pioneer Vill.	M12	416-736-1733	✘	✘	✘	✘	✘	✘
94	Boyd	L12	905-851-0575	✘	✘	✔	✘	✘	✘
34	Brant	P10	519-752-2040	✔	✔	✘	✘	✔	✘
55	Bruce's Caves	H8	519-376-3076	✘	✘	✔	✘	✘	✘
97	Bruce's Mill	L13	905-887-5531	✘	✘	✔	✘	✔	✘
49	Brucedale	J7	519-389-4516	✔	✘	✔	✘	✔	✘
138	Burtt's Creek	H23	613-546-4228	✔	✔	✔	✘	✘	✘
32	Byng Island	Q12	905-774-5755	✔	✔	✔	✘	✔	✘
4	C.M. Wilson	S5	519-354-7310	✔	✔	✔	✘	✔	✘
2	Cedar Creek Beach	T3	519-776-5209	✘	✘	✘	✘	✘	✘
15	Charles J. McEwen	P5	519-245-3710	✘	✘	✘	✘	✔	✘
65	Chippawa Creek	P-Q12	905-386-6387	✔	✔	✔	✘	✔	✘
73	Christie	N11	905-628-3060	✘	✘	✔	✘	✔	✘
96	Cold Creek	L12	416-661-6000	✘	✔	✔	✘	✘	✘
12	Coldstream	P6-7	519-245-3710	✔	✘	✔	✘	✔	✘
56	Colpoy's Lookout	H8	519-376-3076	✘	✘	✘	✘	✘	✘
40	Conestogo Lake	M9	519-638-2873	✔	✔	✔	✘	✔	✘
70	Confederation Park	N12	1-888-319-HRCA	✔	✔	✔	✘	✔	✘
151	Cooper Marsh	F26	613-347-1332	✘	✘	✔	✘	✘	✘
76	Crawford Lake	N11	905-854-0234	✘	✘	✔	✘	✘	✘
120	Crowe Bridge	J17	613-472-3137	✘	✔	✔	✘	✔	✘
84	D.A. Tiffin	J11-12	705-424-1479	✘	✔	✔	✘	✘	✘
7	Dalewood	Q8	519-631-1270	✔	✔	✔	✘	✔	✘
25	Deer Creek	Q9	519-875-2874	✔	✔	✘	✘	✔	✘
54	Denny's Dam	J7	519-364-1255	✔	✘	✔	✘	✔	✘
132	Depot Lakes	H20	613-476-7408	✔	✘	✔	✘	✔	✘
149	Dickenson Square	F23	613-692-3571	✘	✘	✘	✘	✘	✘
72	Dundas Valley	P11	905-627-1233	✘	✘	✔	✘	✘	✘
53	Durham	K9	519-369-2074	✔	✔	✔	✘	✔	✘
158	Eau Claire Gorge	B14	705-474-5420	✘	✘	✔	✘	✘	✘
87	Edenvale	J11	705-424-1479	✘	✔	✘	✘	✘	✘
41	Elora Gorge	M10	519-846-9742	✔	✔	✔	✘	✔	✘
42	Elora Quarry	M10	519-846-5234	✘	✘	✔	✘	✔	✘
105	Ennisklillen	L14	905-579-0411	✘	✘	✔	✘	✘	✘
62	Epping Lookout	J9	519-376-3076	✘	✘	✘	✘	✘	✘
63	Eugenia Falls	K9	519-376-3076	✘	✘	✔	✘	✘	✘
45	Falls Reserve	M8	1-877-FALLSCA	✔	✔	✔	✘	✔	✘
21	Fanshawe	P7	519-451-2800	✔	✔	✔	✘	✔	✘
69	Fifty Point	P12	905-643-8833	✘	✘	✘	✘	✔	✘
131	Flinton	H19	613-476-7408	✘	✘	✘	✘	✔	✘
143	Foley Mountain	H21	613-692-3571	✘	✔	✔	✘	✔	✘
46	Galbraith	M8	519-335-3557	✘	✔	✔	✘	✔	✘
109	Ganaraska Forest	K15	905-885-8173	✘	✘	✔	✘	✘	✘
110	Garden Hill	K-L15	905-885-8173	✘	✘	✔	✘	✔	✘
88	Glen Haffy	L11	905-584-2922	✘	✘	✔	✘	✘	✘
111	Goodrich-Loomis	K17	613-394-4829	✘	✘	✔	✘	✘	✘
136	Gould Lake	J20	613-546-4228	✘	✘	✔	✘	✔	✘
152	Gray's Creek	F25	613-938-3398	✘	✘	✔	✘	✘	✘
98	Greenwood	L13	905-683-2951	✘	✔	✔	✘	✔	✘
38	Guelph Lake	M10	519-824-5061	✔	✔	✘	✘	✔	✘
29	Haldimand	Q11	905-778-2700	✔	✔	✔	✘	✔	✘
104	Harmony Valley	L14	905-579-0411	✘	✘	✔	✘	✘	✘
122	Harry Smith	K18	613-476-7408	✘	✘	✔	✘	✘	✘
113	Hastings	J-K16	613-394-4829	✘	✘	✘	✘	✘	✘
28	Hay Creek	Q10	519-428-4622	✔	✔	✔	✘	✔	✘
51	Headquarters	K8	519-364-1255	✘	✘	✔	✘	✘	✘
90	Heart Lake	M11	905-846-2494	✘	✘	✔	✘	✔	✘
103	Heber Down	L14	905-579-0411	✔	✘	✔	✘	✘	✘
60	Hibou	H8	519-376-3076	✘	✘	✔	✘	✔	✘
151	High Falls	E24	613-984-2948	✘	✘	✘	✘	✘	✘
16	Highland Glen	P5	519-245-3710	✘	✘	✔	✘	✔	✘
3	Hillman Marsh	T4	519-776-5209	✘	✘	✔	✘	✔	✘
78	Hilton Falls	M-N11	905-854-0262	✘	✘	✔	✘	✘	✘
160	Holiday Beach	T2	519-776-5209	✔	✔	✔	✘	✘	✘
117	Hope Mill	K16	705-750-0545	✔	✔	✘	✘	✔	✘
57	Indian Falls	H8	519-376-3076	✘	✘	✔	✘	✘	✘
59	Inglis Falls	J8	519-376-3076	✘	✘	✔	✘	✘	✘
162	Jessups Falls	E24	613-938-3611	✘	✘	✔	✘	✘	✘
1	John R. Park Homestead	T3	519-776-5209	✘	✘	✔	✘	✘	✘
140	K and P Trail	F20	613-259-2421	✘	✘	✔	✘	✘	✘
79	Kelso	M-N11	905-878-5011	✘	✔	✔	✘	✔	✘
114	Ken Reid	J14	705-328-2271	✘	✘	✔	✘	✘	✘

Figure C-3 Recreation Map– Conservation Area Information

Note. From *Ontario Recreation Map*, by MapArt Publishing Corporation, 2005, Oshawa, ON: Peter Heiler Ltd. Copyright 2005 by Mapmedia Corp.

Figure C-4 Backroad Mapbook–Walkerton

Note. From *Southwestern Ontario: Backroad Mapbook* (p. 49), by C. Minutillo, 2008, Burnaby, BC: Mussio Ventures Ltd. Copyright 2008 by Mussio Ventures Ltd.

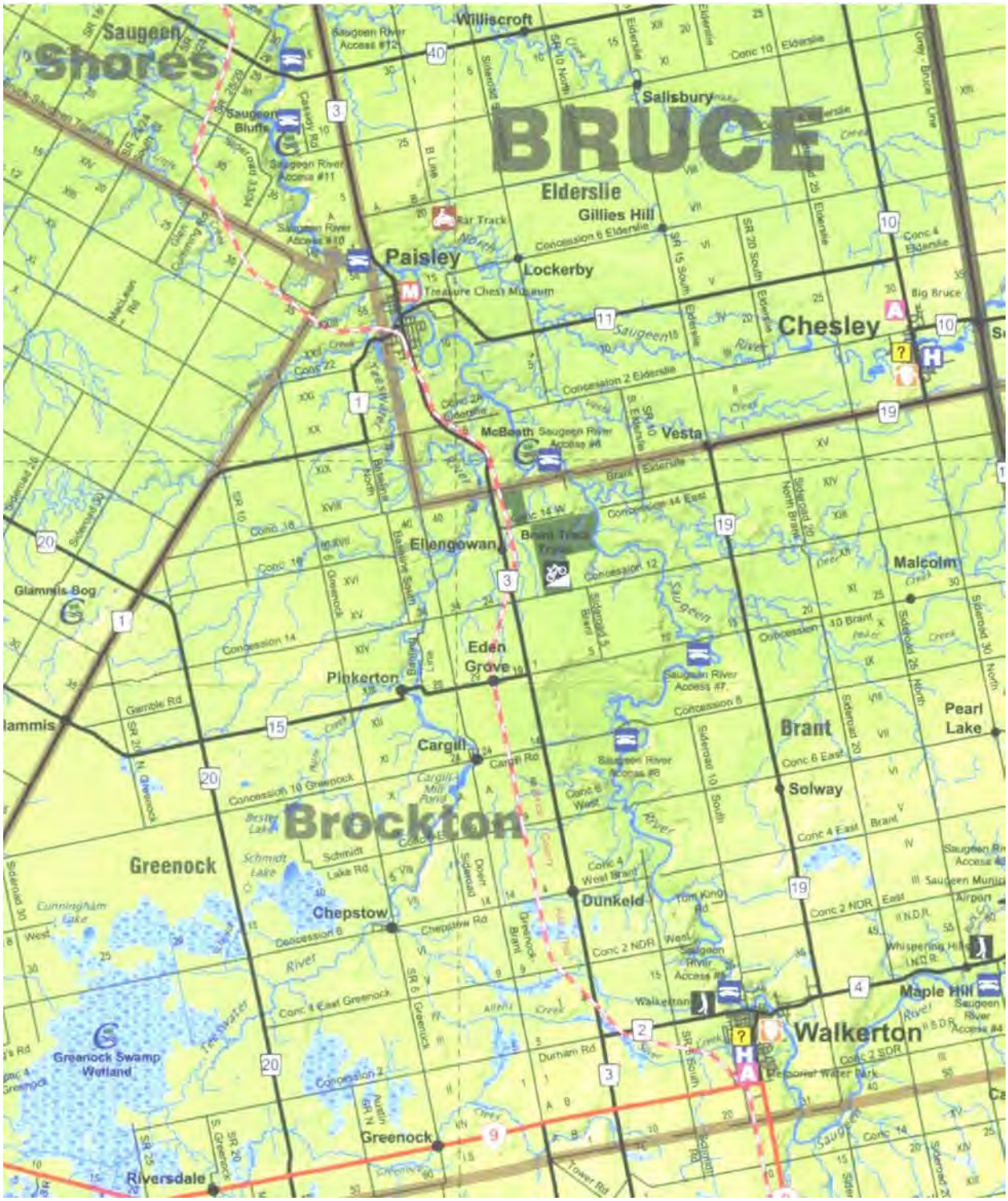


Figure C-5 Grey-Bruce Official Visitor Map

Note. From *Grey-Bruce Official Visitor Map*, by County of Bruce, 2008, London, ON: Charterhouse Printing. Copyright 2008 by County of Bruce

CAMPGROUND INFORMATION

Campground	Location	Rates	General Information / Rules
Lobies Park	P.O. Box 850, 20 Hannah Street, Walkerton, Ontario N0G 2V0 Tel: 519-881-3435	Non-serviced sites: • per day $20 • per week $110 • per month $400 Group camping: • per night $120	• Park quiet hours are 2300 hrs–0800 hrs. • Campsite check out time is 1100 hrs; check in is at 1400 hrs. • Campers shall keep their respective site in a clean and tidy order and all pets must be tied and / or on a leash at all times. • Campfires must be controlled in a pit area and supervised at all times. All fires must be extinguished by 0100 hrs.
Rotary Riverside Campground	416 Water Street, Paisley, Ontario N0G 2N0 Tel: 519-353-5575	Contact campground for campsite rates and availability.	
McBeath Conservation Area	9 km upstream of the Village of Paisley along the Saugeen River. Tel: 519-353-5142 Email: kempwelch@bmts.com	Contact the Friends of McBeath for campsite rates and availability.	• Group and family campsites are available for up to 75 people. • This site is accessible only by water. There is no public vehicle access. • The conservation area is designated a glass-free zone.
Saugeen Bluffs Conservation Area	132 Saugeen Bluffs Rd, 8 km north of Paisley off Bruce Rd 3. Tel: 519-364-1255	Non-serviced sites: • per day $27 • per week $165 Group camping: • per person per night $4.50	• There are over 200 spacious sites within the conservation area. • The campground features two picnic shelters, laundry facilities, a store and a wading pool. • There is a fully developed trail system in the conservation area. • An alcohol ban exists in the park on the May long weekend. • Campers are not permitted to bring their own firewood.
Hidden Valley Camp	RR #5, Paisley, Ontario N0G 2N0 Tel: 519-353-4100	Contact campground for campsite rates and availability.	

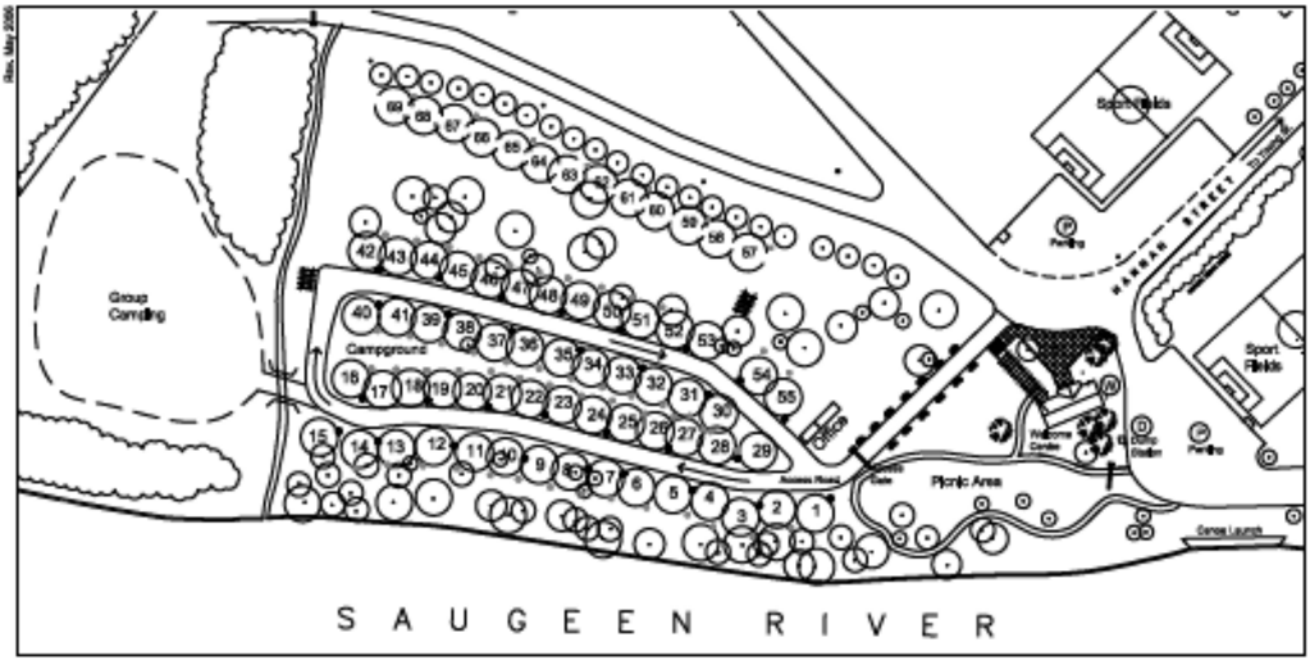


Figure D-1 Lobies Campground

Note. From *Lobies Campground* by Municipality of Brockton. Retrieved March 27, 2009, from http://town.walkerton.on.ca/Municipality/Lobies.html

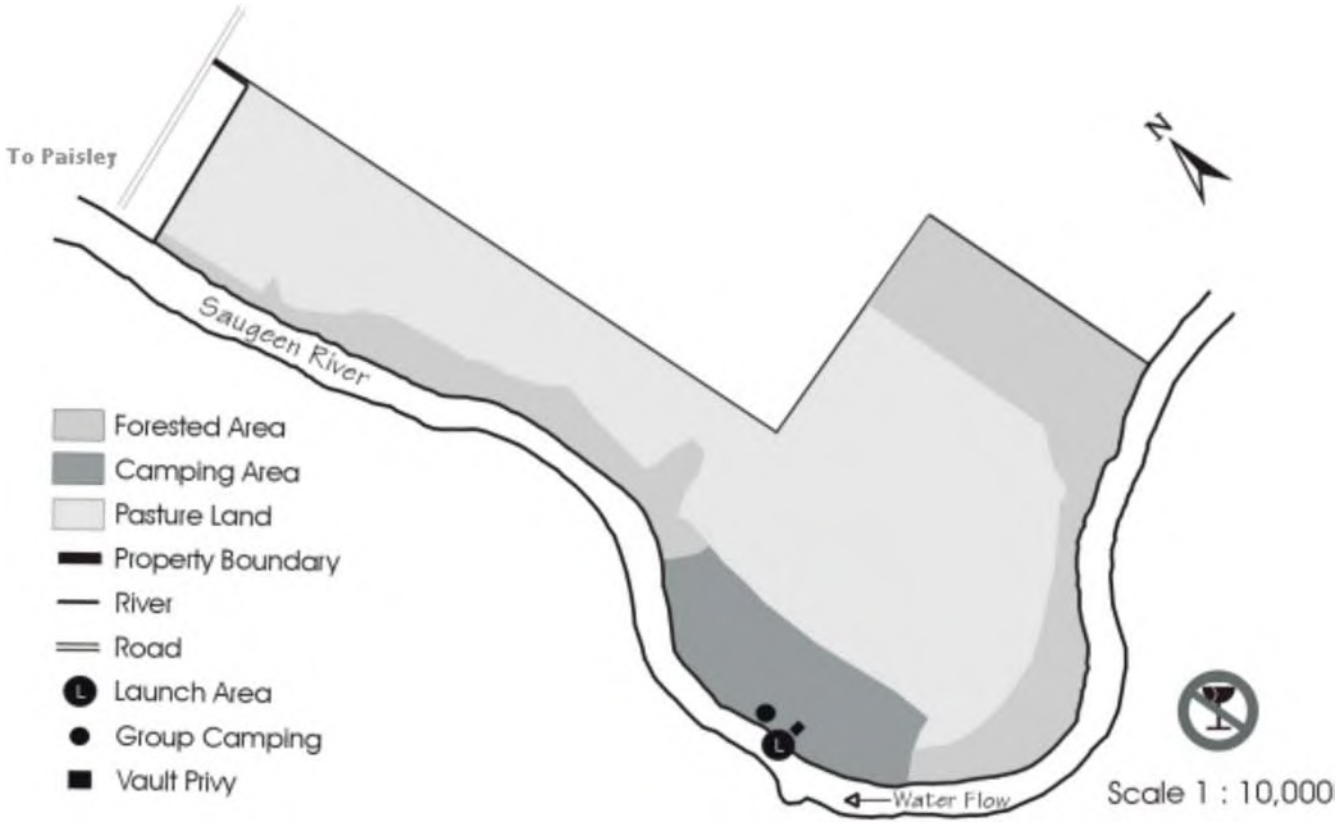


Figure D-2 McBeath Conservation Area Map

Note. From *McBeath Conservation Area* by Saugeen Conservation. Retrieved March 27, 2009, from http://www.svca.on.ca/ca-mcbeath.htm

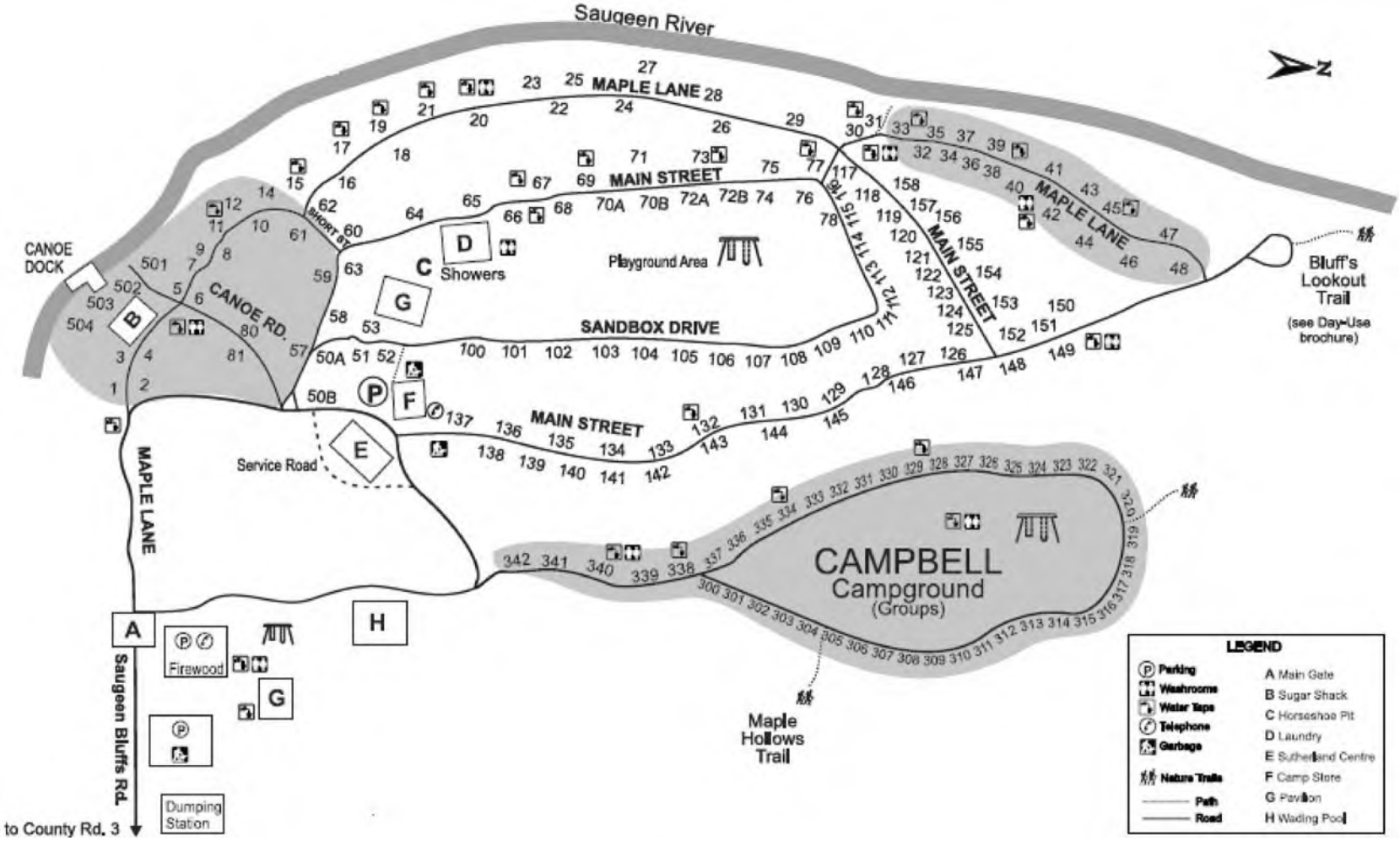


Figure D-3 Saugeen Bluffs Conservation Area Campground Map

Note. From *Campsite Map by* Saugeen Conservation. Retrieved March 27, 2009, from http://www.svca.on.ca/ca-bluffs2b.htm

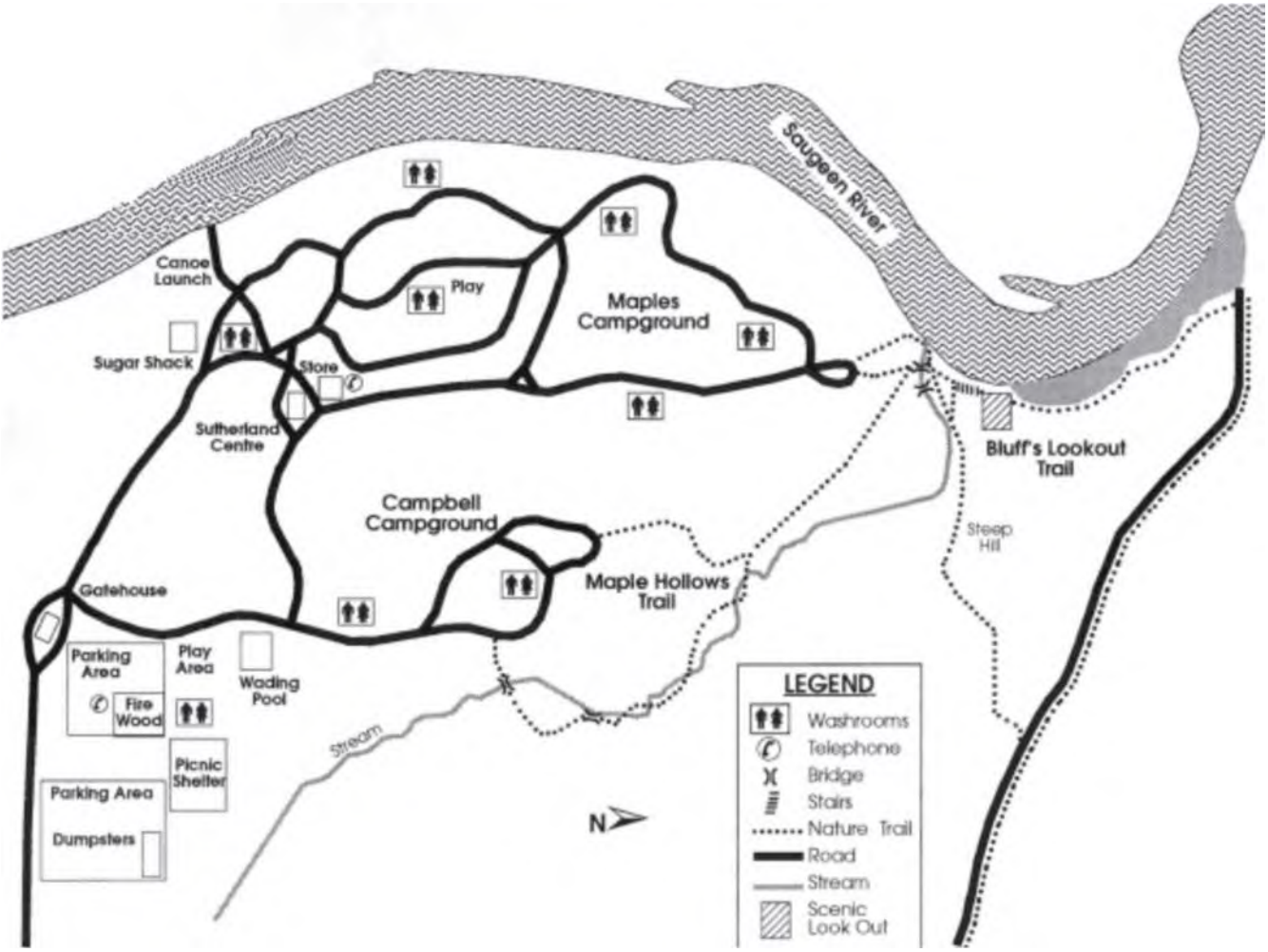


Figure D-4 Saugeen Bluffs Conservation Area Trail Map

Note. From *Trail Map* by Saugeen Conservation. Retrieved March 27, 2009, from http://www.svca.on.ca/ca-bluffs4.htm

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MOUNTAIN BIKE TRAILS INFORMATION

Brant Tract Trails

Brant Tract Trails has more than 20 km of hand cut single-track trails. Trails range from tight and technical to open and flowing concepts and can satisfy the beginner to the more advanced mountain biker. The property provides mountain bikers with spectacular views of valleys, wetlands and tower pines.

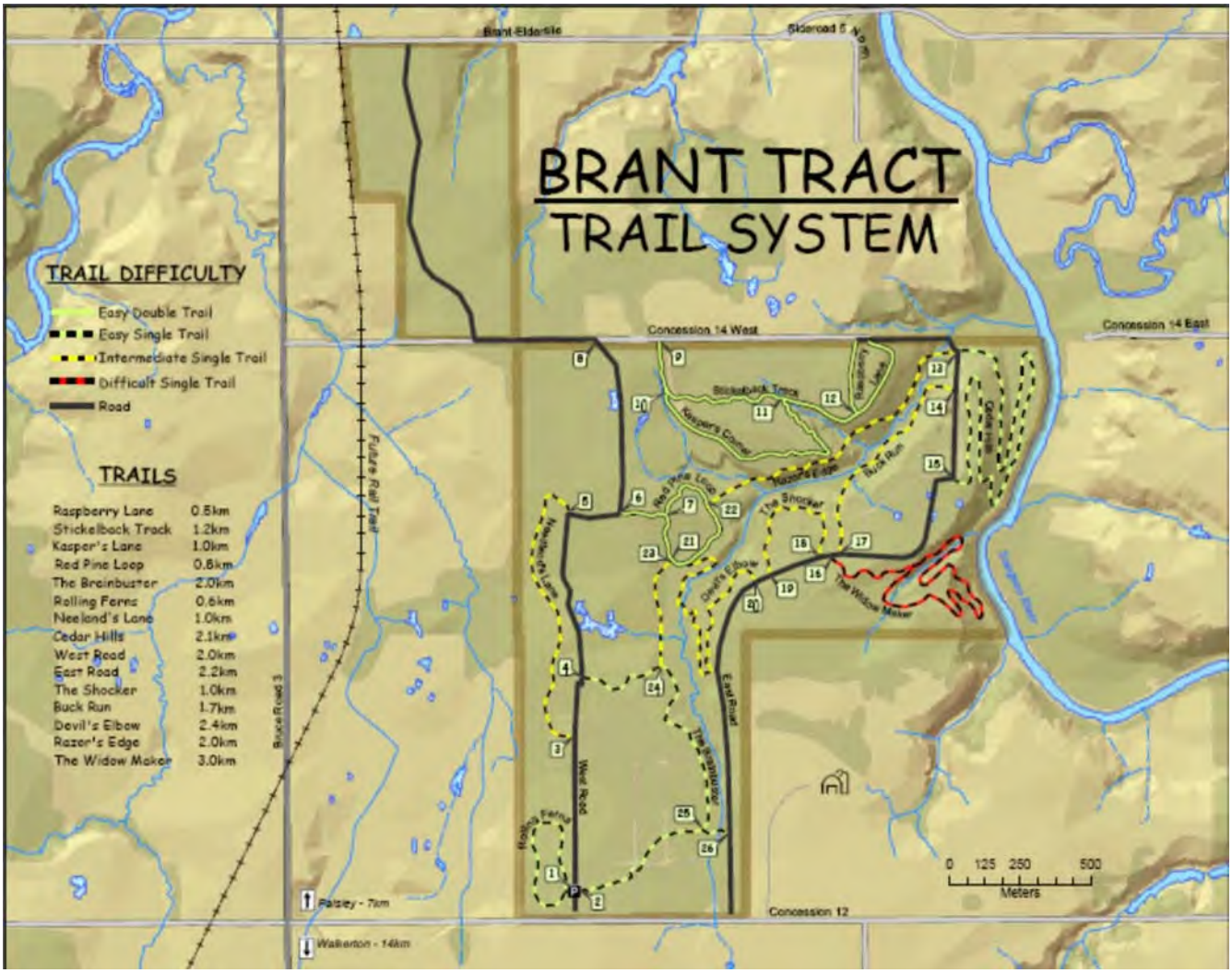

Figure E-1 Brant Tract Trail System

Note. From *Brant Tract Trails* by Mountain Bike the Bruce. Retrieved March 27, 2009, from http://www.mtbthebruce.com/brantusuage.php

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CANOE ROUTE INFORMATION

Saugeen Access Point #5 (Lobie's Park) to Saugeen Access Point #6 (Brant Conc. 8)

This is the longest section of the Saugeen River uninterrupted by bridges. The river winds out of Walkerton around several islands. In the spring, paddlers may choose one of several channels around these scenic islands but as summer goes on it is wise to stay to the deeper main channel. The Saugeen meanders through a broad valley between densely forested hills. In places, the river actually cuts into these hills, creating tall clay-sand bluffs, which provide a home for thousands of swallows, kingfishers, and other cliff-dwelling birds. Approaching the bridge on the Brant Concession 8, the bluffs diminish and give way to mixed farmland and forest. In this area it is possible to see deer and fox along the banks.

Saugeen Access Point #6 (Brant Conc. 8) to Saugeen Access Point #7 (Brant Conc. 10)

As the Saugeen progresses toward Lake Huron, the woodlands and bluffs of the upper areas give way to the rolling farmland of the middle sections. It is common to see cattle, horses and other livestock coming down to the river for a drink. The river slowly meanders through this mixed agricultural and forested land, this mixed habitat is ideal for the deer populations in the area and therefore sightings are common. A set of power lines crosses the river in this section. These mark the halfway point of the Hanover-Southampton portion of the Saugeen River.

Saugeen Access Point #7 (Brant Conc. 10) to Saugeen Access Point #8 (Brant-Elderslie Town Line)

This section ventures back in to woodlands, with some spots of agricultural land. The river continues on its slow relaxed pace through several sharp bends before this section comes to an end at a steel covered bridge just outside the hamlet of Ellengowan. This spot makes for an excellent put-in point for paddlers looking for a relaxed two day trip (6 hrs per day) to Southampton as well as a nice lunch spot for those out for a day trip on the middle section of the Saugeen.

Saugeen Access Point #8 (Brant-Elderslie Town Line) to Saugeen Access Point #9 (Paisley Hose Tower Dock)

The first section before Paisley passes through more mixed farm and forest. Shortly after the Ellengowan bridge is McBeath Conservation Area. From McBeath, the river takes a winding path to Paisley, coming right up beside the town and then swinging back away before making its way into the village. Several canoe docks line the river as it travels through the heart of the town. One of these is the Rotary Park: a scenic campground in downtown Paisley. For those looking for a lunch break, a canoe dock is situated just below the restored Fire Hose Tower, before the set of bridges in Paisley.

Saugeen Access Point #9 (Paisley Hose Tower Dock) to Saugeen Access Point #10 (Bridge North of Paisley)

Proceeding past this dock and under the bridge, paddlers will note the Teeswater River flowing over a dam and joining the Saugeen. Shortly downstream, the North Saugeen also joins the main river. Finally upon exiting Paisley, paddlers will pass under Bruce County Road 3 and come to a popular canoe launch at the north end of Paisley.

Saugeen Access Point #10 (Bridge North of Paisley) to Saugeen Access Point #11 (Saugeen Bluffs Conservation Area)

After leaving this canoe launch behind, the Saugeen picks up speed slightly and winds its way down to the Saugeen Bluffs Conservation Area. Through this trip, paddlers will notice the river's banks becoming progressively higher until they peak at about 100–115 ft. at the Saugeen Bluffs. The Saugeen Bluffs Conservation Area is a good place to spend the night or have a lunch break. The Conservation Area offers several canoe launch sites beside the river for canoe trippers for a reasonable fee.

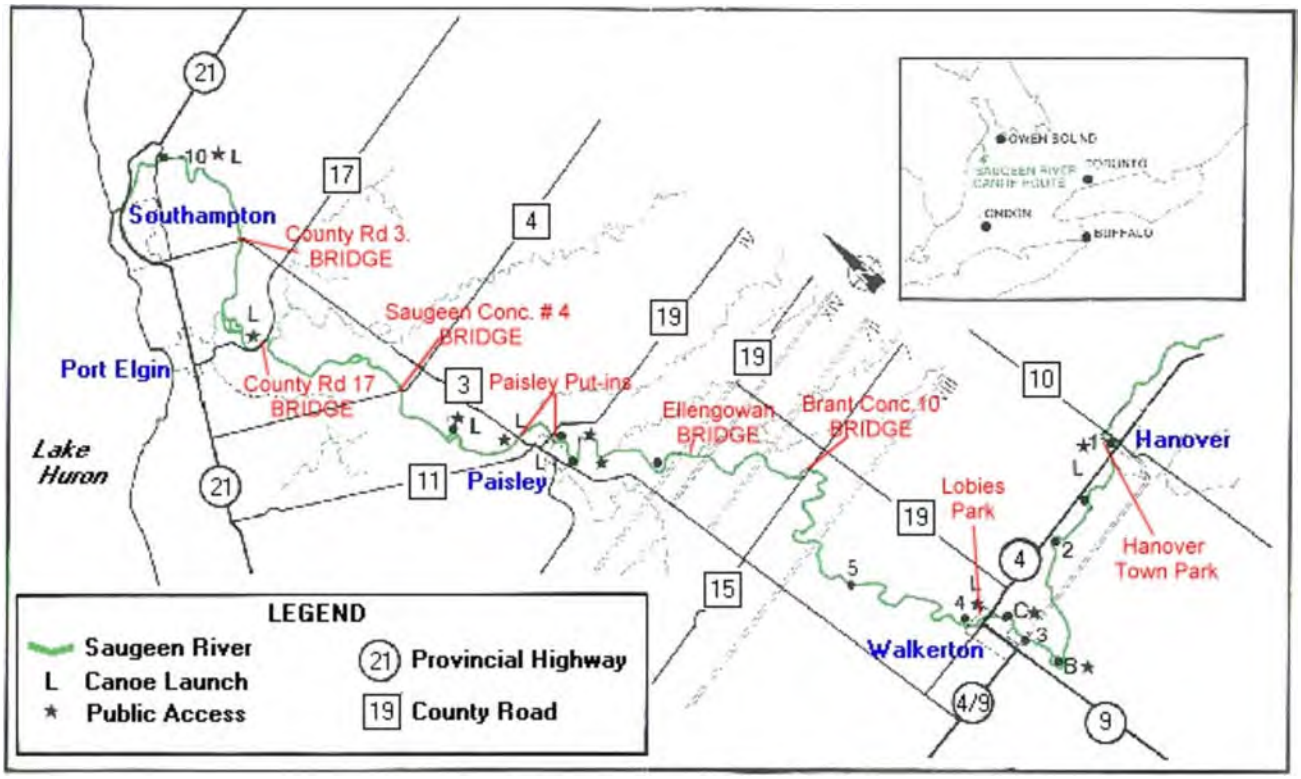

Figure F-1 Saugeen River Canoe Route

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/images/saugeenriver1.gif

Figure F-2 Saugeen River Canoe Route Access Points

Note. From *Saugeen River Canoe Route Map* by Saugeen Conservation. Retrieved March 27, 2009, from http://www.svca.on.ca/canoeroutes/map.htm

Figure F-3 Saugeen River Canoe Route Map Legend

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/paddling/maplegend.htm

Location: Along the west side of Young Street, north of Durham Street.

Facilities: Dock, parking, flush toilets, group camping and picnic shelters.

Description: There is a dock and a floating dock at the river access point. Parking is available at the campground. There are no signs to mark the facility.

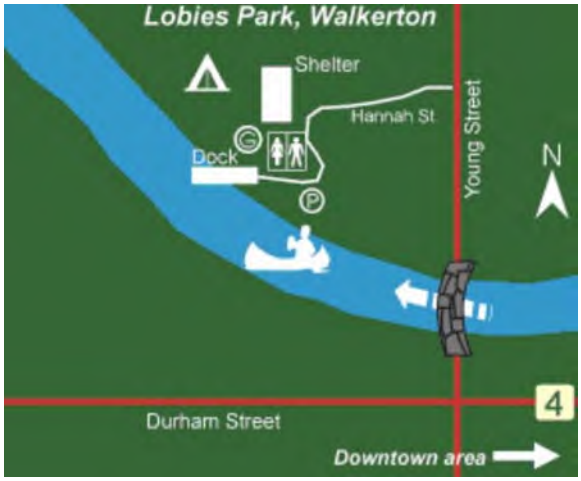

Figure F-4 Saugeen Access Point #5–Lobies Park Campground

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/paddling/saugeenmap3.htm

Location: Brant Concession #8 is located 0.2 km west of Sideroad #10 or 2.5 km east of Bruce Rd #3.

Facilities: River access, parking and garbage cans.

Description: River access is 80 m from the parking area. There is a 3 m high bank on the northeast side of the bridge. Roadside parking is on the east side of the bride.

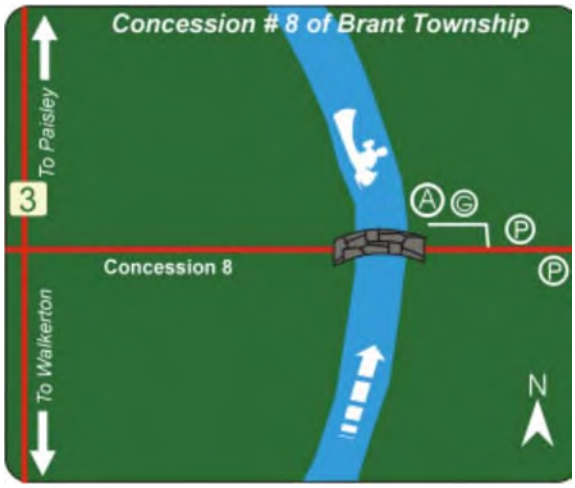

Figure F-5 Saugeen Access Point #6–Concession #8 of Brant Township

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/paddling/saugeenmap4.htm

Location: Brant Concession #10 is 1 km west of Bruce Rd #19 or 5 km east of Bruce Rd #3.

Facilities: River access and parking.

Description: River access is 75 m from the parking area at the northeast side of the bridge. Roadside parking is east of the bridge or southwest of the bridge.

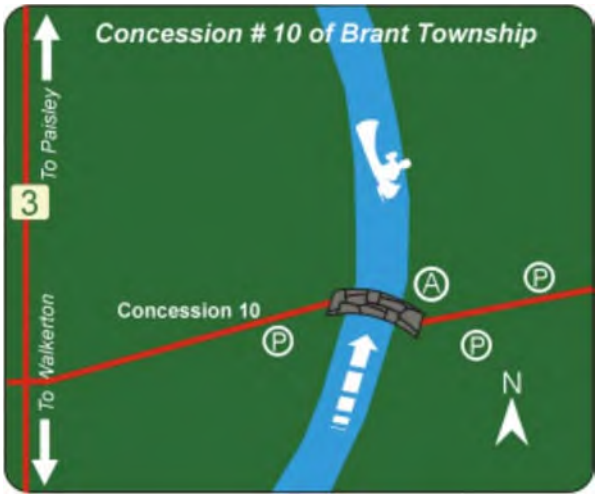

Figure F-6 Saugeen Access Point #7–Concession #10 of Brant Township

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/paddling/saugeenmap5.htm

Location: The Ellengowan bridge is located 2 km east of Bruce Rd #3 on the Elderslie / Brant Townline.

Facilities: River access, parking and garbage cans.

Description: River access is northwest of the bridge. The bank is 20 m high and the shore can be slippery. Parking is on the west side of the bridge. The Saugeen Valley Conservation Authority has a destination sign under the bridge.

Figure F-7 Saugeen Access Point #8–Ellengowen Bridge - Elderslie / Brant Townline

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/paddling/saugeenmap6.htm

Location: The access point is located behind the old fire station, next to Thompson Brother's Furniture, on Water Street, east of Queen Street.

Facilities: River access, parking, garbage cans and picnic area.

Description: River access is 15 m down the bank to the floating dock. Roadside parking is limited, however there is a town parking lot behind the old hotel.

Figure F-8 Saugeen Access Point #9–Paisley Downtown

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/paddling/saugeenmap7.htm

Location: The bridge is located north of Paisley on Bruce Rd #3.

Facilities: River access, parking, garbage cans and picnic area.

Description: River access is 50 m down a gentle slope to the rocky shore. A County of Bruce sign is at the side of the road.

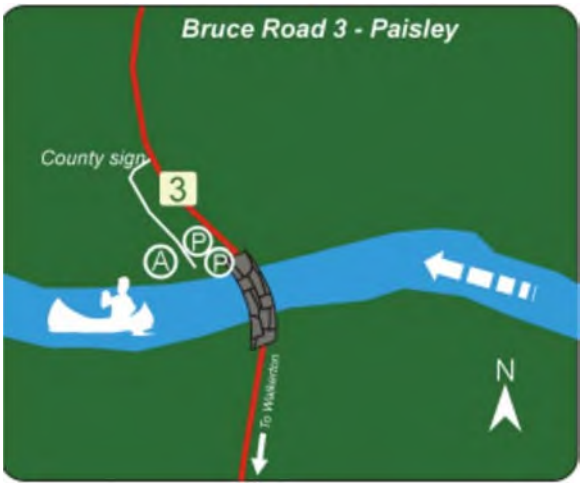

Figure F-9 Saugeen Access Point #10–Paisley North End

Note. From *Saugeen River Canoe Route* by Thorncrest Outfitters, Copyright 2005 by Thorncrest Outfitters. Retrieved March 27, 2009, from http://www.thorncrestoutfitters.com/paddling/saugeenmap8.htm

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HOSPITAL INFORMATION

Figure G-1 County of Bruce General Hospital, Walkerton, Ontario

Note. From *Maps* by MapQuest, Copyright 2009 by MapQuest Inc. Retrieved April 1, 2009, from http://www.mapquest.com/maps?city=Walkerton&*state=ON&address=21+McGivern+St.+W.%2C+*

Figure G-2 Chesley and District Hospital, Chesley, Ontario

Note. From *Maps* by MapQuest, Copyright 2009 by MapQuest Inc. Retrieved April 1, 2009, from http://www.mapquest.com/maps?city=Chesley&*state=ON&address=39-2nd+Street+Se*

COMPLETED SECTION 2 OF THE EXPEDITION PLANNING BOOKLET

IDENTIFY EXPEDITION ROUTE PLANNING RESOURCES

Reference Materials	Organizations / Authorities
Ontario Recreation Map	Ontario Parks
Topographical maps–Markdale, Collingwood, Goderich, Lucknow, Wingham, Chesley, Walkerton and Wiarton	Saugeen Valley Conservation Authority
Canadian Canoe Routes–www.myccr.com	Grey Sauble Conservation Authority
Ontario Trails Council–www.ontariotrails.on.ca	Bruce Trail Association
Backroad Map Book–Southwestern Ontario	Maitland Conservation Authority
A Paddlers Guide to Wilderness Weekend Adventures by Kevin Callan	
A Paddles Guide to The Rivers of Ontario and Quebec by Kevin Callan	
MapQuest	

IDENTIFY FACTORS TO CONSIDER WHEN SELECTING AN EXPEDITION ROUTE

Selecting an Expedition Location Comparison Chart

	Location #1	Location #2	Location #3
	Walkerton	**Wingham**	**Thornbury**
What is the distance to and from the location?	Niagara Falls–231 km Windsor–346.45 km	Niagara Falls–228.07 km Windsor–313 km	Niagara Falls–256.84 km Windsor–444.02 km
How long does it take to travel to and from the location?	Niagara Falls–3.15 hours Windsor–4.46 hours	Niagara Falls–3 hours Windsor–4.10 hours	Niagara Falls–3.17 minutes Windsor–5.35 minutes
How long will it take to get to or receive emergency services?	Hospitals located in Chesley, Walkerton and Hanover. Furthest distance is 15 km.	Hospitals located in Wingham and Goderich. Furthest distance is 20 km.	Hospitals located in Markdale, Collingwood and Meaford. Furthest distance is 25 km.
Is there adequate space at start and end points for drop-off of personnel and equipment?	Yes. Various points in area for start and end points.	Yes. Various points in area for start and end points.	Yes. Various points in area for start and end points.
Can the distance requirements for mode of travel #1 be met?	Saugeen River—Walkerton to Paisley–39 km—earlier take-out points available.	Maitland River—Wingham to Auburn–25 km—earlier take-out points available.	Beaver River—Kimberly to Heathcote–25 km—earlier take-out points available.
Can the terrain requirements for mode of travel #1 be met?	Mostly flatwater, some swifts depending on time of year, lift-overs and sweepers.	Flatwater, some swifts depending on time of year, lift-overs.	Flatwater.

	Location #1	Location #2	Location #3
Can the distance requirements for mode of travel #2 be met?	Brant Tract Trail System— over 25 km of trails. Roads leading to Brant Tract increase distance.	Carrick Tract Trail System—over 13 km of trails. Roads leading to Carrick Tract increase distance.	Kolapore Uplands Wilderness Ski Trails— over 30 km of trails. Roads leading to Kolapore Ski Trails increase distance.
Can the terrain requirements for mode of travel #2 be met?	Novice double- and single- track trails, intermediate single-track trails, dirt roads and paved roads.	Novice double- and single-track trails, intermediate single-track trails, dirt roads and paved roads.	Novice double- and single-track trails, intermediate single-track trails, dirt roads and paved roads.
Are there a number of campsites / rest stops available in the area?	Two Conservation Area campgrounds and three privately owned campground.	Four privately owned campsites and one Conservation Area campground	Two privately owned campgrounds.
What are the associated costs of using the area?	Costs for campsites are between $15 and $30 per night. Group rates are available.	Costs for campsites are between $12 and $30 per night. Group rates are available.	Costs for campsites are between $10 and $25 per night. Group rates are available.
What are the procedures to gain access to use the area?	Contact Grey Bruce Conservation Authority.	Contact Maitland Valley Conservation Authority and Grey Bruce Conservation Authority.	Contact Grey Sable Conservation Authority.
Are there any limitations on group sizes?	No limits - just dependent on availability of campsites.	No limits - just dependent on availability of campsites.	No limits - just dependent on availability of campsites.
Are there any restricted camping areas?	Can only camp in designated campgrounds. Rest stops can occur at campgrounds, conservation areas and crown land. No stopping on private land.	Can only camp in designated campgrounds. Rest stops can occur at campgrounds, conservation areas and crown land. No stopping on private land.	Can only camp in designated campgrounds. Rest stops can occur at campgrounds, conservation areas and crown land. No stopping on private land.

Chosen location: Location #1

Reasons for choosing location: Location #1 provided the best area to meet the goals, objectives and guidelines of the expedition. There are a variety of campgrounds in the area that will accommodate larger groups. The Brant Tract Trails will provide an excellent area for mountain biking. Many resources exist to assist with planning the route.

DEVELOP AN EXPEDITION ROUTE

Length of the expedition:	**2 nights / 3 days (Friday Evening to Sunday Afternoon)**	**2 nights / 3 days (Friday Evening to Sunday Afternoon)**
	Route #1	**Route #2**
Drop-off point and campsite.	Saugeen Access Point #5, Lobie's Park, Yonge Street North, Walkerton, ON (GR 877 868). Campsite at Lobie's Park, Yonge Street North, Walkerton, ON. GR 877 868	Saugeen Access Point #11, Saugeen Bluffs Conservation Area, North of Paisley, 1 km west off Bruce Rd 3 (GR 748 109). Campsite at Saugeen Bluffs Conservation Area, North of Paisley, 1 km west off Bruce Rd 3 (GR 748 109).
Mode(s) of travel day #1.	• Canoe the Saugeen River from Saugeen Access Point #5 (GR 877 868) to Saugeen Access Point #6 (845 947). • Mountain bike to Paisley Rotary Campground (GR 782 059) along the road and the rail trail.	• Mountain bike from Saugeen Bluffs Conservation Area (GR 748 109) to Brant Tract Trails (GR 822 982). • Mountain bike from Brant Tract Trails (GR 822 982) to Paisley Rotary Campground (GR 782 059) along the road.
Mode of travel change point(s) for day #1, if required.	Saugeen Access Point #6–Concession 8, Brant Twp, 2 km East of Hwy 3.	None.
Possible lunch locations for day #1.	• Picnic area along the river - North of Concession 6 (GR 843 928). • Saugeen Access Point #6 (GR 845 947).	• Saugeen Access Point # 9, Paisley Hose Tower dock, east of Bruce Rd 3 and Bruce Rd 11 intersection (GR 782 059). • Brant Tract Trails (GR 822 982).

	Route #1	Route #2
Possible rest-stop / re-supply locations for day #1.	• Saugeen River, near Concession 4, West Brant, east of the town of Dunkeld (GR 850 904). • Rail trail, Concession 14 and Bruce Rd 3 (GR 812 001).	• Saugeen Access Point #9 (GR 782 059). • Brant Tract Trails (GR 822 982).
Evacuation route(s) for day #1.	• Canoe - move to nearest road access takeout and then proceed to County of Bruce General Hospital, 21 McGiven St W., Walkerton, ON (GR 877 853). • Mountain Bike - move from rail trail to main road and then proceed to Chesley and District Hospital, 39-2nd St. SE, Chesley, ON (GR 926 051).	Chesley and District Hospital, 39-2nd St. SE, Chesley, ON (GR 926 051).
Possible campsite(s) for night.	• Paisley Rotary Campground (GR 782 059). • Saugeen Bluffs Conservation Area, North of Paisley, 1 km west off Bruce Rd 3 (GR 748 109).	Paisley Rotary Campground (GR 782 059).
Mode(s) of travel day #2.	• Mountain bike along the road to Brant Tract Trails (GR 822 982). • Mountain bike on Brant Tract Trail system.	Canoe the Saugeen River from Saugeen Access Point #9 (GR 777 073) to Saugeen Access Point #11 (GR 756 083).
Mode of travel change point(s) for day #2, if required.	None.	None.
Possible lunch locations for day #2.	Brant Tract Trails, 6 km south of Paisley on Concession 12, 1 km east of Bruce Rd 3 (GR 822 982).	• Hidden Valley Camp, north of Paisley, approximately half way to Saugeen Bluffs (GR 756 083). • Saugeen Bluffs Conservation Area (GR 756 083)

	Route #1	Route #2
Possible rest-stop / re-supply locations for day #2.	• Bruce Rd 19 and Concession 18 (GR 867 024). • Brant Tract Trails (GR 822 982).	• Saugeen Access Point # 10, bridge north of Paisley, west side of Bruce Rd 3 (GR 777 073). • Hidden Valley Camp, north of Paisley, approximately half way to Saugeen Bluffs (GR 756 083).
Evacuation route(s) for day #2.	Chesley and District Hospital, 39-2nd St. SE, Chesley, ON (GR 926 051).	Move to nearest road access takeout and then proceed to Chesley and District Hospital, 39-2nd St. SE, Chesley, ON (GR 926 051).
Pick-up point.	Brant Tract Trails, 6 km south of Paisley on Concession 12, 1 km east of Bruce Rd 3 (GR 822 982).	Saugeen Access Point #11, Saugeen Bluffs Conservation Area, North of Paisley, 1 km west off Bruce Rd 3 (GR 748 109).

RATING	2nd Choice	1st Choice

PREAPARING AN EXPEDITION ROUTE CARD

Route Card - Day 1

Date:	**5 Oct (Day 1)**	**Team:**	**Spartans**	**Location:**	**Walkerton**
Start Time:	**0800 hrs**	**Estimated Finish Time:**	**1700 hrs**	**Starting Elevation:**	**210 m**

Leg	Mode of Travel	From GR	To GR	Bearing	Distance	Elevation	Time	Route Description
1	Mountain Bike	748 109	767 106		1.3 km	Start (S) - 210 m Finish (F) - 240 m	6 min	West on Conc. 10 Elderslie until it intersects with Bruce Rd 3. Loose surfaced road.
2	Mountain Bike	767 106	782 059		5 km	S - 240 m F - 220 m	15 min (+15 min break)	South on Bruce Rd 3, pass Conc. 8, down big hill, over bridge and into the town of Paisley. Hard packed, main road. Break / water resupply at Paisley Hose Tower.
3	Mountain Bike	782 059	781 055		500 m	S - 220 m F - 220 m	2 min	South on Bruce Rd 3, turn west onto Bruce Rd 1 until it is crossed by the Rail Trail.
4	Mountain Bike	781 055	809 011		5.5 km	S - 220 m F - 250 m	16 min (+15 min break	Follow the Rail Trail south until it intersects with Conc. 14 W. There are some hills along the route - mostly flat ground. Rail Trail will cross Bruce Rd 3 after 2 km. Break / water resupply at this point.
5	Mountain Bike	809 011	812 986		2.6 km	S - 250 m F - 250 m	8 min	Continue South on the Rail Trail until it intersects with Bruce Rd 3.
6	Mountain Bike	812 986	814 981		500 m	S - 250 m F - 250 m	2 min	South on Bruce Rd 3 until it intersects with Conc. 12. Some hills, hard packed, main road.

7	Mountain Bike	814 981	822 982		800 m	S- 250 m F - 250 m	3 min (+1 hour break)	West on Conc. 12 to the entrance to Brant Tract Trails (West Road) parking lot on the north side of the road. Loose surface road. Lunch.
8	Mountain Bike	822 982			11.5 km	various	60 min	Brant Tract Trail system trails will be run in the following order: Rolling Ferns, The Brainbuster, Devil's Elbow, The Shocker, Buck Run, Razor's Edge, Red Pine Loop and Neeland's Lane.
9	Mountain Bike	822 982	784 975		3.8 km	S - 250 m F - 260 m	11 min (+ 15 min break)	West on Conc. 12 to intersection at Baseline Rd N. Will cross Bruce Rd 3, cross Greenock-Brant Townline Rd, go down big hill, cross bridge and causeway. Hard packed, main road. Break/water re-supply.
10	Mountain Bike	784 975	782 059		9.4 km	S - 260 m F - 220 m	45 min	South on Baseline Rd N (becomes Bruce Rd1) to the Paisley Rotary Campground. Loose surface road, multiple hills throughout the leg.

Group Details:	There are six cadets on the team—four male and two female. Three of the six cadets completed Basic Expedition during this past summer. All six cadets have a high level of physical fitness.

Route Card - Day 2

Date:	**6 Oct (Day 2)**	**Team:**	**Spartans**	**Location:**	**Walkerton**
Start Time:	**0800 hrs**	**Estimated Finish Time:**	**1500 hrs**	**Starting Elevation:**	**220 m**

Leg	Mode of Travel	From GR	To GR	Bearing	Distance	Elevation	Time	Route Description
1	Canoe	782 059	777 073		2.5 km		37 min (+ 15 min break)	Break / water resupply at Saugeen Access Point #10 —bridge, river left.

2	Canoe	777 073	756 083		2.8 km		42 min (+ 15 min break)	Break / water resupply at Hidden Valley Camp, river left.
3	Canoe	756 083	748 109		3.8 km		60 min	Some obstructions along the centre of the river, stay river left. Arrive Saugeen Bluffs Conservation area, river right.

Group Details:	There are six cadets on the team—four male and two female. Three of the six cadets completed Basic Expedition during this past summer. All six cadets have a high level of physical fitness.

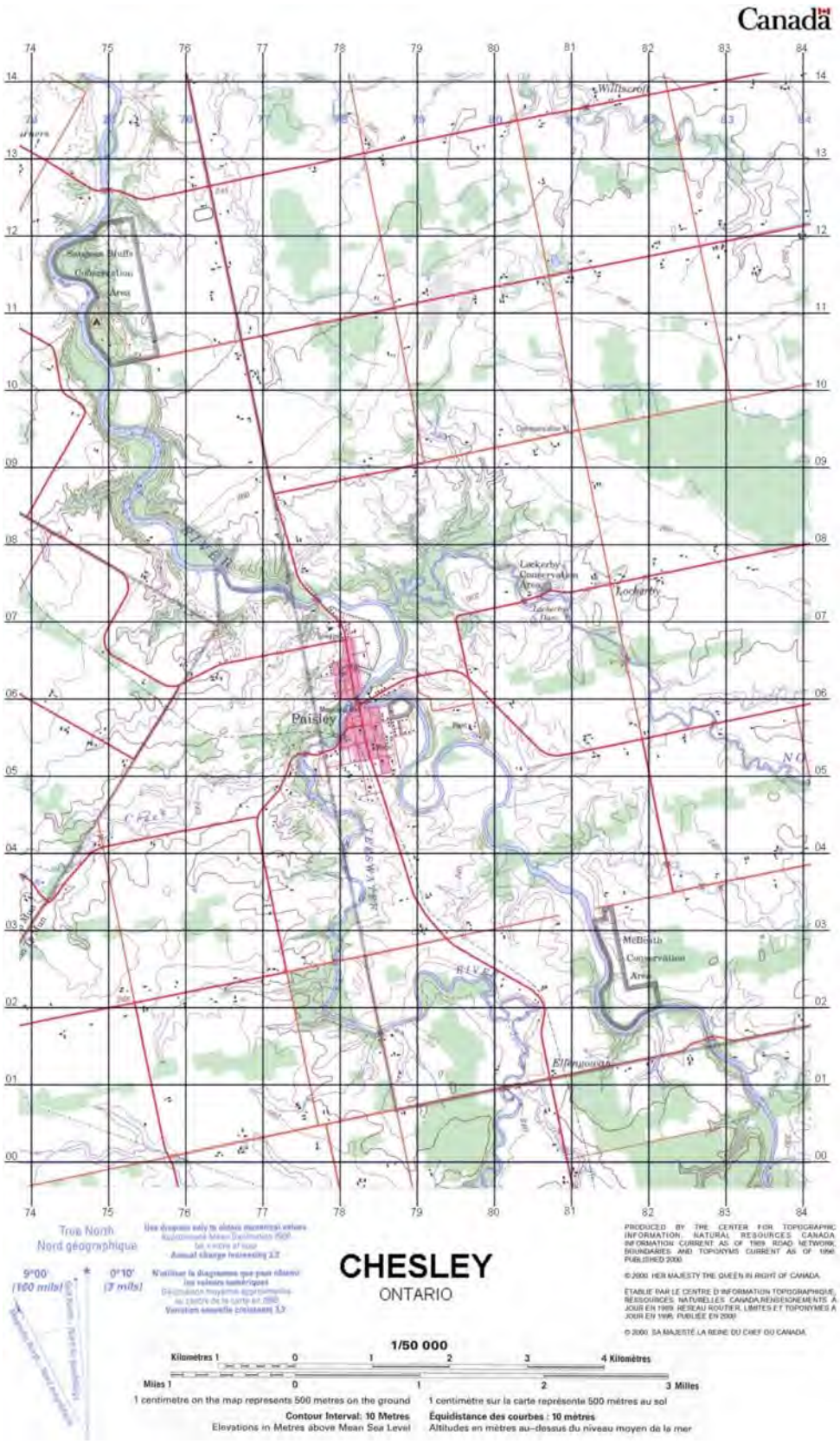
CREATE AN EXPEDITION SCHEDULE

Friday		
Timings	**Tasks / Activity**	**Remarks**
	Collect Expedition Skill / Experience Assessment Form	Expedition centre staff must read and tabulate scores from Expedition Skills / Experience Assessment form. Place cadets in teams of varied skill levels.
	Issue all personal and group expedition equipment	Expedition centre staff.
	Set up campsite	Expedition centre staff to rotate to ensure that cadets know how to set up tents, organize equipment, light lanterns, etc.
	Initial briefing / divide cadets into teams	To include: activities, expectations, safety, timings, dress, meals, rules, etc. Cadets will be introduced to their team instructor.
	Navigation review	Completed as required, time permitting.
2300 hrs	Lights Out	

Saturday		
Timings	**Tasks / Activity**	**Remarks**
0600 hrs	Reveille / Ablutions	Cadets will pack all personal equipment prior to eating breakfast.
0630 hrs	Breakfast	Supply Officer to prepare breakfast, expedition centre staff to model set-up of eating area, garbage collection, clean up, etc.
0730 hrs	Campsite tear down	Under direction of TI each team will tear down all components of the campsite, organize personal and group equipment for transport to new campsite.
0800 hrs	Start Expedition	Mode of Travel #1—Mountain Bike to Brant Tract Trails - from Brant Tract Trails to Paisley Rotary Campground.
1200 hrs - 1300 hrs	Lunch	Lunch will occur at a Brant Tract Trails parking lot.
1600 hrs	Arrive at camp site # 2	Teams will set up their campsites, with the TI providing feedback as required.
1730 hrs	Supper	Preparation of supper will be incorporated into the teams campsite set up routine.
2000 hrs	Evening Activities	Cadet will make one entry in their expedition journal.
2200 hrs	Lights out	

Sunday		
Timings	**Tasks / Activity**	**Remarks**
0600 hrs	Reveille / Breakfast / Tear down campsite	Teams will be required to complete daily routine activities.
0800 hrs	Continue expedition	Mode of travel #2—Canoe from Paisley to Saugeen Bluffs Conservation Area.
1200 hrs	Lunch	Lunch will occur along the canoe route—teams will be required to bring lunch with them.
1330 hrs	Arrive at Saugeen Bluffs	Teams will complete the de-kitting process under the direction of the expedition centre Log O.

1430 hrs	Debriefing	All cadets will be required to: fill out an expedition centre activity critique and complete a journal entry about their experiences during the weekend.
1500 hrs	Depart	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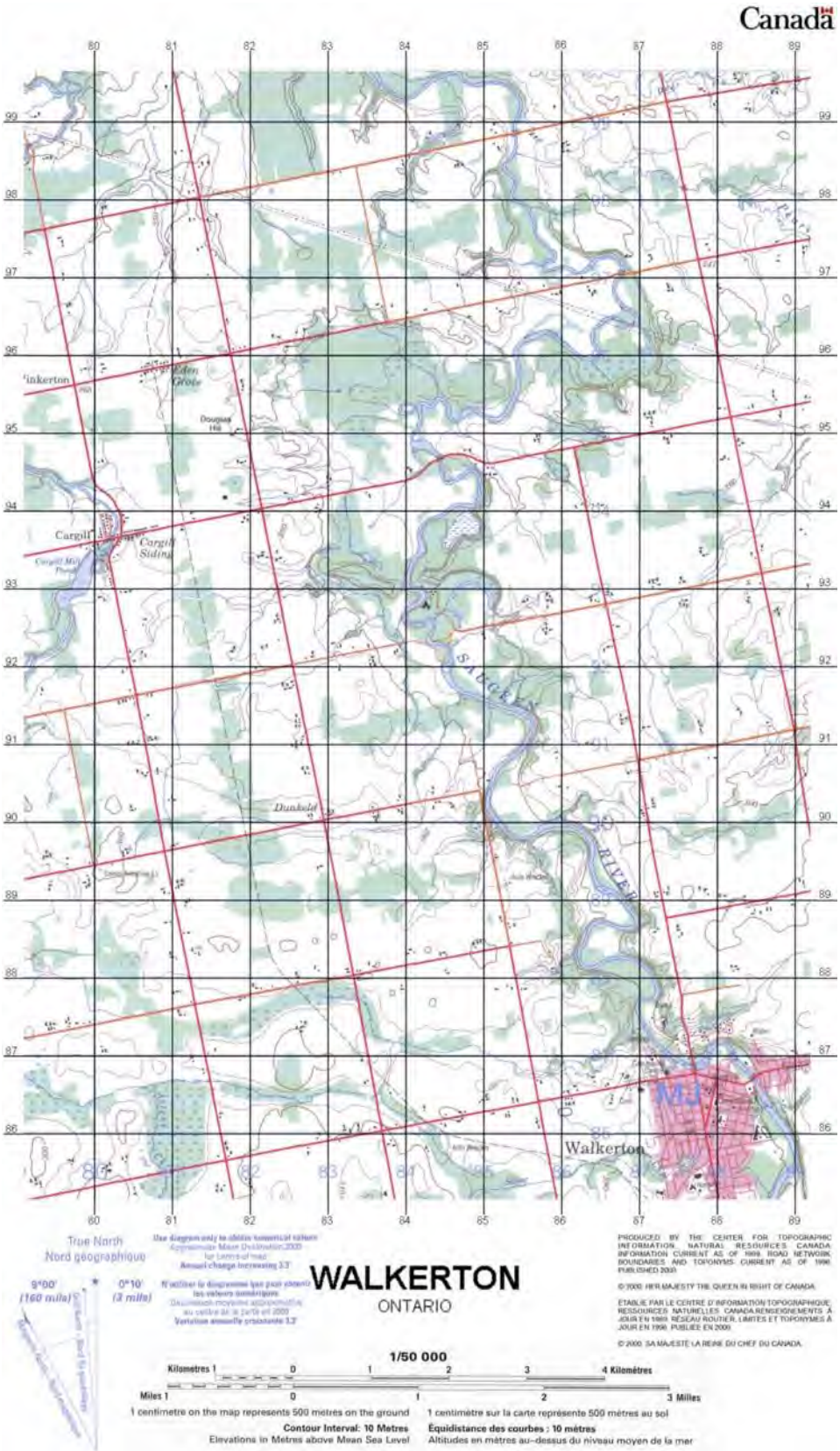
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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 3

EO M425.03 – DEVELOP AN EXPEDITION EQUIPMENT LIST

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-704/PG-001, *Gold 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.

Have the cadets bring their Expedition Duo-Tang.

Photocopy Section 3 of the Expedition Planning Booklet located at Attachment A for each group.

Photocopy Section 3 of the Expedition Planning Booklet located at Attachment A for each cadet.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An in-class activity was chosen for this lesson as it is an interactive way to provoke thought and stimulate interest about developing expedition equipment lists.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have developed an expedition equipment list.

IMPORTANCE

It is important for cadets to examine every part of an expedition and consider what equipment and materials are required to successfully complete the desired training. Each activity has unique characteristics, even the same activity at the same location during the same time of year may present equipment differences. Cadets must scrutinize every expedition and ensure all materials and equipment have been determined so orders and requests can be placed and materials prepared prior to the commencement of the expedition.

Teaching Point 1 **Have the cadets, in groups of no more than three, develop an expedition equipment list.**

Time: 50 min Method: In-Class Activity

BACKGROUND KNOWLEDGE

Cadets shall be informed of the estimated fuel consumption information below prior to carrying out the activity. This information should be available for all cadets to reference.

FUEL CONSUMPTION

When determining how much fuel to pack for an expedition, refer to the owners' manual of the stove being used to determine how much fuel it will consume. Estimates of fuel consumption for a Coleman Peak One single-burner mountain stove per day are:

Summer

- One person requires 1 / 6 L (5.5 ounces) of fuel.
- A group of three requires 1 / 3 L (11 ounces) of fuel.

Spring / Fall

- One person requires 1 / 4 L (8.5 ounces) of fuel.
- A group of three requires 1 / 2 L (17 ounces) of fuel.

Winter

- One person requires 1 / 2 L (17 ounces) of fuel.
- A group of three requires 3 / 4 L (25.5 ounces) of fuel.

ACTIVITY

Time: 50 min

Cadets will be referencing the guidelines and information developed in their Expedition Duo-Tang.

OBJECTIVE

The objective of this activity is to have the cadets to develop an expedition equipment list, to include:

- personal equipment,
- group equipment, and
- activity-specific equipment.

RESOURCES

- Section 3 of the Expedition Planning Booklet located at Attachment A (one per group),
- Completed example of Section 3 of the Expedition Planning Booklet located at Attachment B,
- Expedition Duo-Tang, and
- Pens / pencils.

ACTIVITY LAYOUT

Set up the classroom for group work, with the required resources, for groups of three cadets.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than three.
2. Distribute Section 3 of the Expedition Planning Booklet to each group.
3. Have each group review Sections 1 and 2 in their Duo-Tang.
4. Based on the information recorded and established in Sections 1 and 2, have the cadets identify the required equipment for the expedition, to include:
    - personal equipment,
    - group equipment, and
    - activity-specific equipment, to include:
        - mountain biking; and
        - canoeing.
5. Tell the groups that they will have five minutes for each list.
6. Circulate among the groups and assist the cadets as necessary, offering suggestions and advice. Refer to the completed example of Section 3 of the Expedition Planning Booklet, as required. Cadets answers may differ depending on the guidelines and route developed.
7. Review the answers with the groups.
8. Distribute Section 3 of the Expedition Planning Booklet to each cadet.
9. Allow 15 minutes for each cadet to record their findings in Section 3 of their Expedition Planning Booklet, using the complied information from the group.
10. Have the cadets place the completed Section 3 of the Expedition Planning Booklet into their Expedition Duo-Tang.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' developing of an expedition equipment list will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Have the cadets complete any unfinished areas of Section 3 of the Expedition Planning Booklet that could not be completed during the lesson.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

A successful expedition relies on many conditions. Taking the time to properly assess the required materials for an expedition helps guarantee a positive expedition experience. Shortages and missing materials place stress on the conducting staff and the quality of training being conducted. A well thought-out expedition leads to a successful expedition.

INSTRUCTOR NOTES / REMARKS

Nil.

REFERENCES

A2-001 A-CR-CCP-951/PT-002 Director Cadets 3. (2006). *Royal Canadian Army Cadets adventure training safety standards*. Ottawa, ON: Department of National Defence.

C2-042 ISBN 0-7566-0946-1 Berger, K. (2005). *Backpacking & hiking*. New York, NY: DK Publishing, Inc.

C2-051 ISBN 978-0-7153-2254-3 Bagshaw, C. (2006). *The ultimate hiking skills manual*. Cincinatti, OH: David & Charles.

SECTION 3 – EXPEDITION EQUIPMENT LIST

PERSONAL EQUIPMENT

Personal expedition equipment are items that are used by an individual and are maintained by that person. Personal equipment is the kit a cadet carries in their expedition field pack.

List all items that cadets are required to bring with them to successfully complete the expedition.

NON-ISSUED EQUIPMENT SUPPLIED BY CADET	
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ISSUED EQUIPMENT UPON ARRIVAL	
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GROUP EQUIPMENT

Group equipment is selected for its versatility, weight and ease of use. The more compact an item is or can become, the easier it is to pack and carry. Group equipment is given to the cadets upon arrival at the expedition centre.

List all the items the cadets require to successfully complete the expedition. Group equipment includes items that cadets are not expected to purchase, such as two-man tents, water filters and stoves.

ISSUED GROUP EQUIPMENT

Number of persons per group:____

1.		27.	
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ACTIVITY—SPECIFIC EQUIPMENT

Record the materials and equipment required to effectively complete the desired training. List all associated equipment and materials that are used for each mode of travel.

MODES OF TRAVEL			
Mode of Travel #1 Equipment Required		**Mode of Travel #2 Equipment Required**	
Type of Activity:		**Type of Activity:**	
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5.		5.	
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COMPLETED EXAMPLE OF SECTION 3 OF THE EXPEDITION PLANNING BOOKLET

PERSONAL EQUIPMENT

Personal expedition equipment are items that are used by an individual and are maintained by that person. Personal equipment is the kit a cadet carries in their expedition field pack.

List all items that cadets are required to bring with them to successfully complete the expedition.

	NON-ISSUED EQUIPMENT SUPPLIED BY CADET
1.	**Camera**
2.	**Camp soap (biodegradable)**
3.	**Clothing (for 2 days 2 nights)**
4.	**Facecloth or small towel x 2**
5.	**Gloves x 1 pair**
6.	**High energy snacks**
7.	**Lip balm**
8.	**Matches (minimum of 20 strike anywhere)**
9.	**Notepad and pencil**
10.	**Pocket knife / survival knife**
11.	**Rain gear**
12.	**Sunglasses**
13.	**Sunscreen—SPF 15, (30 recommended)**
14.	**Survival kit**
15.	**Toilet paper x 1 roll**
16.	**Toothbrush**
17.	**Toothpaste**
18.	**Wide brim hat**
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	ISSUED EQUIPMENT UPON ARRIVAL
1.	**Backpack (one per cadet)**
2.	**Carabiner (one per cadet)**
3.	**Flashlight / headlamp (one per cadet)**
4.	**Insect repellent (one per cadet)**
5.	**KFS (knife, fork, spoon,) set (one per cadet)**
6.	**Plate (one per cadet)**
7.	**Sleeping bag (one per cadet)**
8.	**Sleeping mats (one per cadet)**
9.	**Small bowl (one per cadet)**
10.	**Trekking pole (one per cadet)**
11.	**Valise (one per cadet)**
12.	**Water bottle (one per cadet)**
13.	**Water carrier (one per cadet)**
14.	**Whistle (one per cadet)**
15.	**Mosquito net (one per cadet)**
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GROUP EQUIPMENT

Group equipment is selected for its versatility, weight and ease of use. The more compact an item is or can become, the easier it is to pack and carry. Group equipment is given to the cadets upon arrival at the expedition centre.

List all the items the cadets require to successfully complete the expedition. Group equipment includes items that cadets are not expected to purchase, such as two-man tents, water filters and stoves.

ISSUED GROUP EQUIPMENT

Number of persons per group: 9

1.	**15-m rope (one per group)**
2.	**Batteries** (spares for communication device and GPS)
3.	**Compass (two per group)**
4.	**First-aid kit (one per group)**
5.	**Food (as detailed in the ration plan)**
6.	**Fuel bottle(s) (three, one litre bottles per group)**
7.	**Garbage bags (one per meal)**
8.	**Glow sticks (two per cadet)**
9.	**GPS receiver (one per group)**
10.	**Hand-held radio (two per group)**
11.	**Naphtha (three litres)**
12.	**Pot set (two sets)**
13.	**Large resealable bags (10 per group)**
14.	**Single burner mountain stove (two per group)**
15.	**Tent complete, 3-person (three per group)**
16.	**Topographical map / guidebook (one per group)**
17.	**Water filter (two per group)**
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ACTIVITY—SPECIFIC EQUIPMENT ANSWER KEY

Record the materials and equipment required to effectively complete the desired training. List all associated equipment and materials that are used for each mode of travel.

MODES OF TRAVEL

Mode of Travel #1 Equipment Required	
Type of Activity: Canoeing	
1.	**Bailer (one per canoe)—22**
2.	**Canoes (one per tandem group)—22**
3.	**Canoe repair kit (one per canoe group)—4**
4.	**Paddles (three per canoe)—66**
5.	**Painters (two per canoe)—44**
6.	**PFD (one per person)— 44**
7.	**Throw Bag with rope, not less than 15 m (49 ft) (one per canoe)—22**
8.	**15-m buoyant heaving line or throw bag (one per canoe)—22**
9.	**Wet / dry suits for each person if water conditions are below 10 degrees Celsius—44**
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Mode of Travel #2 Equipment Required	
Type of Activity: Mountain Biking	
1.	**Basic bike repair kit (one per group)—4**
2.	**Helmet (one per person)—44**
3.	**Mountain Bike complete (one per person)—44**
4.	**Reflective vest (one per group)—4**
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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 4

EO M425.04 – DEVELOP AN EXPEDITION RATION PLAN

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-704/PG-001, *Gold 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.

Have the cadets bring their Expedition Duo-Tang.

Photocopy the *Eating Well With Canada's Food Guide* located at Attachment A and the Energy Expenditures for Physical Activity Information Sheet located at Attachment B for each cadet.

Photocopy the Expedition Ration Plan Information Sheet located at Attachment C for each cadet.

Photocopy Section 4 of the Expedition Planning Booklet located at Attachment D for each cadet.

Review the completed example of Section 4 of the Expedition Planning Booklet located at Attachment E.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TPs 1–4 as it introduces the cadets to developing an expedition ration plan.

An in-class activity was chosen for TP 5 as it is an interactive way for the cadets to confirm their comprehension of developing an expedition ration plan.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have developed an expedition ration plan while considering meal requirements, food options, food weight and nutritional value.

IMPORTANCE

It is important for cadets to develop an expedition ration plan as it is a significant step in the process of planning an expedition. Being able to identify the different types of rations, their nutritional values and how the food is going to be packed and cooked, while considering the type of activities that are to be conducted, will aid in the overall success of the expedition. With a successful ration plan, cadets will have more time and energy throughout the day to fully participate in the expedition.

Teaching Point 1 **Discuss daily nutrition requirements when on an expedition.**

Time: 10 min Method: Interactive Lecture

This TP is intended to discuss nutritional requirements when on an expedition.

Distribute *Eating Well With Canada's Food Guide* located at Attachment A and the Energy Expenditures for Physical Activity Information Sheet located at Attachment B for each cadet for reference while describing the nutrition requirements and developing an expedition ration plan.

Basic nutrition must be kept in mind when planning expedition rations, as cadets typically burn many more calories on an expedition compared to most everyday activities. Ensuring an adequate amount of calories and nutritional balance helps to maintain energy levels and positive attitudes, as well-nourished cadets can think better and tend to make better safety-related decisions.

NUTRIENTS

Calories. A measurement of food energy. Required calories are based on the amount and intensity of expedition activities. When an individual's expedition activities change, their eating habits should reflect those changes. More calories are required as activity level increases.

Sodium. Most sodium in food comes from sodium chloride, which is table or sea salt. Salt is a common ingredient in processed and prepared foods. The appropriate amounts of sodium help maintain fluid and electrolytes balance when active.

Water is essential. Even a small amount of dehydration (one percent of body weight) can increase cardiovascular strain as indicated by a disproportionate elevation of heart rate during exercise and limit the ability of the body to transfer heat from contracting muscles to the skin's surface where it can be dissipated to the environment.

Carbohydrates. Primary sources of energy for the body. The types of carbohydrates are fibre, which is a complex carbohydrate, and sugar, which is a simple carbohydrate.

- **Complex carbohydrates.** Break down slowly and can help prevent overeating. They are found in vegetables, fruit, whole grains, brown rice, nuts, soy products and legumes.
- **Fibre.** A complex carbohydrate found in plants. Unlike other carbohydrates it passes through the body undigested and is healthy for the digestive system. Fibre provides energy for the muscles and brain.
- **Simple carbohydrates.** Break down quickly and can cause a person to become hungry quickly (quick high, quick low). They are found in sugary soft drinks, sugary cereals, white bread, white rice, cookies, candy, fries and pastries.
- **Sugars.** A simple carbohydrate. Natural sugars are found in foods such as milk, fruit and vegetables. Added sugars contribute calories, yet they have no significant nutritional value.

Protein. Found in a variety of foods such as meat, poultry, fish, legumes, nuts, milk products and grain products. It builds muscles, bones and teeth.

Vitamin C. Found in many fruits and vegetables. Helps the body fight infections.

Iron. Found in foods such as meat, fish, poultry, grains, vegetables, fruit, nuts and seeds. Helps the red blood cells carry oxygen throughout the body.

The following personal daily nutritional guidelines must be adhered to:

- 50–80 percent should be carbohydrates,
- 10–15 percent should be proteins, and
- 30 percent should be fats (of which only 10 percent should be saturated fats).

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What are calories and why are they important when planning meals for an expedition?

Q2. What types of foods are proteins found in?

Q3. Why is important to include iron when considering nutrition requirements?

ANTICIPATED ANSWERS:

A1. A measurement of food energy. Required calories are based on the amount and intensity of expedition activities. When an individual's expedition activities change, their eating habits should reflect those changes. More calories are required as activity level increases.

A2. Proteins are found in a variety of foods such as meat, poultry, fish, legumes, nuts, milk products and grain products.

A3. Iron helps the red blood cells carry oxygen throughout the body.

Teaching Point 2 **Discuss planning meals for an expedition.**

Time: 10 min Method: Interactive Lecture

This TP is intended to consider the people participating in the expedition when planning the meals.

When planning meals for an expedition, considerations need to be determined, such as nutrition, taste, perishability, cooking ease and cleanup. As well, the following aspects of the expedition and mealtimes also need to be determined.

Type of activity. The average individual on an expedition will consume thousands of calories throughout the day, an important factor to remember when planning an expedition ration plan. Depending on the expedition activity, the following calorie consumption is to be considered:

- Activities such as moderate backpacking or canoeing will consume 2 500–3 000 calories per day.
- Strenuous activities such as difficult backpacking or snow camping will consume 3 000–3 500 calories per day.
- Very strenuous activities such as mountaineering or extended periods of time spent in cold weather requires 3 500–5 000 calories per day.

Number of people. For each meal, calculate the amount of cadets on the expedition and the amount of food that will be required for each. Count the total number of meals and categorize them as breakfast, lunch, dinner or snack.

Individuals consume from 1.5–2.5 pounds (.68–1.13 kg) of food per day. When planning meals and meal sizes for the expedition, the following per person, per day estimates are helpful:

- average activities require 1.5 pounds (.68 kg) of food,
- strenuous activities require 1.5–2 pounds (.68 to .91 kg) of food, and
- very strenuous activities require 2–2.5 pounds (.91 to 1.13 kg) of food.

Size of cooking groups. The decision needs to be made whether to cook in small groups or one large group, depending on the number of cadets on the expedition.

- **One large group.** Mealtimes with one large group can promote relaxation and a sense of community. Cooking in a large group ultimately saves weight, as the total number of stoves and pots to carry are minimized, however the actual cooking process tends to take longer to complete.
- **Several small groups.** Mealtimes with small groups tend to be more efficient and it enables more people to become more proficient cooks. Small groups can create a sense of separation unless cooking groups are rotated frequently.

Group leaders need to decide whether to cook and eat with the groups or alone. On a short trip or with young cadets, it makes sense for the leader to share food with the group. On a long trip or with more experienced cadets, it can be very productive for the group(s) if the leaders separate themselves. It gives cadets complete control of the quality and timings of the meals and a sense of independence.

Special meal requirements. When deciding what to eat at each meal, it is important to take note of food preferences (eg, vegetarians) and allergies within the group.

Helpful Tips

The following are helpful tips for when planning the rations and conducting mealtimes on an expedition:

- **Plan ahead.** While dinner is cooking, plan the food for the next day. Sort the food required for the next day while on the trail in one or two stuff sacks. Try to plan simple meals for long days and more complex meals on the easier days.
- **Eat often.** While conducting expedition activities, try to consume calories more efficiently by eating five times a day (breakfast, morning snack, lunch, afternoon snack and dinner).
- **Pack individual snack bags.** Rather than having one large bag of trail mix, divide the large bag into individual snack bags the night before. This way, each person can snack throughout the day according to individual needs, rather than waiting for a group-determined snack break. It also limits the spreading of germs.
- **Keep snacks accessible.** Pack lunch and snacks in the top or side pockets of the expedition field pack for easy access.
- **Start slow-cooking food early.** Pre-soak foods that may take a long time to cook (eg, beans).

- **Oil the pot.** Prior to cooking starches or grains, rub the inside of the pot with margarine or oil. This makes cleanup easier and prevents liquids from boiling over.
- **Be creative with leftovers.** Think of ways to use leftovers (eg, leftover rice can be kneaded into bread dough, fried up with spices, or made into rice pudding by adding milk, sugar, raisins and nutmeg or cinnamon). Screw-top hard-plastic containers are useful for storing leftovers for later consumption.
- **Make hot drinks for more than one.** When making hot drinks, make a full pot for several cadets.
- **Drink, drink, drink.** Water helps digest food.
- **Use dried fruits and vegetables.** Rehydrated dried fruits and vegetables can make a bland meal seem almost gourmet.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. How many calories are consumed when conducting very strenuous activities?

Q2. How many pounds of food do cadets consume per day, on average?

Q3. What are the advantages to cooking as a large group?

ANTICIPATED ANSWERS:

A1. Very strenuous activities require 3 500–5 000 calories per day.

A2. Cadets consume from 1.5–2.5 pounds of food per day.

A3. Mealtimes with one large group promotes relaxation and a sense of community. Cooking in a large group ultimately saves weight, as the total number of stoves and pots to carry are minimized.

Teaching Point 3 **Discuss the types and options of expedition rations.**

Time: 10 min Method: Interactive Lecture

This TP is intended to introduce the types and options when planning expedition rations.

Distribute the Expedition Ration Plan Information Sheet located at Attachment C for each cadet for reference while describing the types and options of expedition rations and developing an expedition ration plan.

EXPEDITION RATION TYPES

Whether conducting a menu plan or bulk rations for the expedition, there are five food types to consider when developing an expedition ration plan.

1. **Freeze-dried.** A way to preserve food by freezing it and drying it by the sublimation of ice in a vacuum. Pre-packaged freeze-dried meals are very light to carry and allow for quick preparation with minimal cooking skills and time, however they tend to be more expensive (average $4–10 per meal) and tend to be less nutritious. There are many types of food that can be freeze-dried (eg, meat, pasta and vegetables).

Pre-packaged meals that are made for four people may actually only satisfy two very hungry people. Supplementing with additional rice or noodles may be required.

2. **Dehydrated.** Food that has had the water removed for preservation and storage (eg, fruit, vegetables and meat).

3. **Trail food.** Food that can be consumed while in the middle of an activity (eg, trail mix and granola bars).

4. **Fresh rations.** Food that has been store bought and is still fresh for consumption (eg, fruit, vegetables and meat).

5. **Individual meal packages (IMPs) and meals ready to eat (MREs).** Otherwise known as boil-in-the-bag. Each IMP and MRE include a main course (meat or vegetarian), vegetables and fruit in sealed foil pouches, and dried foods in paper/tinfoil pouches. All of the food items are safe to eat cold and dry—they may not taste as good as hot food, though. High sugar items like chocolate, hard candies and drink mixes, as well as coffee and tea are also included.

   These types of meals were developed to meet a typical day's three meal requirement. These meals are identified as breakfast, lunch and supper and contain between 1400 and 1800 calories—enough calories for an adult performing strenuous tasks for prolonged periods.

Staple food is the chief element or a main component of a meal (eg, rice or noodles).

EXPEDITION RATION OPTIONS

Being able to develop an appropriate expedition ration plan is an important aspect of expedition planning, as the food consumed can dramatically affect the success of an expedition. There are two different expedition rationing options that are commonly followed when designing a ration plan.

Menu Planning

Ask the cadets questions about planning a menu to evaluate their level of knowledge.

Some sample questions may include:

- Have you planned meals for an expedition before?
- What factors did you have to consider when planning meals for an expedition?
- What type of meals did you plan for the expedition?

Menu planning systematically plans the contents of each meal over the course of the expedition. The advantages to menu planning are that there is an organized guide of each meal created to assist in preparation and it is a convenient way to plan for short expeditions (2–5 days).

Steps of the Menu Planning System

The menu planning system has seven steps:

1. Determine the number of meals (breakfast, lunch, dinner and snacks) that are required for the expedition.

2. Identify items which can be eaten at each meal.

3. Decide specifically what to eat at each of the meals, taking note of food preferences and allergies within the group.

When deciding each meal, some helpful hints may include:

- packing fresh foods (fruits and vegetables) for the first day or two;
- freezing meat that will be thawed and ready to cook for dinner; and
- adding freeze-dried items which can add additional nutrition (eg, freeze-dried peas added into a pasta dish).

4. Estimate how much food will be needed at each meal to feed every cadet, while considering:
   a. how big the appetites will be,
   b. how strenuous the expedition will be, and
   c. the time of year.
5. Determine the total food required, based on the menu and generate a shopping list.
6. Purchase the food.
7. Repackage, prepare and pack the food for the expedition.

Bulk Rationing

Buy food in bulk based on the amount and weight of food consumed per day. The advantages to bulk rationing are that it provides opportunities for cooking creativity, allows easier calculations for caloric and nutritional levels and is more beneficial for longer trips. The bulk ration system tends to be more financially feasible, as cadets can eat plenty of delicious food for $3–6 a day.

Bulk food must be repacked into clear plastic bags or containers to reduce packaging and additional waste in the field. There are many foods that can be purchased in bulk to repackage for the expedition such as pasta, beans, rice, flour, cereals, nuts, dried fruits, sugar, soup bases and spices.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. What are the five types of expedition rations?

Q2. What are the two different expedition rationing options that are commonly followed when designing a ration plan?

Q3. What is the average cost per person, per day with the bulk ration system?

ANTICIPATED ANSWERS:

A1. The five types of expedition rations are:

- freeze-dried,
- dehydrated,
- trail food,

- fresh rations, and
- IMPs.

A2. The two different expedition rationing options are menu planning and bulk rations.

A3. The bulk ration system tends to be more financially feasible, as cadets can eat plenty of delicious food for $3–6 a day.

Teaching Point 4 **Discuss packing food for an expedition.**

Time: 5 min Method: Interactive Lecture

This TP is intended to discuss packing and distributing food prior to conducting an expedition.

Have examples of containers, pre-assembled meals and packed food for the cadets to view.

Once the expedition ration plan has been developed and the food has been purchased, the food must be pre-assembled and packed. The following steps simplify packaging, carrying and preparing food while on the expedition.

Strip away the packaging. Cardboard, paper, foil and cans are all excess weight and potential litter.

Select containers. Pack food in see-through bags and containers to allow the contents to be easily seen and selected without having to open the bag or container. Labelling or marking the bags or containers can also aid in selecting. Use bags or containers that are lightweight and are resealable. Examples of containers that can be used include:

- resealable plastic bags (or other strong bags that can be tied),
- resealable plastic containers,
- plastic bottles with screw-top lid, and
- squeeze tubes.

When labelling each container or bag, meal directions or ingredients can also be marked on the outside (eg, pasta directions or chili ingredients).

Pre-assemble the meals. Pre-assembling most of the food prior to the expedition saves time and aids by having the meal preparation times go faster and smoother. Some examples of pre-assembling meals include:

- throwing all ingredients in a bag (called meal-in-a-bag) and cook when required;
- pre-soaking foods that require a longer time to cook (eg, beans); and
- dividing trail food into individual bags.

Develop storage for cold items. As some meals require foods to be chilled or frozen throughout the expedition, cold storage will need to be developed for those items. It is recommended that frozen or chilled items be used first to ensure they stay fresh. If this is not possible, a cold storage system needs to be developed. As groups are rarely stationary on an expedition, maintaining cold storage may be difficult, however some locations to store cold foods may include:

- ice packs and coolers,
- food barrels,
- in a river, lake or creek (ensure the container is sealed),
- in the snow, and
- with regular or dry ice (be careful when handling dry ice).

Divide items among group members. As repackaging consolidates food into a more manageable system of transport, it is easier to distribute the food among the group. When the food has been labelled, it is then distributed among group members. Keep the contents of one complete meal together with one person, as this allows for each meal to be found easily among the group.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS:

Q1. What are some examples of containers that may be used to pack and store food while on an expedition?

Q2. Why is it beneficial to pre-assemble most of the food prior to the expedition?

Q3. What are some locations that food can be stored in order to stay cold?

ANTICIPATED ANSWERS:

A1. Some examples of containers that can be used to pack and store food while on an expedition include:

- resealable plastic bags (or other strong bags that can be tied),
- resealable plastic containers,
- plastic bottles with screw-top lid, and
- squeeze tubes.

A2. Pre-assembling most of the food prior to the expedition saves time and aids in having the meal preparation time go faster and smoother.

A3. Some locations to store cold foods include:

- ice packs and coolers,
- food barrels,
- in a river, lake or creek (ensure the container is sealed),
- in the snow, and
- with regular or dry ice (be careful when handling dry ice).

Teaching Point 5 **Have the cadets, in groups of no more than three, develop an expedition ration plan.**

Time: 15 min Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in groups of no more than three, develop an expedition ration plan and record the information in the Expedition Planning Booklet.

RESOURCES

- *Eating Well With Canada's Food Guide* located at Attachment A (one per cadet),
- Energy Expenditures for Physical Activity Information Sheet located at Attachment B (one per cadet), and
- Expedition Ration Plan Information Sheet located at Attachment C (one per cadet),
- Section 4 of the Expedition Planning Booklet located at Attachment D (one per cadet),
- Completed example of Section 4 of the Expedition Planning Booklet located at Attachment E,
- Expedition Duo-Tang, and
- Pens / pencils.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than three.
2. Distribute to each cadet:
    a. Section 4 of the Expedition Planning Booklet, and
    b. Expedition Ration Plan Information Sheet.
3. Introduce the expedition ration guidelines, to include:
    a. meal requirements based on activity,
    b. food options,
    c. food weights,
    d. nutritional value, and
    e. packing and food distribution.
4. Have the groups read through the Expedition Ration Plan Information Sheet.
5. Have the groups fill in the expedition ration information in Section 4 of the Expedition Planning Booklet using information gathered from the Expedition Ration Plan Information Sheet.

6. Have the groups share their answers. Refer to the completed example of Section 4 of the Expedition Planning Booklet as required.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 5

The cadet's participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

QUESTIONS:

Q1. What foods are vitamin C found in and why is vitamin C important to the body?

Q2. After determining whether to have large or small cooking groups, what other factors need to be considered when deciding how or where to eat as the leader?

Q3. What are the seven steps when conducting the menu planning system on an expedition?

ANTICIPATED ANSWERS:

A1. Vitamin C is found in many fruits and vegetables and helps the body fight infections.

A2. Group leaders need to decide whether to cook and eat with the groups or alone. On a short trip or with young cadets, it makes sense for the leader to share food with the group. On a long trip or with more advanced cadets, it can be very productive for the group(s) if the leader(s) separate themselves. It gives cadets complete control of the quality and timings of the meals and a sense of independence.

A3. The seven steps when conducting the menu planning system are:

1. Determine the number of meals (breakfast, lunch, dinner and snacks) that are required for the expedition.
2. Identify items which can be eaten at each meal.
3. Decide specifically what to eat at each of the meals.
4. Estimate how much food will be needed at each meal to feed every cadet.
5. Determine the total food required, based on the menu and generate a shopping list.
6. Go shopping for the food.
7. Repackage, prepare and pack the food for the expedition.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 425 PC.

CLOSING STATEMENT

A well thought out ration plan can provide the required nutrients and energy levels required to successfully complete the expedition and achieve the goals and objectives that have been set out. As the ration plan is being developed it is also important to consider the types of activities, cadets and how the food is going to be packed and cooked. Creating a ration plan is a skill that can be applied when planning other overnight activities.

INSTRUCTOR NOTES / REMARKS

Nil.

REFERENCES

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C2-208 ISBN 978-1-59485-033-2 Raynolds, J., Lodato, A., Gordon, R., Blair-Smith, C., Welsh, J., & Gerzon, M. (2007). *Leadership the outward bound way*. Seattle, WA: The Mountaineers Books.

C2-251 ISBN 978-0-8117-3464-6 Pearson, C., & Kuntz, J. (Eds.) (2008). *NOLS backcountry cooking: Creative menu planning for short trips*. Mechanicsburg, PA: Stackpole Books.

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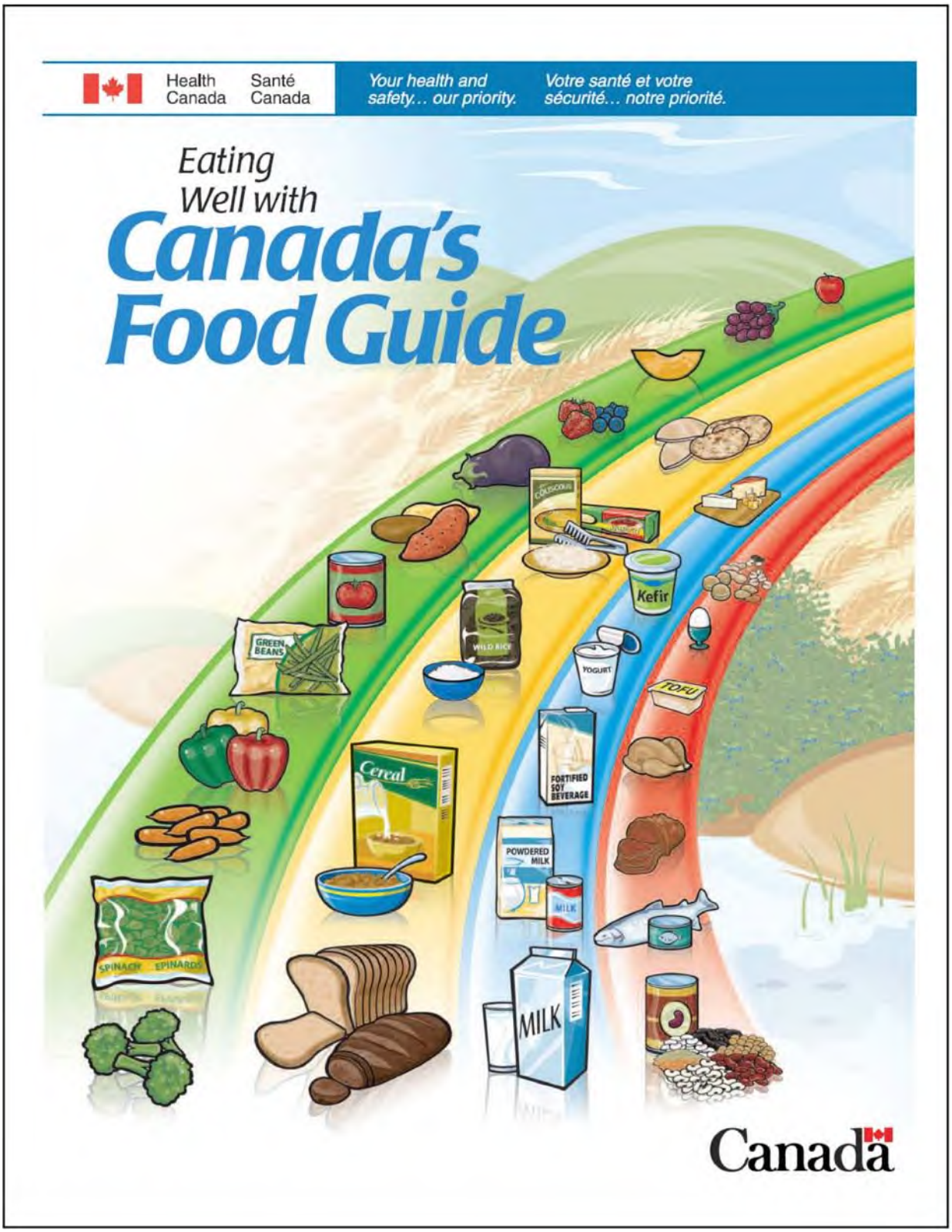
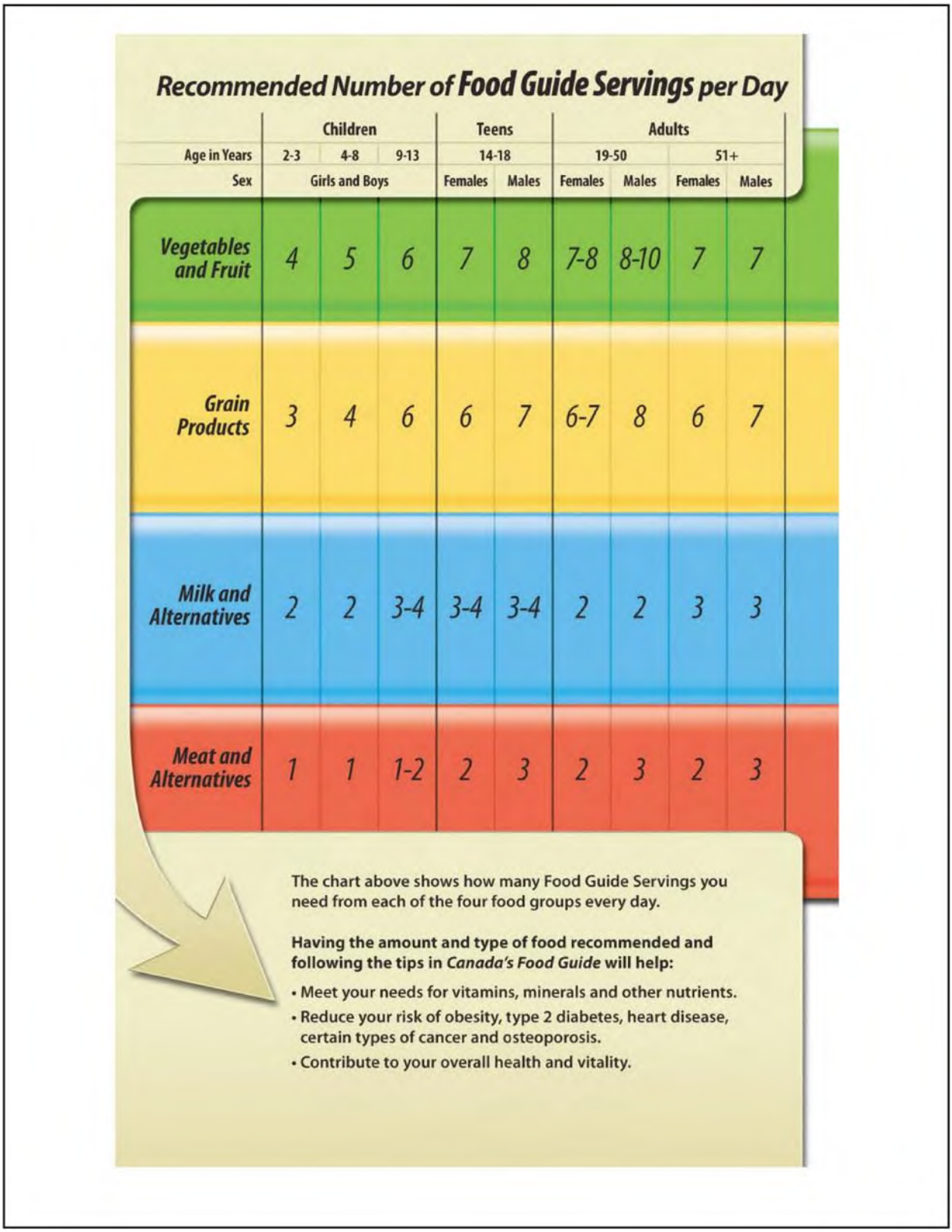

Health Canada
Santé Canada
Your health and safety… our priority.
Votre santé et votre sécurité… notre priorité.
Eating Well with
Canada's Food Guide
GREEN BEANS
WILD RICE
COUSCOUS
Kefir
YOGURT
TOFU
Cereal
FORTIFIED SOY BEVERAGE
POWDERED MILK
MILK
SPINACH
EPINARDS
Canada



Recommended Number of Food Guide Servings per Day

	Children			Teens		Adults			
Age in Years	2-3	4-8	9-13	14-18		19-50		51+	
Sex	Girls and Boys			Females	Males	Females	Males	Females	Males
Vegetables and Fruit	4	5	6	7	8	7-8	8-10	7	7
Grain Products	3	4	6	6	7	6-7	8	6	7
Milk and Alternatives	2	2	3-4	3-4	3-4	2	2	3	3
Meat and Alternatives	1	1	1-2	2	3	2	3	2	3

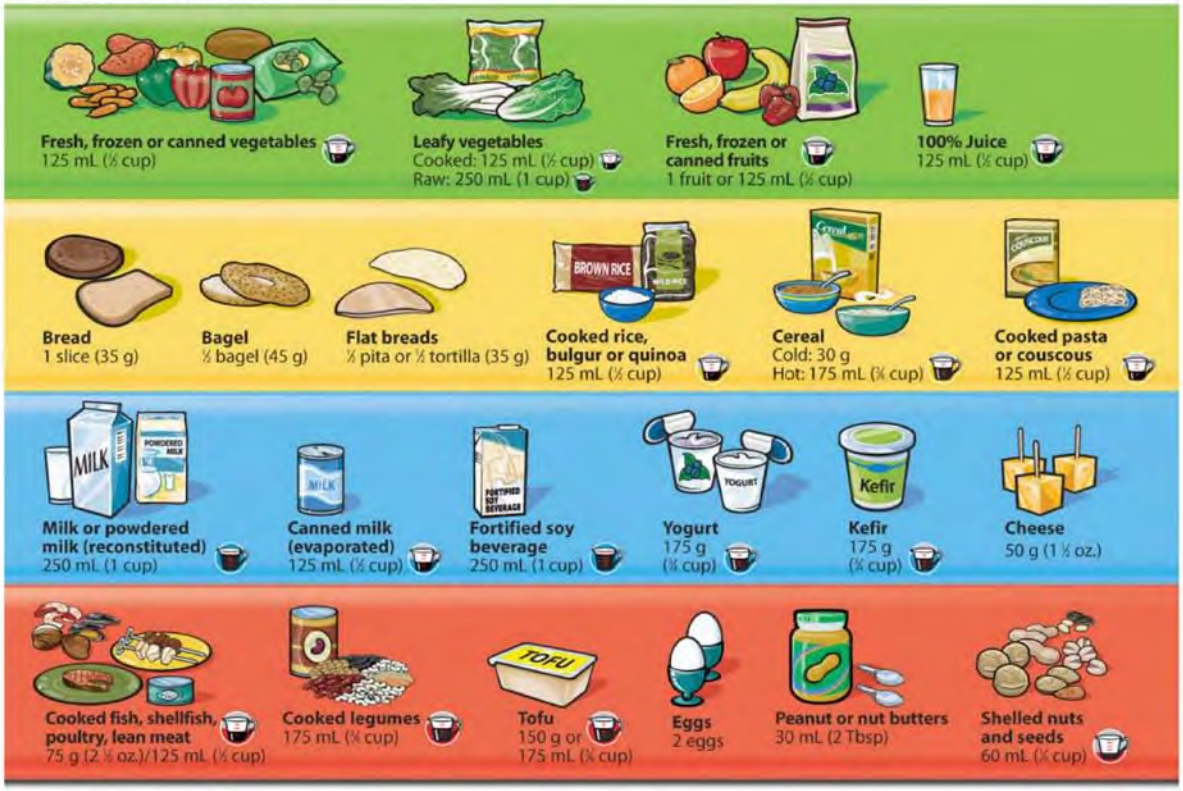
The chart above shows how many Food Guide Servings you need from each of the four food groups every day.

Having the amount and type of food recommended and following the tips in *Canada's Food Guide* will help:

- Meet your needs for vitamins, minerals and other nutrients.
- Reduce your risk of obesity, type 2 diabetes, heart disease, certain types of cancer and osteoporosis.
- Contribute to your overall health and vitality.

What is One Food Guide Serving?

Look at the examples below.



Oils and Fats

- Include a small amount – 30 to 45 mL (2 to 3 Tbsp) – of unsaturated fat each day. This includes oil used for cooking, salad dressings, margarine and mayonnaise.
- Use vegetable oils such as canola, olive and soybean.
- Choose soft margarines that are low in saturated and trans fats.
- Limit butter, hard margarine, lard and shortening.

Make each Food Guide Serving count…

wherever you are – at home, at school, at work or when eating out!

- **Eat at least one dark green and one orange vegetable each day.**
  - Go for dark green vegetables such as broccoli, romaine lettuce and spinach.
  - Go for orange vegetables such as carrots, sweet potatoes and winter squash.
- **Choose vegetables and fruit prepared with little or no added fat, sugar or salt.**
  - Enjoy vegetables steamed, baked or stir-fried instead of deep-fried.
- **Have vegetables and fruit more often than juice.**

- **Make at least half of your grain products whole grain each day.**
  - Eat a variety of whole grains such as barley, brown rice, oats, quinoa and wild rice.
  - Enjoy whole grain breads, oatmeal or whole wheat pasta.
- **Choose grain products that are lower in fat, sugar or salt.**
  - Compare the Nutrition Facts table on labels to make wise choices.
  - Enjoy the true taste of grain products. When adding sauces or spreads, use small amounts.

- **Drink skim, 1%, or 2% milk each day.**
  - Have 500 mL (2 cups) of milk every day for adequate vitamin D.
  - Drink fortified soy beverages if you do not drink milk.
- **Select lower fat milk alternatives.**
  - Compare the Nutrition Facts table on yogurts or cheeses to make wise choices.

- **Have meat alternatives such as beans, lentils and tofu often.**
- **Eat at least two Food Guide Servings of fish each week.***
  - Choose fish such as char, herring, mackerel, salmon, sardines and trout.
- **Select lean meat and alternatives prepared with little or no added fat or salt.**
  - Trim the visible fat from meats. Remove the skin on poultry.
  - Use cooking methods such as roasting, baking or poaching that require little or no added fat.
  - If you eat luncheon meats, sausages or prepackaged meats, choose those lower in salt (sodium) and fat.

Enjoy a variety of foods from the four food groups.

Satisfy your thirst with water!

Drink water regularly. It's a calorie-free way to quench your thirst. Drink more water in hot weather or when you are very active.

* Health Canada provides advice for limiting exposure to mercury from certain types of fish. Refer to www.healthcanada.gc.ca for the latest information.

Advice for different ages and stages…

Children

Following *Canada's Food Guide* helps children grow and thrive.

Young children have small appetites and need calories for growth and development.

- Serve small nutritious meals and snacks each day.
- Do not restrict nutritious foods because of their fat content. Offer a variety of foods from the four food groups.
- Most of all... be a good role model.

Women of childbearing age

All women who could become pregnant and those who are pregnant or breastfeeding need a multivitamin containing **folic acid** every day. Pregnant women need to ensure that their multivitamin also contains **iron**. A health care professional can help you find the multivitamin that's right for you.

Pregnant and breastfeeding women need more calories. Include an extra 2 to 3 Food Guide Servings each day.

Here are two examples:

- Have fruit and yogurt for a snack, or
- Have an extra slice of toast at breakfast and an extra glass of milk at supper.

Men and women over 50

The need for **vitamin D** increases after the age of 50.

In addition to following *Canada's Food Guide*, everyone over the age of 50 should take a daily vitamin D supplement of 10 µg (400 IU).

How do I count Food Guide Servings in a meal?

Here is an example:

Vegetable and beef stir-fry with rice, a glass of milk and an apple for dessert		
250 mL (1 cup) mixed broccoli, carrot and sweet red pepper	=	2 **Vegetables and Fruit** Food Guide Servings
75 g (2 ½ oz.) lean beef	=	1 **Meat and Alternatives** Food Guide Serving
250 mL (1 cup) brown rice	=	2 **Grain Products** Food Guide Servings
5 mL (1 tsp) canola oil	=	part of your **Oils and Fats** intake for the day
250 mL (1 cup) 1% milk	=	1 **Milk and Alternatives** Food Guide Serving
1 apple	=	1 **Vegetables and Fruit** Food Guide Serving

Eat well and be active today and every day!

The benefits of eating well and being active include:

- Better overall health.
- Lower risk of disease.
- A healthy body weight.
- Feeling and looking better.
- More energy.
- Stronger muscles and bones.

Be active

To be active every day is a step towards better health and a healthy body weight.

Canada's Physical Activity Guide recommends building 30 to 60 minutes of moderate physical activity into daily life for adults and at least 90 minutes a day for children and youth. You don't have to do it all at once. Add it up in periods of at least 10 minutes at a time for adults and five minutes at a time for children and youth.

Start slowly and build up.

Eat well

Another important step towards better health and a healthy body weight is to follow *Canada's Food Guide* by:

- Eating the recommended amount and type of food each day.
- Limiting foods and beverages high in calories, fat, sugar or salt (sodium) such as cakes and pastries, chocolate and candies, cookies and granola bars, doughnuts and muffins, ice cream and frozen desserts, french fries, potato chips, nachos and other salty snacks, alcohol, fruit flavoured drinks, soft drinks, sports and energy drinks, and sweetened hot or cold drinks.

Read the label

- Compare the Nutrition Facts table on food labels to choose products that contain less fat, saturated fat, trans fat, sugar and sodium.
- Keep in mind that the calories and nutrients listed are for the amount of food found at the top of the Nutrition Facts table.

Nutrition Facts

Per 0 mL (0 g)

Amount		% Daily Value
Calories 0		
Fat 0 g		0 %
Saturates 0 g		0 %
+ Trans 0 g		
Cholesterol 0 mg		
Sodium 0 mg		0 %
Carbohydrate 0 g		0 %
Fibre 0 g		0 %
Sugars 0 g		
Protein 0 g		
Vitamin A 0 %	Vitamin C	0 %
Calcium 0 %	Iron	0 %

Limit trans fat

When a Nutrition Facts table is not available, ask for nutrition information to choose foods lower in trans and saturated fats.

Take a step today...

- ✓ Have breakfast every day. It may help control your hunger later in the day.
- ✓ Walk wherever you can – get off the bus early, use the stairs.
- ✓ Benefit from eating vegetables and fruit at all meals and as snacks.
- ✓ Spend less time being inactive such as watching TV or playing computer games.
- ✓ Request nutrition information about menu items when eating out to help you make healthier choices.
- ✓ Enjoy eating with family and friends!
- ✓ Take time to eat and savour every bite!

For more information, interactive tools, or additional copies visit Canada's Food Guide on-line at:
www.healthcanada.gc.ca/foodguide

or contact:

Publications
Health Canada
Ottawa, Ontario K1A 0K9
E-Mail: publications@hc-sc.gc.ca
Tel.: 1-866-225-0709
Fax: (613) 941-5366
TTY: 1-800-267-1245

Également disponible en français sous le titre :
Bien manger avec le Guide alimentaire canadien

This publication can be made available on request on diskette, large print, audio-cassette and braille.

 HC Pub.: 4651 Cat.: H164-38/1-2007E ISBN: 0-662-44467-1

ENERGY EXPENDITURES FOR PHYSICAL ACTIVITY INFORMATION SHEET

Many references evaluate the amount of calories burnt during various activities. This table is to serve as a guide with the understanding that other resources could suggest different values. Values below are for activities of one-hour durations.

Activity (1 hour)	Cadet Weight		
	130 lbs	155 lbs	190 lbs
Backpacking, general	413	493	604
Bicycling, < 16 km / h, leisure	236	281	345
Bicycling, > 32 km / h, racing	944	1126	1380
Bicycling, 16–19 km / h, light effort	354	422	518
Bicycling, 19–22.4 km /h, moderate effort	472	563	690
Bicycling, 22.4–25.4 km / h, vigorous effort	590	704	863
Bicycling, 25.4–30.4 km / h, very fast, racing	708	844	1035
Canoeing, on camping trip	236	281	345
Canoeing, rowing, > 9.6 km / h, vigorous effort	708	844	1035
Canoeing, rowing, light effort	177	211	259
Canoeing, rowing, moderate effort	413	493	604
Cooking or food preparation	148	176	216
Hiking, cross country	354	422	518
Skiing, cross-country, moderate effort	472	563	690
Skiing, cross-country, slow or light effort	413	493	604
Skiing, cross-country, uphill, maximum effort	974	1161	1423
Skiing, cross-country, vigorous effort	531	633	776
Snowshoeing	472	563	690
Walking, 3.2 km / h, slow pace	148	176	216
Walking, 5.6 km / h, uphill	354	422	518
Walking, 6.4 km / h, very brisk pace	236	281	345
White-water rafting, kayaking, or canoeing	295	352	431

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EXPEDITION RATION PLAN INFORMATION SHEET

Steps of the Menu Planning System

1. Determine the number of meals (breakfast, lunch, dinner and snacks) that are required for the expedition.
2. Identify items which can be eaten at each meal.
3. Decide specifically what to eat at each of the meals.
4. Estimate how much food will be needed at each meal to feed every cadet.
5. Determine the total food required, based on the menu and generate a shopping list.
6. Purchase the food.
7. Repackage, prepare and pack the food for the expedition.

Number of Calories per Pound for Some Expedition Ration Items

DAIRY	GRAINS / STARCHES	LEGUMES	MEATS	TRAIL FOODS	SWEETS	CONDIMENTS	DRINKS	SPICES	MISC.
Powdered Milk: 1650	Flour (white): 1650	Lentils: 150	Bacon Bits: 2836	Dried Apricots: 1100	Honey: 1300	Jelly: 1200	Tea: 0	Salt and Pepper: 0	Yeast: 0
Powdered Eggs: 2700	Flour (wheat): 1500	Pinto Beans: 200	Pepperoni: 2250	Mix Dried Fruit: 1250	White Sugar: 1700	Peanut Butter: 2580	Coffee: 0	Garlic Powder: 0	Olive Oil: 4000
Margarine: 1900	Pancake Mix: 1850	Chili Base: 1600	Salami: 2050	Raisins: 1400	Brown Sugar: 1700	Maple Syrup: 1222	Hot Cocoa Mix: 1650	Oregano: 0	Vegetable Oil: 4000
Cheddar Cheese: 1760	Pasta Noodles: 1700	Soup Mix: 2000		Salted Peanuts: 2650	Chocolate Chips: 2100	Salad Dressing: 500	Juice Mix: 1950	Chili Powder: 0	Granola Bars: 1760
Parmesan Cheese: 1800	Rice (white): 1650			Roasted Peanuts: 2500	Cocoa: 1650	Soy Sauce: 240		Onion Powder: 0	Popcorn: 1650
Dairy Cream: 3750	Rolled Oats: 1750			Cashews: 2500	Cookies: 2200	Bbq Sauce: 240		Curry Powder: 0	Ketchup: 400
	Cream of Wheat: 1750			Walnuts: 2450	Brownie Mix: 1800			Beef Bouillon: 0	Tomato Sauce: 109
	Potato: 1624			M&M's: 2133				Tabasco: 0	

<table>
<tr>
<td rowspan="3">Core Nutrients
• calories,
• sodium,
• carbohydrates, to include:
○ complex carbohydrates,
○ fibre,
○ simple carbohydrates, and
○ sugars.
• proteins,
• vitamin C, and
• iron.</td>
<td>Nutritional Needs Required per Cadet per Day
• 50 percent to 80 percent carbohydrates,
• 10 percent to 15 percent proteins, and
• 30 percent fats (of which only 10 percent should be saturated fats).</td>
</tr>
<tr>
<td>Types of Expedition Activities
• Activities such as moderate backpacking or canoeing will require 2 500–3 000 calories per day.
• Strenuous activities such as difficult backpacking or snow camping will require 3 000–3 500 calories per day.
• Very strenuous activities such as mountaineering or extended time spent in cold weather requires 3 500–5 000 calories per day.</td>
</tr>
<tr>
<td>Average Consumption per Day
• From 1.5–2.5 pounds (.68–1.13 kg) of food.
• Average activities require 1.5 pounds (.68 kg) of food.
• Strenuous activities require 1.5–2 pounds (.68–.91 kg) of food.
• Very strenuous activities require 2–2.5 pounds (.91–1.13 kg) of food.</td>
</tr>
</table>

Helpful Tips When Planning Expedition Rations and Conducting Mealtimes

- Plan ahead.
- Eat often.
- Pack individual snack bags.
- Keep snacks accessible.
- Start slow-cooking food early.
- Oil the pot.
- Be creative with leftovers.
- Make hot drinks for more than one cadet.
- Drink, drink, drink.
- Use dried fruits and vegetables.

SAMPLE MENU PLAN	Friday	Saturday	Sunday
Breakfast		Hash browns with cheese Powdered Milk Hot coffee / chocolate	Oatmeal Powdered Milk Salami Hot coffee / chocolate
Morning snack		GORP	Granola bars
Lunch / Dinner		Salami Bagels Havarti cheese Fruit drink	Veggie wrap Carrots Soup Fruit drink
Afternoon snack		Peanut butter Crackers	
Dinner / Supper	Instant soup Basic pasta Fruit bars Hot chocolate	Chili No-bake cookies Fruit Hot Chocolate	

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SECTION 4 – EXPEDITION RATION PLAN

IDENTIFY THE ACTIVITIES BEING CONDUCTED ON THE EXPEDITION

_____

_____

_____

_____

_____

1: Identify expedition ration planning guidelines.

Time of Year / Number of Days	
Number of Cadets	

2: Determine number of meals required.

	Day One	Day Two	Day Three	Total
Breakfast				
Morning Snack				
Lunch / Dinner				
Afternoon Snack				
Dinner / Supper				

3: Determine the following.

What type of meals may be prepared and eaten on this type of expedition.	
Determine how much food is required.	
Special meal requirements.	
Cooking group size(s).	
Packing food considerations. (packaging, pre-assembling meals and food and weight distribution)	
Budget (if applicable).	

4: Create a menu plan.

	Day One	Day Two	Day Three
Breakfast			
Morning Snack			
Lunch / Dinner			
Afternoon Snack			
Dinner / Supper			

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COMPLETED EXAMPLE OF SECTION 4 OF THE EXPEDITION PLANNING BOOKLET

IDENTIFY THE ACTIVITIES BEING CONDUCTED ON THE EXPEDITION

Canoeing on flatwater. Paddling a distance between 10–15 km.

Mountain biking on familiarization trails. Biking a distance between 40–50 km.

1: Identify expedition ration planning guidelines.

Time of Year / Number of Days	Fall (October) / 2 nights, 3 days.
Number of Cadets	36 cadets (12 females, 24 males), 8 staff (5 male, 3 female) = 44 total cadets

2: Determine number of meals required.

	Day One	Day Two	Day Three	Total
Breakfast		44	44	88
Morning Snack		44	44	88
Lunch / Dinner		44	44	88
Afternoon Snack		44		44
Dinner / Supper	44	44		88

3: Determine the following.

What type of meals may be prepared and eaten on this type of expedition.	A menu that includes some fresh rations, with some meals to be pre-assembled prior to the expedition. Breakfast Saturday morning and Supper / Dinner Saturday evening will be the two pre-assembled meals. The remaining meals and snacks will be fresh rations.
Determine how much food is required.	44 cadets—six meals and three snacks each. 264 meals and 132 snacks total. (note the total weight of food and caloric requirements)
Special meal requirements.	One vegetarian.
Cooking group size(s).	Six groups with each group consisting of six cadets and one staff. Two remaining staff will be cooking / eating on their own.
Packing food considerations. (packaging, pre-assembling meals and food and weight distribution)	Two meals will be pre-assembled prior to expedition. Remaining meals will be fresh rations stored in containers. Each cadet will carry one full meal and their individual snacks.
Budget (if applicable).	Not applicable.

4: Create a menu plan.

	Day One	Day Two	Day Three
Breakfast		Pancakes Fruit Powdered milk Hot coffee / chocolate	Fried cheese bagels Salami Fruit drink Hot coffee / chocolate
Morning Snack		No-bake cookies	Peanut butter Crackers
Lunch / Dinner		Italian pasta salad Fruit bars Cheese Fruit drink	Basic falafel Vegetables No-bake cookies Powdered milk
Afternoon Snack		Trail Mix	
Dinner / Supper	Sweet and sour rice Vegetables Crackers Hot coffee / chocolate	Vegetarian meatballs Soup Fruit Hot coffee / chocolate	

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 5

EO C425.01 – DISCUSS ACTIONS TAKEN WHEN A PERSON IS LOST

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-704/PG-001, *Gold 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.

Refer to local area instructions as well as the corps / regional standard operating procedure (SOP) for information on when to contact emergency services after a person is missing or lost, for use in TP 5.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TPs 1–4 and TP 6 as it introduces the cadets to precautions to take, lost person behaviour, ways to communicate with a lost person and common search and rescue techniques.

A group discussion was chosen for TP 5 as it allows the cadets to interact with their peers and share their knowledge and opinions about when to contact emergency services when lost. Sharing in the discussion encourages the cadets to examine their own thoughts and feelings and may prompt them to re-examine their previously held ideas. Participating in a group discussion improves the cadets' listening skills and team development.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have discussed actions taken when a person is lost.

IMPORTANCE

It is important for cadets to know what actions to take when lost as well as the actions searchers will take to find them. When completing cadet activities in the field, the possibility of becoming lost is always present. When planning and leading activities, it is important to understand and communicate search and rescue principles. Cadets participating in an activity should be aware of the actions they must take when lost, as it will increase the chances of them being found quickly.

Teaching Point 1 **Discuss lost person behaviour.**

Time: 10 min Method: Interactive Lecture

LOST PERSON BEHAVIOUR

Every lost person will react differently. The behaviours listed are generalizations of lost persons.

It is possible that some cadets have been lost before (eg, in a big department store, driving to an unfamiliar destination with their parents, out for a walk). Have the cadets share their experiences.

Have the cadets briefly answer the following questions:

- If you became lost, how would you react?
- Do you think you could control fear and panic?
- Would you be prepared to analyze the situation and establish a logical course of action?

Understanding / predicting the behaviour of a lost or missing person can greatly increase the chances for a successful search.

Initial Actions

A person who has received some survival training will know that the first step when becoming lost is to STOP (stop, think, observe and plan) and then gather information in order to try to determine current location. Someone who has not been trained may begin to panic when they realize that they are lost.

Movement Patterns

If a lost person finds a trail, they will most likely start hiking on it. It is more likely they will follow a route of easy travel than one more advanced. A lost person will rarely reverse direction on a trail. They may hike to higher elevation, hoping to see more of the area.

The person may convince themselves that they are making their way back to the group, when in fact they are heading in the opposite direction.

Behaviour Patterns

Behaviour will differ from one person to the next, from situation to situation.

Have the cadets imagine they have become lost. Ask them if they think their behaviour would be different in the daytime than in the night-time? Why?

Day behaviour. Throughout the day, a lost person will most likely attempt to be found by wandering to look for people or wait for searchers to locate them. When a person keeps themselves busy, feelings of fear and panic will be minimized.

Night behaviour. A lost person may become scared and lonely in the night and seek temporary shelter. They will usually stay in the same place throughout the night. If capable, they will try to ignite a fire (which may also act as a signal).

Panic behaviour. Panic often causes a person to act without thinking. When a lost person panics, they become disoriented and wander aimlessly, possibly becoming hysterical.

Behaviour when a person does not want to be found. A person who does not want to be found likely became lost to gain attention or for fear of punishment. They are most likely seeking solitude and will not respond to searchers' efforts and will do very little to aid in their rescue.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What are some typical movement patterns of a lost person?

Q2. If a person is lost and finds a trail, what will they likely do?

Q3. Why would a person not want to be found?

ANTICIPATED ANSWERS:

A1. If a lost person finds a trail, they will most likely start hiking on it. They are also much more likely to follow a route of easy travel than one more advanced. A lost person will rarely reverse direction on a trail. A lost person may hike to a high elevation, hoping to see more of the area.

A2. They will most likely start hiking on it.

A3. A person who does not want to be found likely became lost to gain attention or for fear of punishment.

Teaching Point 2 **Explain precautions that will minimize the possibility of a person becoming lost.**

Time: 10 min Method: Interactive Lecture

This lesson concentrates on becoming lost as an individual. Stress that the same principles apply when a group of cadets become lost.

There is a possibility of becoming lost at all times when in the field, even when going to the washroom or filling up a canteen. It is good practice to carry a whistle at all times and have a general idea of the layout of the land.

PRECAUTIONS THAT WILL MINIMIZE THE POSSIBILITY OF A PERSON BECOMING LOST

All of the precautions listed below should be included during the initial briefing of an activity.

Provide Clear and Detailed Instructions on the Activity Being Completed

When briefing the cadets on the activity to be completed, ensure the instructions are clear and detailed. All cadets should know the what, where, why, when and how prior to the start of the activity.

Everyone involved in the activity should have a clear understanding of the route and the route plan. During the initial briefing, make sure everyone looks at their map and follows along the route as it is identified and described. This way, the cadets can visualize where they are going as well as see the features along the route, such as hills, rivers, trails and other conventional signs.

Set Activity Boundaries

Objects such as pole lines, fences, and rivers make great boundaries. Have all of the cadets look at the map and outline the boundaries along the route. When the cadets participating in the activity have clearly-defined and well-understood boundaries, the chances of becoming lost are minimized. If a person does become lost, they will likely be found quicker, by staying within the boundaries.

Provide All Personnel With a Safety Bearing

A safety bearing, when set on a compass, leads a person to a major feature such as a road, fence or landmark. It is designed to assist a person who is lost or separated from the group to find a location where they can then be located. A safety bearing should be derived for every cadet activity involving hiking / navigation / expedition-type activities. It can be set on the compass and walked on until the feature is reached. It is also good to provide a general direction to travel (eg, hike north-west until a road is reached)

Enforce a "Buddy System" at All Times

Using the buddy system will help reduce the possibility of a person becoming lost, because they will never be alone. The buddy system should be enforced throughout all weekend training activities, even at night when a person has to use the washroom.

Becoming disoriented by going to the washroom in the dark could result in becoming lost.

Provide All Personnel With Noise-Making Devices

A series of three anything (eg, whistle blasts, flashes) is the universal signal for distress. Each cadet should have devices that can be used to signal when training in the field. Noise-making devices can be whistles, horns or even yells.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. Why is it important to set activity boundaries?

Q2. What is a safety bearing?

Q3. What is the universal sign for distress?

ANTICIPATED ANSWERS:

A1. When the cadets participating in the activity have clearly-defined and well-understood boundaries, the chances of becoming lost are minimized. If a person does become lost, they will likely be found quicker (if they stay within the boundaries).

A2. A safety bearing, when set on a compass, leads a person to a major feature such as a road, fence or landmark. It is designed as a way to assist a person who is lost or separated from the group to find a location where they can wait to be found.

A3. A series of three anything (eg, whistle blasts, flashes).

Teaching Point 3 **Explain immediate actions to take when one becomes lost or separated from the group.**

Time: 5 min Method: Interactive Lecture

Each survival situation must be analyzed and dealt with according to the circumstances. In addition to being proficient in survival skills, individuals should also know something about the area they may be required to survive in—the climate, flora, fauna, escape routes, search and rescue procedures, etc. The mind is the most essential component for survival. Being prepared means being able to cope with the seven enemies of survival, while still being able to make good decisions.

IMMEDIATE ACTIONS TO TAKE WHEN ONE BECOMES LOST OR SEPARATED FROM THE GROUP

Employ the STOP Procedure

Once it is determined that one is lost, the best thing to do is to stay in one place, keep calm and try to gather information to determine one's location. It is extremely important to concentrate on making good decisions.

STOP is a mnemonic for:

- **Sit.** Stop where you are! Do not panic. Many lost people waste valuable energy and risk injury by panicking—running aimlessly, continuing to travel after dark, or walking in circles. If a lost person decides to immediately wander in an attempt to find their location, in most cases they will move further away and increase the distance between the known points of their course. This will only increase the size of the search area, increasing the time it will take for a rescue team to locate an individual. As long as there is no immediate danger, stay in one place. During the first 30 minutes of being lost is when people tend to make their biggest mistakes. Making good decisions about the situation involves thinking through options without panicking.
- **Think.** Think about immediate and future dangers and the factors involved in the situation. Consider the time of day, personal physical condition and the last time water or food was consumed. Try to list the options that are available.

- **Observe.** Observe and listen for the signals of rescuers. Study the immediate environment, determining weather, terrain and resources available. Check the immediate area for a shelter location, fresh drinking water, and for clues of the current location.
- **Plan.** Plan the best course of action. It could be close to dark and consideration should be given to setting up shelter, finding water or starting a fire. A safety bearing could have been provided prior to beginning the activity and consideration should be given to use it or not. Include how to signal rescuers in the plan.

Listen for a Whistle Signal / Yell / Horn Honking From the Group / Searchers

When the group becomes aware that a person is missing or lost, one of the first steps is to make noise, that the missing person may hear.

Communicate the Location to the Group / Searchers by Making Noise

As a missing person, it is important to make noise that the group / searchers may hear so that they can approach the general area. Blowing a whistle or banging objects together to make noise will save the voice.

Walk on the Safety Bearing to the Nearest Road or Fence Line

After employing the STOP procedure and listening for and communicating with noise, the next step is to walk on the safety bearing provided in the briefing. The safety bearing should help a missing person become located by leading them to a major feature such as a road, fence or landmark. Once the feature has been reached, the person should stop, remain in their position and wait to be found.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. What is the first action to take when lost?

Q2. What should one think about when employing the STOP procedure?

Q3. Why should a lost person make noise?

ANTICIPATED ANSWERS:

A1. Employ the STOP procedure.

A2. Think about immediate and future dangers and the factors involved in the situation. Consider the time of day, personal physical condition, and the last time water or food was consumed. Try to list the options that are available.

A3. It is important to make noise that the group / searchers may hear so that they can approach the general area.

Teaching Point 4 **Explain actions the group / searchers will take when a person becomes lost.**

Time: 15 min Method: Interactive Lecture

The actions listed below are the first steps a group will take when it is confirmed that a person has become lost.

The leader of the group will begin to complete these actions without search and rescue personnel. These actions will help make the decision about when to call search and rescue personnel to be dispatched to the area.

If search and rescue professionals are dispatched, they will require this information.

ACTIONS THE GROUP / SEARCHERS WILL TAKE WHEN A PERSON BECOMES LOST

When it is discovered that a person is missing, the first instinct may be to go in the direction they were last seen, shouting their name. If everyone in the group has the same instinct, the list of missing persons may soon include the entire group.

Panic is triggered when a person becomes lost; however, it is a time when people need to remain calm, think clearly and act deliberately.

Analyze the Severity of the Situation

A combination of factors affecting urgency will help determine not only how quickly to respond, but the nature and level of response. A decision whether or not to contact emergency services will have to be made. The first step is to analyze the severity of the situation. If the majority of these factors are a high level of concern, it is likely that the leader should contact emergency services.

Time of day. A person lost in the evening is more of a concern than in the morning. Searching is more likely to be successful during daylight.

Weather. Severe weather (eg, torrential rain, snow, cold, fog) lessens the chances of a person being found. The forecasted weather should be considered. Searching is more likely to be successful in good weather.

Age and experience level of the person. A person with limited navigation and survival training will be more concerning than a person who has completed a variety of survival training.

Medical concerns. When a missing person has a medical concern or injury, their condition must be carefully analyzed. Will they need medication soon? How long can they go without medication? Will they need medical attention when found?

People with serious medical issues could behave abnormally.

Equipment in the person's possession. When a person has limited equipment, the necessity to begin a search becomes more important. When participating in an activity, it is important that cadets have equipment such as a signalling device, water and rain gear (if the forecast is calling for rain). Knowing what the person is wearing will help the search process, since personnel know what colour(s) to look for.

When conducting activities, it is a good idea to give every cadet a garbage bag. The garbage bag can act as raingear, a water collection device, temporary shelter and a signalling device, yet it is small enough to fit in the cadet's pocket.

Signalling devices available. When a missing person has a signalling device, such as a whistle, a horn, matches or a flashlight, the group can be made aware of the sounds and sights to look for. The leader should also complete an inventory of the signalling devices available that the group can use to signal the lost person.

Communicate With the Lost Person

There are a variety of ways in which the group should try to communicate with the lost person.

Make noise. When a lost person hears noise, they will likely move toward it. Also, hope of being found will begin to rise, since they are now aware that people are looking for them close by.

Mark trees. A lost person may wander around the area. If they see a marking on a tree left by the group, they will know that people are near. When marking trees, the group could also leave instructions stating what the person should do.

Use signalling devices. There are a variety of signalling devices that the group could use, such as a signal fire, flares, a whistle, and a horn. If the lost person sees a signal, they will know which direction to head toward.

Confine the Area to Establish a Search Perimeter

Confinement area. A search perimeter that encompasses the last known area of the missing person and beyond. Once the area has been established, it should be unlikely that the missing person could pass through it without being detected.

Road blocks / trail blocks / patrols. Roads or pathways provide routes in which the missing person could depart. Road blocks / trail blocks / patrols leading in and out of the confinement area should be established. It is possible that the missing person could find a car passing by and simply hop in it and get transported to the closest town (while people are still searching). Also, personnel in the area can be made aware of the situation and provide searchers with any known information.

Lookouts. Searchers find locations at high elevations and look for the missing person.

Track traps. Areas in which tracks easily appear (eg, dusty road, sandy area, and mud) and are brushed off so that there are no tracks or marks. These areas are then checked frequently for tracks. If tracks are found in a track trap, searchers know that the missing person has moved through the area.

String lines. As searchers make their way through the perimeter of an area, one person carries a spool of string. As they walk through an area, the string unrolls, leaving a visible trail. The string then serves as a perimeter to confine the missing person, as well as a sign that assistance is nearby.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS:

Q1. What are the factors considered to analyze the severity of the situation when a person becomes lost?

Q2. What is a confinement area?

Q3. What are some ways to confine the area to establish a search perimeter?

ANTICIPATED ANSWERS:

A1. The factors used to analyze the severity of the situation are:

- the time of day,
- the weather,
- the age and experience level of the person,
- medical concerns,
- equipment in the person's possession, and
- signalling devices available.

A2. A confinement area is a search perimeter that encompasses the last known area of the missing person and beyond. Once the area has been established, it should be unlikely that the missing person could pass through it without being detected.

A3. A search perimeter can be established by using:

- road blocks / trail blocks / patrols,
- lookouts,
- track traps, and
- string lines.

Teaching Point 5 **Discuss when to contact emergency services.**

Time: 5 min Method: Group Discussion

BACKGROUND KNOWLEDGE

The point of the group discussion is to draw the following information from the group using the tips for answering / facilitating discussion and the suggested questions provided.

WHEN TO CONTACT EMERGENCY SERVICES

There are no hard and fast rules that state when emergency services should be contacted after a person becomes lost. It is the responsibility of the leader to make the call based on the following factors:

- time of day,
- current and forecasted weather,
- age and experience level of the cadet,
- medical concerns,

- equipment in the cadet's possession, and
- signalling devices available.

If there is any doubt whether or not the cadet will be found, there is little light left in the day or the temperatures are dropping, it is recommended that emergency services be contacted.

It typically takes emergency services a minimum of one hour to initiate a search and rescue mission once they have been notified and even longer for rural areas without teams stationed in the area. Also, emergency services will usually not begin a search after dark—they will wait until first light.

It is much easier to call off emergency personnel than call them in.

GROUP DISCUSSION

TIPS FOR ANSWERING / FACILITATING DISCUSSION:

- Establish ground rules for discussion, eg, everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

SUGGESTED QUESTIONS:

Q1. What local area instructions and corps / regional SOP for when to contact emergency services exist in your area?

Q2. What factors would influence the decision whether or not to contact emergency services?

Q3. Approximately how long do you think it would take emergency services to get to your local area and begin a search mission?

Other questions and answers will develop throughout the group discussion. The group discussion should not be limited to only those suggested.

Reinforce those answers given and comments made during the group discussion, ensuring the teaching point has been covered.

CONFIRMATION OF TEACHING POINT 5

The cadets' participation in the group discussion will serve as the confirmation of this TP.

Teaching Point 6 **Discuss ground search procedures used by search and rescue professionals when dispatched.**

Time: 5 min Method: Interactive Lecture

There are a wide variety of documented search and rescue procedures. These procedures will be completed by search and rescue professionals, once they have been dispatched to the area.

GROUND SEARCH PROCEDURES USED BY SEARCH AND RECUE PROFESSIONALS WHEN DISPATCHED

Hasty Search

A hasty search does not have definable boundaries. This type of search is used to discover evidence / the missing person quickly by visiting general locations where they are likely to be found (eg, campsites, abandoned vehicles, roads, trails). Hasty search techniques are usually used in the early stages of a search, but can be used anytime to check an unconfirmed sighting or to recheck specific, likely locations.

The goal of a hasty search is speed. The team is normally comprised of two to four searchers.

Running a trail, path or track is an example of a hasty search.

Other terms used to describe hasty searches include scratch, eyeball, quick-look, 360s, sign-cutting, ridge running, road / trail patrolling and trail running.

Loose Grid Search

This search involves searchers lining up on a baseline, at a wide spacing. Spacing is dependent on terrain and visibility. Generally, the amount of overlapping area should be minimal; however, searchers should always be able to maintain occasional visual / voice contact with the searchers on either side.
Once the search lanes are established, each searcher proceeds to search their area by weaving / roaming forward.

The loose grid search is generally used in the early stages of a search operation, especially if hasty searches found clues and the time frame is short. They may also be valuable in situations where the search area is large and the area has not been confined.

The goal of a loose grid search is to cover a large geographic area quickly, with few resources. The team is normally comprised of three to seven searchers.

Other terms used to describe loose grid searches include open grid and low coverage searches.

For Figures 1–3:

- A = the visual scan width, and
- B = the sweep width.

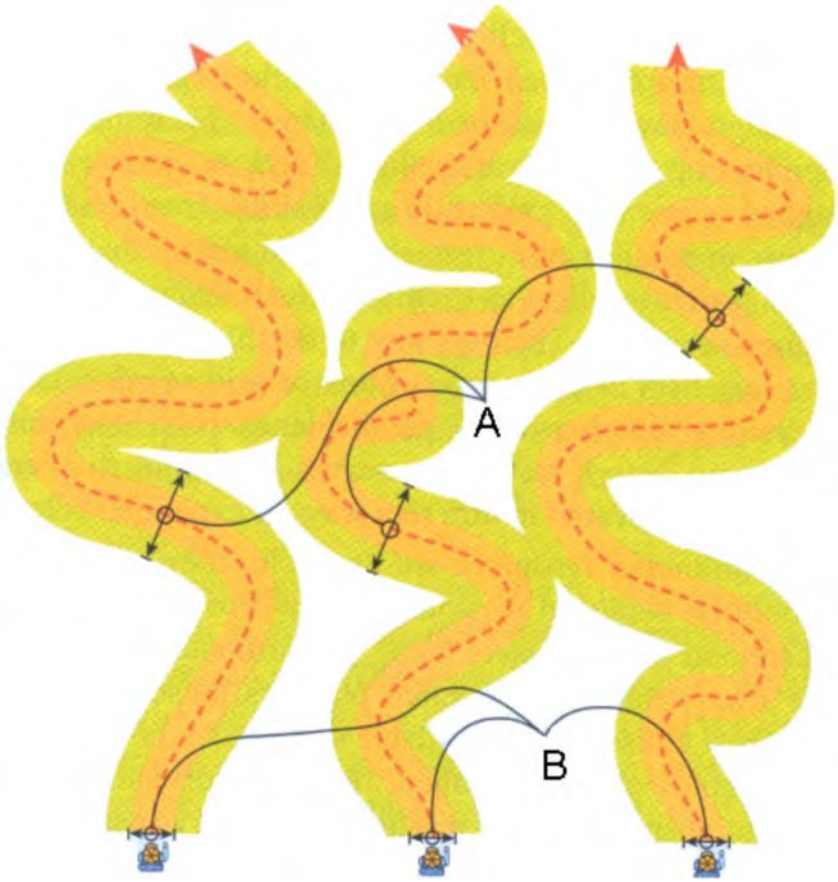

Figure 1 Loose Grid Search—Example 1

Note. From *Fundamentals of Search and Rescue* (p. 244), by National Association for Search and Rescue. 2005, Mississauga, ON: Jones and Bartlett Publishers Canada. Copyright 2005 by Jones and Bartlett Publishers, Inc.

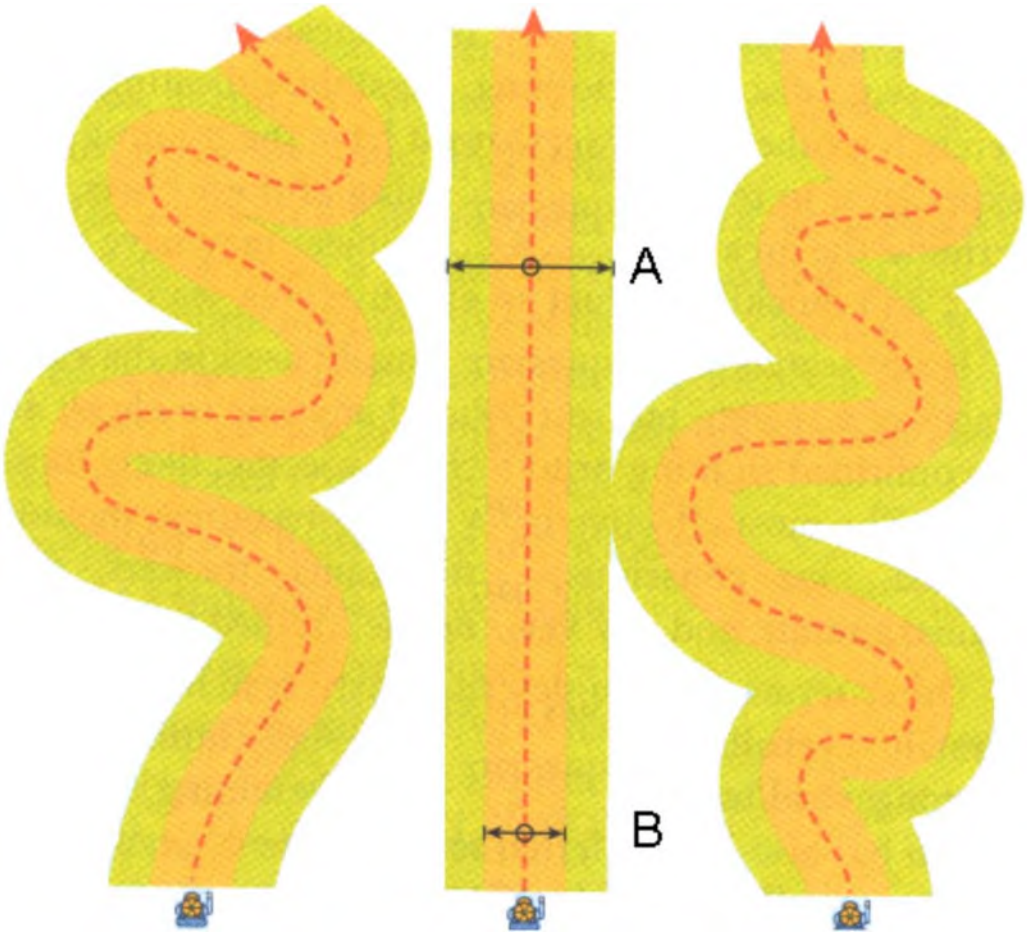

Figure 2 Loose Grid Search—Example 2

Note. From *Fundamentals of Search and Rescue* (p. 244), by National Association for Search and Rescue. 2005, Mississauga, ON: Jones and Bartlett Publishers Canada. Copyright 2005 by Jones and Bartlett Publishers, Inc.

Tight Grid Search

A tight grid search is a slow, highly systematic area search. It is generally used when a very thorough, high-coverage search is required. This involves searchers lining up on a baseline, relatively close together. They then proceed along straight, parallel, equally spaced tracks, scanning the area. Since searchers are close together, there will be a visual overlap by adjacent searchers into the other person's area.

The goal of a tight grid search is to minimize the chances that a clue or the missing person will remain undetected. The team is normally comprised of four to seven searchers.

Other terms used to describe tight grid searches include closed grid, sweep searches, Type III searches and saturation searching.

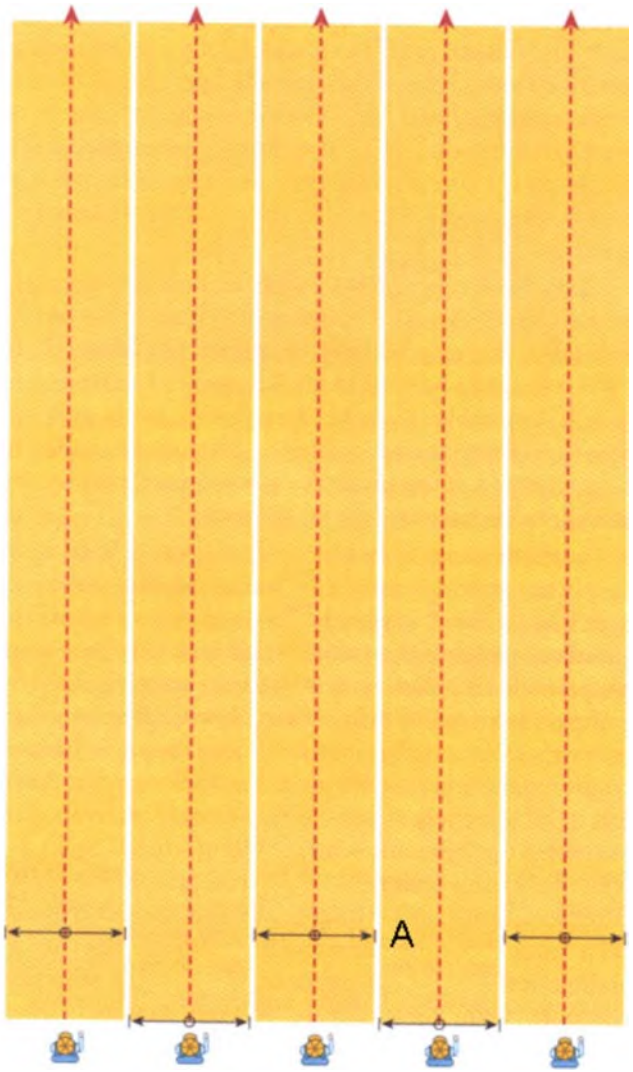

Figure 3 Tight Grid Search Example

Note. From *Fundamentals of Search and Rescue* (p. 246), by National Association for Search and Rescue. 2005, Mississauga, ON: Jones and Bartlett Publishers Canada. Copyright 2005 by Jones and Bartlett Publishers, Inc.

CONFIRMATION OF TEACHING POINT 6

QUESTIONS:

Q1. What is a hasty search?

Q2. The goal of this type of search is to cover a large geographic area quickly, with few resources.

Q3. What type of search team is normally comprised of three to seven searchers?

ANTICIPATED ANSWERS:

A1. A hasty search does not have definable boundaries. This type of search is used to discover evidence / the missing person quickly by visiting general locations where they are likely to be found (eg, campsites, abandoned vehicles, roads, trails).

A2. A loose grid search.

A3. A loose grid search team.

QUESTIONS

Q1. Describe the steps of the STOP procedure.

Q2. What is a string line?

Q3. When should emergency services be contacted?

ANTICIPATED ANSWERS

A1. Once it is determined that one is lost, the best thing to do is to stay in one place, keep calm and try to gather information to determine one's location. It is extremely important to concentrate on making good decisions.

STOP is a mnemonic for:

- **Sit.** Stop where you are! Do not panic. Many lost people waste valuable energy and risk injury by panicking—running aimlessly, continuing to travel after dark, or walking in circles. If a lost person decides to immediately wander in an attempt to find their location, in most cases they will move further away and increase the distance between the known points of their course. This will only increase the size of the search area, increasing the time it will take for a rescue team to locate an individual. As long as there is no immediate danger, stay in one place. During the first 30 minutes of being lost is when people tend to make their biggest mistakes. Making good decisions about the situation involves thinking through options without panicking.
- **Think.** Think about immediate and future dangers and the factors involved in the situation. Consider the time of day, personal physical condition and the last time water or food was consumed. Try to list the options that are available.
- **Observe.** Observe and listen for the signals of rescuers. Study the immediate environment, determining weather, terrain and resources available. Check the immediate area for a shelter location, fresh drinking water, and for clues of the current location.
- **Plan.** Plan the best course of action. It could be close to dark and consideration should be given to setting up shelter, finding water or starting a fire. A safety bearing could have been provided prior to beginning the activity and consideration should be given to use it or not. Include how to signal rescuers in the plan.

A2. As searchers make their way through the perimeter of an area, one person carries a spool of string. As they walk through an area, the string unrolls, leaving a visible trail. The string then serves as a perimeter to confine the missing person, as well as a sign that assistance is nearby.

A3. There are no hard and fast rules that state when emergency services should be contacted after a person becomes lost. Answers will vary.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

A person can become lost simply by leaving a tent to go to the washroom and becoming disoriented or by following an incorrect compass bearing on a hike. Cadets participating in an activity should be aware of the actions they must take when lost, as it will increase the chances of them being found quickly.

INSTRUCTOR NOTES / REMARKS

Nil.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 6

EO C425.02 – ANALYZE PROBLEMS USING AN EXPEDITION CASE STUDY

Total Time: 270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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.

Photocopy the Case Study Worksheet located at Attachment A. One copy is required for each cadet and each group.

There are eight case study examples located at Attachment B. The difficulty level of the case study increases by number. If attempting a case study for the first time, it is recommended that a lower number case study be chosen. Select a case study to use, become familiar with it and photocopy it for each cadet.

A case study may generate a lot of class discussion. Keep the discussion on track. Develop a list of open-ended questions to use throughout the activity. Some examples of open-ended questions are:

- How did you make that choice?
- What would you do differently?
- Why do you feel that way?
- What do you think would have happened if…?
- What does that mean to you?
- Is there another way of looking at it?
- Why is that important?

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A case study was chosen for this lesson as it allows the cadet to analyze problems using expedition case studies.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have analyzed problems using an expedition case study.

IMPORTANCE

It is important for cadets to analyze expedition-based problems. Using expedition case studies is a great way to help build better judgment and decision-making skills. Real-life cases can be analyzed and problems / issues debated without the risk of poor decisions causing harm. Using case studies helps to build confidence to make decisions later.

Teaching Point 1 **Have the cadets complete an expedition case study activity.**

Time: 80 min Method: Case Study

CASE STUDY

In the case study method, the cadet is provided with the opportunity to consider a real-life situation. Cadets respond to a scenario by examining the facts and incidents of the case, to critically analyze data and develop solutions. Facilitate by guiding the cadets toward answers.

The method is used to challenge cadets to apply what they know to a real situation.

Using expedition-based cases is a great way to help build judgment and decision-making skills. Real-life cases can be analyzed and problems / issues debated without the risk of poor decisions causing harm. Using case studies helps to build experience.

The process is a learning opportunity. In some cases, the correct decision is rarely obvious and in many cases several different solutions could work, provided they are implemented correctly—the goal is to develop skills.

The case study method works best with relatively small groups of relatively mature cadets. The primary objective is not to find a correct solution to the problem(s) but to understand the principles involved.

ACTIVITY

Time: 80 min

OBJECTIVE

The objective of this activity is to have the cadets analyze problems using an expedition case study.

RESOURCES

- Case Study Worksheet located at Attachment A (one per cadet and one per group),
- Case Study located at Attachment B (one per cadet), and
- Pens / pencils.

ACTIVITY LAYOUT

Set up the area with tables and chairs for both individual and group work.

ACTIVITY INSTRUCTIONS

Timings may have to be adjusted, depending on the productivity of the cadets.

1. Conduct a briefing, to include an explanation of:
   a. the objective and importance of the activity; and
   b. the resources required to perform the activity.
2. Summarize the case study that will be analyzed during the activity.
3. Distribute a Case Study Worksheet, the case study and a pen / pencil to each cadet.
4. Allow 25 minutes for the cadets to read the case study and complete the Case Study Worksheet.
5. Divide the cadets into groups of no more than three.
6. Distribute a Case Study Worksheet to each group.
7. Allow 20 minutes for the cadets to share and discuss the answers from their Case Study Worksheets. Each group will record their group answers on the Case Study Worksheet.
8. Rotate from group to group to verify that the cadets understand the issues and answer any questions.
9. Allow 25 minutes for the cadets to discuss their answers with the entire class.
10. Elaborate on the main points through well-formed, pre-planned questions. Guide the cadets through the facts, assumptions and problems of the case study. Direct them to the cause of the problem, as well as the consequences. Lead the cadets from issue to issue and discuss critical points.
11. Conduct a debriefing on the activity by asking:
    a. if it was difficult for the group to solve the problems in the case study (why / why not);
    b. what issues were difficult to decide on;
    c. why some decisions were more difficult to make than others;
    d. how some of the issues identified in the activity relate to issues that have occurred on a previous expedition(s), if any;
    e. what three words you would use to summarize what you learned from completing this activity; and
    f. how this information can assist you when planning an expedition.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in analyze problems using an expedition case study will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the case study will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

The case study is a way to apply known concepts to a real situation. The process is a learning opportunity. In some cases, the correct decision is rarely obvious and in many cases several different solutions could work, provided they are implemented correctly—the goal is to develop skills. It is a great way to think about problems that could occur, while analyzing how they could also be prevented.

INSTRUCTOR NOTES / REMARKS

An experienced instructor shall be chosen to instruct this lesson.

This EO may be conducted as many as three sessions of three periods each during Gold Star training.

REFERENCES

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CASE STUDY WORKSHEET

Case Study Title: _____

Name / Group: _____

Read the case study individually and answer the four questions below. When combined into groups, each group will be required to discuss their answers and record group answers. If extra room is required, use the back of the sheet.

1. A **fact** is something that is known to have occurred. Identify five facts that led to problems in this case study.

•
•
•
•
•

2. An **assumption** is something that a person takes or accepts to be true, without proof, for the purpose of argument or action. Identify five assumptions you believe led to problems in the case study.

•
•
•
•
•

3. A **problem** is a doubtful or difficult matter requiring a solution. Identify three major problems that occurred throughout the case study. Once identified, use the column on the right side to rank each problem from the most serious (# 1) to the least serious (# 3).

•	
•	
•	

4. A **solution** is an act or means of solving a problem or difficulty. Develop solutions to the problems identified in Question 3.

Solution to Problem #1
Solution to Problem #2
Solution to Problem #3

CASE STUDY #1

FORGOTTEN BATTERIES AFFECT EVACUATION

Narrative:

Three summer camp backpacking leaders were preparing for a week-long trip. They had worked with each other several times before and were looking forward to getting out of the camp and into the field. While the campers were at the lake, the leader, Sam, and his co-leaders, Sally and Bob, worked on putting together the gear in the main office. They gathered maps, first aid kits, batteries, radios and field paperwork while they reviewed student profiles and medical histories, looked at maps while chatting about the route, the chance for good fishing and maybe a peak climb. While this was going on, Bob, an avid Red Sox fan, tuned into the team's game with the New York Yankees on the television.

"Hey, the Red Sox are up by two in the sixth. Great! I hate the Yankees," Bob said.

Sam wrestled with first aid kits, watching the game intermittently as the noise of the crowd or Bob made it clear that something interesting was happening. Sally inventoried the maps and asked if they needed any route information from the climbing guide. No one answered, so she said, "Hey guys, leave the game for a minute and help me finish. Do we need the guide?"

"Naw," said Sam. "The peak is a walk. I've done it several times. Don't forget the batteries. If we don't have an evacuation, we can use them in the Walkman."

Sally commented that the radio uses batteries quickly and the spare set is essential.

Bob asked about the checklist. He didn't see it in the paperwork.

"I hate that thing," said Sam. "We never needed it until those airheads forgot the maps last summer."

Sam searched around, found the checklist, checked off its items, initialled it, and stuck it in his pocket. "Done. What's up with the game?" The trio finished their prep work with the game in extra innings and the dinner bell ringing.

"Grab the stuff, and let's go. I'll get the batteries and the maps," Bob said. He placed the batteries on the couch and turned his attention to the television, where the Yankees just took the lead from the Red Sox. "Cripes, the Yankees are the evil empire, but they win and win."

They left the room and the next morning for the field.

Two days and about 15 km (9.5 miles) up the trail, Sally fell while crossing some deadfall and badly fractured her left lower leg. It was clear they needed medical support. Sam asked for the radio. Bob quickly dug it out of his pack and tried to turn it on. The batteries were dead. Sally didn't have the spares, nor did Sam. Bob had a sudden vivid image of the batteries on the couch in front of the television.[1]

[1] From *Risk Management for Outdoor Leaders: A Practical Guide for Managing Risks Through Leadership* (p. 42), by D. Leemon & T. Schimelpfenig, 2005, Lander, WY: National Outdoor Leadership School.

CASE STUDY #2

AN INAPPROPRIATE CALL FOR HELP

Narrative:

Four students were hiking 20 minutes ahead of the staff, enjoying a well-earned afternoon of independent travel. Along the way, one student tripped on a tree root and fell forward, striking her head on the ground. Momentarily stunned, then scared, she began to hyperventilate. Two of the other students in the group dropped their packs and ran back to the staff, telling them about the injury.

When they arrived on the scene, the staff found the injured student breathing rapidly and complaining of tingling in her hands and a headache. She seemed disoriented and agitated. They decided this was a severe head injury and called to request a medical evacuation. The cell phone connection was inconsistent, coming in and out, and they drained their batteries relaying the first request for immediate rescue.

After things settled down, the staff performed a more careful assessment of the student. One of them recognized that the student was hyperventilating and scared. The instructors wanted to alert the life flight, but the cell phone was dead. Unfortunately, the life flight had a serious mechanical problem during the flight and had to perform an emergency landing, winding up in a deep valley and out of radio contact. The sheriff had to send a plane to search for the first helicopter and a second helicopter to respond to the original call for help. The student was transported to the hospital where she was quickly assessed and released with a small bruise on her head.[2]

[2] From *Risk Management for Outdoor Leaders: A Practical Guide for Managing Risks Through Leadership* (pp. 39–40), by D. Leemon & T. Schimelpfenig, 2005, Lander, WY: National Outdoor Leadership School.

CASE STUDY #3

STUDENT LEFT ALONE IN REMOTE TERRAIN

Narrative:

Twelve students and two instructors decided to hike to the summit Mount Fester. The route began with 365 m (1 200 feet) of gentle, open slopes and ended with the summit cone consisting of 60 m (200 feet) of challenging Class Three boulder hopping. During the climb, the group became spaced out with one instructor at the front and the trip leader in the back with the slower students. One student in the rear began to complain of having a headache and feeling dizzy and nauseous. The leader yelled to the students ahead to let the instructor in front know that he was stopping. The message was slowly passed up the line, and it reached the instructor when she was at the base of the challenging cone. The message she heard was, "You go ahead; I'll be up later." There was no mention of an ill student.

Over the course of the next half hour, the leader had the ill student drink water and eat some snacks. He reported feeling better but not strong enough to continue the climb. The leader left him with a sleeping bag and headed up the peak. The leader met the rest of the group. They had not reached the summit because the instructor had decided it was too difficult to supervise 11 students on her own on the difficult terrain.

The leader thought he might be able to make it to the top with a smaller group. He told the instructor to pick up the ill student during the descent to camp. The leader then continued to the summit with two students.

The instructor, however, did not find the resting student. She figured the student might have returned to camp on his own, but when she and her group arrived at camp, the ill student was nowhere to be found. The instructor then climbed back up the mountain to search for him.

During this time, the other leader and his group descended to camp by a different route. When he got to camp and learned about the situation, the leader returned on his own to the location where he had left the student. The missing student was still there, sleeping. He said he felt fine and returned to camp. An hour later, the other instructor and her search group returned to camp.[3]

[3] From *Risk Management for Outdoor Leaders: A Practical Guide for Managing Risks Through Leadership* (pp. 40–42), by D. Leemon & T. Schimelpfenig, 2005, Lander, WY: National Outdoor Leadership School.

CASE STUDY #4

GROUP LOST ON FIRST DAY OF EXPEDITION

Narrative:

Charlie and Henry, wilderness instructors for a wilderness program, arrived with their students at their planned drop-off point late one afternoon. The previous day, preparation day, had been difficult for the instructors. Henry, the trip leader, had been assigned to the course at the last minute, and was not happy about it. He complained about leading adolescents and suspected that this assignment was punishment for complaints about his previous trip, on which students said he was short-tempered, distant and difficult to approach.

During the preparation day, Henry criticized Charlie for miscalculating the amount of stove fuel they would need. Then, after Charlie had evenly distributed the group's gear, Henry reorganized all of it in front of several staff members while grumbling about poorly-trained new staff. Charlie's explanation that he had divided the gear as instructed fell on deaf ears.

The drop-off point was in thick forest with rolling hills and few distinct landmarks. As the van pulled away, Charlie and Henry looked at their maps and prepared to hike to the "X" (the destination for camp) in separate groups. Henry pointed to where they were, and marked an "X" where he wanted them to meet in a few hours. Charlie was concerned. He didn't think they were starting where they thought they were. He mentioned this to Henry, who replied irritable, "No, we are at the correct spot. I've been here several times before."

Unconvinced, Charlie used his Global Positioning System (GPS) receiver and plotted their position. It showed they were 700 m (2 300 feet) northeast of where they thought they were on the map. He pointed this out to Henry who bluntly replied, "I don't need that crutch. I can read a topographical map."

Henry then left with his group and Charlie left about a half hour later. After walking through a maze of two-track dirt roads, Charlie was convinced they were disoriented and pulled out his GPS. Using this he navigated to the "X," arriving at dark. The other group was not there. Charlie did not know what else to do, so he made camp. In the meantime, Henry hiked to his "X," and of course Charlie was not there.

Charlie waited that night and all of the next day for Henry to arrive. Henry also waited for Charlie, and at noon the next day he hiked with his group back to the drop-off point thinking that Charlie would return there. When Charlie did not show up that evening, Henry called the base on his cell phone (Charlie didn't have one) and said he had lost a group. He was obviously irritated and complained about these "new instructors who can't navigate."

The support staff at the base plotted on a map the coordinates Henry gave them for the "X," and arranged for an aircraft to fly one staff person over the area first thing in the morning. After their second pass over the area, they saw a bright flash of light coming from a small clearing—it was Charlie. Support staff contacted a very irritated Henry on his cell phone and told him Charlie was in the right place waiting for him.[4]

[4] From *Risk Management for Outdoor Leaders: A Practical Guide for Managing Risks Through Leadership* (pp. 42–43), by D. Leemon & T. Schimelpfenig, 2005, Lander, WY: National Outdoor Leadership School.

CASE STUDY #5

RAPPELLED OFF THE END OF THE ROPE

Narrative:

An instructor (Tyrell) and student (Beth) were rappelling from the top of Block Tower. The first rappel was tricky because the end of the rappel could not be seen from the top anchor and belay. Knowing that Beth would be out of sight and that communication would be difficult, the instructor gave Beth explicit instructions on what to do and what to expect. He described the rappel route in detail, including what the next rappel station would look like and how to clip into the anchor bolts.

Beth said she understood the instructions and, although she was tired, Tyrell believed she had been attentive. As Beth rappelled, he used the belay to judge when Beth would reach the anchor. Beth stopped at the anticipated belay point, then, after a few moments pause, continued to slowly descend. The belay slack disappeared and then the belay loaded. To Tyrell, it was obvious that Beth had just rappelled off the end of her rope.

Tyrell was able to tie off the belay rope and remove himself from the belay anchor. He then secured the belay rope and prepared to descend on the rappel line. This took about 10 minutes. He rappelled to a ledge where he could walk out to its outer edge and look down. He saw Beth hanging well below the ledge of the next rappel station with the rope passing directly over the anchor bolts. Tyrell quickly descended to the anchor at the second rappel station and clipped in. It was now clear that Beth had in fact rappelled directly over the anchor and, after stopping and looking at it, had for some reason continued downward.

Beth was hanging against a vertical face and could not climb up. Tyrell built an anchor and set up a pulley system using the free rappel line. He raised her to a small ledge where she could stand and then placed her on belay so she could climb an easy part of the face to his ledge. He then clipped her in, took apart the raising system and climbed back to the anchor above. After returning to the ledge, they continued to descend without incident.

Beth had no real explanation of why she continued rappelling. This was not her first multi-pitch climb, and she had previously shown attentiveness to details and reliability. She said she stopped and looked at the anchor but was having a good time rappelling and was "spacing out." She said, "It was feeling really neat," so she continued to rappel.[5]

[5] From *Risk Management for Outdoor Leaders: A Practical Guide for Managing Risks Through Leadership* (p. 39), by D. Leemon & T. Schimelpfenig, 2005, Lander, WY: National Outdoor Leadership School.

CASE STUDY #6

PARTICIPANT KILLED IN AN AVALANCHE

Narrative:

At 9:30 am on Day Five of a 10-day backcountry ski trip in Wyoming, a group of 11 students and two leaders set out to ski 5 km to the base of Patterson Peak. They planned to break trail for their next campsite, and once there, they would mound snow for snow shelters (they had planned to move into this camp the next day).

Willy, one of the leaders, was at the front of the group. Dave, the other leader, was at the back of the group, about 15–20 minutes behind. During the morning, as they crossed some flat areas, Dave felt a collapse of the snow pack. He did not think it was indicative of any instability in the snow pack, however, and did not mention it to Willy.

About mid-morning, the group broke out onto a 20-degree open slope, facing north-northeast. They could see that it extended uphill about 30 m (100 feet), gradually increasing in steepness up to a tree band. Above the band of trees and not immediately obvious to the leaders or anyone else in the group, the slope steepened for about 120 m (400 feet) as it rose to a cliff band. Willy decided that neither the slope nor the snow pack was a danger. He made a gradual descending traverse across the slope to the valley bottom and the future camp location and the rest of the group followed.

Willy and Dave discussed whether to return by the route they had come or break a different trail back to the existing camp. Willy liked the route they had just travelled. Dave wanted to avoid crossing the same slope. He felt it would be difficult for students carrying full packs and pulling sleds when they moved camp the next day. While he did not say so, he was also concerned about a slope on the route that he thought posed an avalanche danger, and this, along with the collapsing snow he felt earlier, made him want to establish an easier route back. The two instructors had a brief conversation about which route to take but failed to reach a decision. For the next hour and a half, they busied themselves making snow shelters.

At about 1:40 pm, a student, Steve, came to Willy and Dave complaining of pain in his feet. Willy inspected Steve's feet and decided that the group needed to head back to camp. Again, Willy and Dave discussed the route. Willy felt that using the already broken trail would be more efficient and would allow them to get Steve back to camp more quickly. Dave concurred.

Willy started out leading the group back on the existing trail, and Dave brought up the rear. Willy re-emphasized to the group what to do in the event of an avalanche, including skiing downhill, struggling to stay close to the surface, and creating an air pocket. Though Willy did, by now, recognize the slope as a possible avalanche slope, he didn't think it was threatening, and so he didn't establish spotters or have the students ski across one at a time.

When Willy got across, he turned to watch the students. Suddenly he head a sound (like a crack) from up slope, and looking up, he saw the avalanche. He yelled at the students in the slide path—five of them—to "ski down!" Steve was already out of the way. Denise easily skied out of the path. Frank and Molly skied downhill and to the side, but were caught by the avalanche.

Roger looked at the avalanche and then at Willy, and then waved his arms and yelled. He did not attempt to ski down out of the slide path, even though he was a capable skier. The slide caught Roger and carried him down slope. He was on the surface for 6–8 m (20–25 feet) before being buried.

When the snow stopped moving, Frank was buried to his chest and Molly was buried to her waist. Willy saw that Frank and Molly were not in imminent danger; he focused his attention on Roger.

About five or six minutes after the slide ended, Willy located Roger by using an avalanche transceiver and quickly uncovered his face. Roger was buried about 1 m (3 feet) under the surface. He was completely encased in snow and was not breathing. There was no pulse. Rescue breathing was begun immediately and chest compressions were started as soon as his chest could be uncovered. The efforts were continued for two hours. Unfortunately, they were unsuccessful.[6]

[6] From *Risk Management for Outdoor Leaders: A Practical Guide for Managing Risks Through Leadership* (pp. 44–46), by D. Leemon & T. Schimelpfenig, 2005, Lander, WY: National Outdoor Leadership School.

CASE STUDY #7

ADAM'S STORY

Narrative:

In the summer of 1998, Adam Dzialo was 12 years old. He loved sports and was good at everything he played. When he wasn't playing a sport, he was at a sports camp. Adam's family had a busy summer planned for him. He was signed up for six sports camps, including hockey camp which was going to be his first week away from home and Team Adventure, an outdoor program run by the local community college. The Team Adventure brochure promised "five days of fun and excitement!" featuring a ropes course, rock climbing, canoeing, hiking, a river crossing and one overnight camping trip.

The Team Adventure activities were designed to introduce participants to different types of outdoor skills or experiences each day. On many of the earlier trips, participants complained about the Friday hike—it wasn't exciting enough. Heather and Patrick (the team leaders) asked for permission to alter the itinerary for the group and try a river swimming and rescue drill instead. Permission was granted. The group would hike to the summit on Thursday and on Friday, a hike to Deerfield River, where the group would complete river activities.

On Friday morning, the group broke camp and headed for the river, stopping briefly along the way to get the water release time. The river's flow was controlled by scheduled water releases from the nearby dam. Heather and Patrick wanted to time their activities so that they could be finished before the full force of water hit the group. Before the release, the river is a shallow stream. Afterward, it rises gradually and progressively as a bubble of water makes its way down the riverbed.

After obtaining the water release time, the leaders knew they had a few hours, so there was no need to rush. The group stopped for lunch and the leaders discussed how to read water and fitted everyone with life jackets. They tested each jacket by attempting to lift it over the person's head. At just under 90 pounds, Adam was a little small for an adult-sized life jacket, but it passed their test and they decided it was an acceptable fit.

The chosen location seemed like an excellent choice for a swimming and rescue drill, and had been used for that kind of activity many times by multiple organizations. On the bank, the group was split into two teams. The swimmers went upstream with Patrick while the rescuers went downstream with Heather. They were about 60 m (200 feet) apart.

Upstream, Patrick provided a briefing for the swimmers, explaining where to swim, the proper position, how to grab the throw bag, and what to do if the throw bag missed. It had been predetermined that before each boy went, Patrick would look both ways and give a thumbs-up sign to Heather to indicate he was ready. When Heather returned the sign, the swimmer would be free to go.

Downstream, Heather explained the proper use of throw bags to her group and positioned two rescuers near her side along the bank. The plan was that if the first throw bag missed the swimmer, the second person would throw their bag.

No one was required to participate and some opted out.

During mid-afternoon, the leaders brought the group together. Patrick had to drive someone upstream to meet his mother at a prearranged pick-up point. He was expected to be back in 10 minutes. Heather said she felt comfortable continuing the exercise, so some people went back upstream to take another run at the river. Heather stayed downstream with the rescuers. The signalling system would be the same, but the swimmers would decide for themselves when to enter the water.

When it was Adam's turn, the full release from the dam had arrived and commercial rafts, with guides, were beginning to appear. Adam floated in the water in a seated position. He waved to his friends downstream and then appeared to stand up. His body flipped over and he then disappeared under the water.

Heather ran upstream along the shore and tried to swim out to Adam. The current forced her back downstream. During the next few minutes, several rafting guides were ashore and joined the rescue operation. Several attempted to reach Adam. All of them were swept away by the current. Some of the guides tried to create a "human chain" to reach him, but the current was too strong.

With the aid of rope, the group created a "tag line" and a few minutes later Adam was reached. One guide was able to get a firm grip on Adam's life jacket. He let go of the rope and pulled as hard as he could. He was able to pull the life jacket free, but Adam's foot was lodged.

Because there was too much slack in the tag line, trees were added as anchor systems and additional ropes were used to pull the tag line taut. Four men attached a raft to the line across the river and manoeuvered it as close as they could to where Adam was trapped. They were finally able to get Adam's head above water and could start rescue breathing. Two other men worked to pull Adam's foot free. He had been under the water for 25 minutes.

Patrick had returned, several people had called 911 and emergency personnel had already arrived on the scene. Within minutes, Adam was transferred to an ambulance, carried to a nearby heliport and flown by helicopter to a hospital.

After the first 72 hours, the doctors told Adam's family that he would live. However, they held very little hope for a full recovery. Adam had suffered from "anoxic encephalopathy" as a result of the near drowning—the neuromuscular system that controls movement had been damaged.

After the accident, now 19 years old, Adam needs assistance with every aspect of daily living. He attends physical therapy five times a week, speech therapy four times a week and Advanced Biomechanical Rehabilitation exercises three times a week. He communicates with his eyes, laugh and smile. He cannot walk. His parents remain optimistic that he will, one day, walk and talk again.[7]

[7] From *Lessons Learned II: Using Case Studies and History to Improve Safety Education* (pp. 5–26), by D. Ajango, 2005, Eagle River, AL: SafetyEd: Safety Education for Outdoor and Remote Work Environments.

CASE STUDY #8

SEA KAYAKERS STRANDED IN DARKNESS AND FOG

Twelve kayakers and two instructors pushed off on the final expedition day of the Boundless Experiences Inc. eight-day kayaking course at Rigarogy Island, in the waters of southern Ireland's Baltimore Bay. The distance for the day of paddling from Rigarogy Island to Cleare Island was approximately 35 km (20 miles) among the islands of the bay, with several crossings of open water. There were many small craft warnings for southwest winds of 27–37 km per hour (15–20 knots). The waves were choppy and up to 1 m (3 feet) high and rain was in the forecast. In addition, the group had had a few nights of short sleep.

Shannon, the assistant trip leader, checked in with the six women and six men in the group, who ranged in age from 19–58, while they were preparing breakfast to give a pep talk and assess their physical condition as well as their spirits. She then reported to Zachary, the very experienced 40-year-old leader. They discussed the plans for the day, and he made the judgment call that, even though the weather conditions, travel distance, and group fatigue levels were not ideal, the group would go ahead with the schedule and have the final expedition day, which would be led by the students. Though all of the students received appropriate training, Zachary and Shannon knew that, given the weather conditions, they would need to stick pretty close behind the students when paddling, just in case assistance was required.

A couple of hours later after launching, the fleet of four single and five two-person kayaks were heading west across open water, Nash (in a single kayak) capsized. Instead of staying in close convoy with the rest of the group, he had once again split off from the group. But he successfully performed a wet exit, and the crew rallied quickly to get him back into his kayak. His boat was then pumped dry and the crew continued on, arriving at Hare Island, the lunch destination, at 1:30 pm.

At lunch, Zachary and Shannon wanted to update the base on the group's progress, but also wanted to save the two-way radio's batteries for emergency use because the very high frequency radio's rechargeable batteries had not been swapped at the start of the expedition for ones that would maintain charge for longer. Zach decided to use his cell phone to call the base and change the estimated time of arrival from 3:00 pm to 5:00 pm. No one answered, so he left a message and planned to call again later in the afternoon.

At 2:30 pm, Shannon tried to reach the base, this time with the radio, but had no luck. Most students opted to wear wetsuits for the rest of the day. At 3:00 pm, the crew ensured there was no trace of the visit left at the site and the group set off. There was approximately 13 km (8 miles) farther to the base.

By late afternoon, it was raining hard. The group was approaching the end of a channel, so they rafted up so that they could check their maps and compasses, since, as had often been the case, they were having trouble agreeing on exactly where they were and what course to follow.

The group made good time heading southwest past a string of small islands, though were still behind schedule. At 5:30 pm, Zachary moved up ahead of the students, taking the lead and urging everyone to keep up the pace behind him.

By 7:30 pm, the sun became lost behind the clouds and fog could be seen. There was still 5 km (3 miles) left. Twenty minutes later, in the fog and dwindling daylight, the group decided to tighten the convoy, leaving only about 30 m (100 feet) between the front and back of the line. There were wind and waves coming in from the south—the direction of travel.

Zachary called the group together and checked to see how everyone was doing and whether everyone was prepared to make the final push. He was familiar with the area and estimated that it would take 10 minutes to cross the area. None of the students spoke up.

Zachary gave the group the heading of 180 degrees magnetic and firmly stressed the need to maintain a close convoy formation. Kelly, who was tired and concerned about the coming darkness, asked that another, stronger

two-person kayak be appointed to stick close beside her and her partner, but Zachary reassured her that the entire group would be sticking together, so such a buddy system would not be needed.

A few minutes before 8:00 pm, the group was enveloped in fog and waves. Although the wind had somewhat dropped, Zachary (guided by his compass, which was mounted on his kayak) headed the convoy, with Shannon in the middle of the back half. There was now approximately 12 m (40 feet) between the front and back of the kayak line. There was a green buoy ahead to the left, but the group could not make out its number. Zachary believed it was buoy Number 13, which confirmed his sense that the group was right on course.

By this time, darkness and fog had made it impossible for Zachary to read his compass, so he tried to use the direction of the parallel rows of incoming waves as a navigational aid. He was unaware that there were refracting waves—a condition in which the lines of waves make an arc as they swing past a point of land. The result was that the waves were coming in more from the west rather than south, as Zachary was predicting.

With the size of the waves, the group was having trouble maintaining the close convoy without bumping into each other. It was also difficult to see everyone, so the group started shouting back and forth to maintain contact.

Zachary called Shannon up to his kayak to ask her to try to read his compass. The compass indicated that the group was heading west, rather than south. To make sure, Zachary borrowed a hand-held compass from the closest kayak. The compass confirmed that the group was 90 degrees off course. By this time Zachary, like the rest of the group was stretched pretty thin from fatigue, and possibly dehydration, so it was understandable when he turned his kayak around and headed north for a few minutes. He did a 180-degree turn, and the group followed him south, continuing to use voice contact to keep together.

Soon the group could only hear the sound of waves crashing into rocks. Zachary shouted for all of the kayaks to gather. Two two-person kayaks did not show up, and the rest of the group, already quite apprehensive, were screaming back and forth as they tried to bunch the kayaks together while they bounced and dipped into the waves. The students were starting to panic.

A minute or two later, at about 8:30 pm, a flare illuminated in the gloom. Zachary told Shannon to remain with the pod of kayaks, and, shouting and blowing his whistle, he rapidly set off toward the rocks in search of the missing students. Moments later he found one of the kayaks next to a rocky ledge. Martin and Margaret told him that the two women from the other kayak, Kelly and Ruth, were standing on the ledge with their kayak pulled up beside them, and that they had set off the flare. Zachary told Martin and Margaret to paddle back to the others, using whistles and shouts as a guide.

Zachary could now see Kelly and Ruth's silhouettes on the ledge, so he yelled to them to ask if they were okay. They replied that they were okay and able to stay on the ledge, in spite of the rising tide and the breaking waves. Zachary assured them that they would be helped off the ledge as soon as possible.

Zachary returned to the rest of the group and briefed them on the situation. He then tried to get his jacket and flashlight out of his rear hatch and the two-way radio from under his rear deck. He retrieved the radio and called the base. In an even voice, he informed the volunteer on duty of the situation and requested that a motor vehicle be quickly sent to assist. It was now approximately 9:00 pm. Zachary called to check on the rescue efforts and was informed that a motor vehicle was on the way. By 9:45 pm, there were still no sign that help was on the way.

Twenty minutes later, Shannon set off an emergency flare. The group could make out a large motor vehicle coming toward them. All group members were rescued.

Careful assessment by senior staff members determined that none of the students or instructors would need medical attention.[8]

[8] From *Leadership the Outward Bound Way* (pp. 213–219), by J. Garrett, 2007, Seattle, WA: The Mountaineers Books.

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 1

EO M426.01 – PREPARE FOR EXPEDITION TRAINING

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-704/PG-001, *Gold 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.

Obtain necessary examples of outdoor clothing, equipment and high-energy snacks.

The joining instructions and training schedule referred to in TP 2 will vary depending on the region. Acquire these documents from the local expedition centre.

Photocopy the Navigation Review Package located at Attachment A for each cadet.

If the expedition centre is conducting cold weather activities (snowshoeing / skiing), TPs 1 and 2 will have to be altered. Information is available in EO C121.03 (Select Cold Weather Clothing) and EO C121.04 (Recognize the Effects of Cold Weather).

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TPs 1 and 2 to orient the cadet to the selection of expedition equipment and expedition training.

An in-class activity was chosen for TP 3 to give directions to the Navigation Review Package that will be completed prior to attending the Gold Star expedition.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall be expected to prepare for expedition training.

IMPORTANCE

It is important for cadets to understand the importance of preparing for expedition training as a way to ensure everyone is comfortable when participating in an expedition. Reviewing the joining instructions prior to undergoing training as well as completing a navigation review will assist cadets in preparing for expedition training.

Teaching Point 1 **Review the selection of clothing and equipment for an expedition.**

Time: 10 min Method: Interactive Lecture

This TP is designed to familiarize cadets with the proper clothing and equipment to pack for expedition training. Cadets should have knowledge of this subject from previous expedition training.

Have examples of outdoor clothing, equipment and high-energy snacks available if possible.

Customize the lesson to the anticipated weather for the respective expedition centre and its activities. Cadets should be advised to check the weather forecast prior to the training.

CLOTHING

The most effective way to maintain warmth and comfort in varying conditions is by using multiple layers of clothing. Layers allow one to build a microclimate that surrounds the body, which can then be adapted to moisture, wind, temperature and exertion levels.

Remember:

- It is easier to stay warm than to try to warm up after getting cold.
- It takes more insulation to stay warm when sitting still than when moving.
- Heat is lost faster to a cold solid object through conduction than to cold air through convection, which is the transfer of heat by upward movement.

Where the expedition will be held in cold weather, ensure cadets follow the principles for keeping warm.

CLEAN CLOTHING. Important for both sanitation and comfort. Dirt and grease will fill air pockets in clothes and allow the heat to escape your body more easily, leaving you feeling cold sooner.

OVERHEATING must be avoided. Overheating causes perspiration, which causes clothing to become damp. Dampness fills the air pockets in the clothing with heat-conducting moisture, permitting the body heat to escape. Overheating can be prevented by ventilation or removing layers.

LOOSE and in **LAYERS**. Clothes and footwear that are too tight restrict the blood circulation, increasing the danger of frostbite. Clothes should not be too loose either, as this allows trapped air to move, causing heat loss. Layering allows you to take clothing off before you overheat and add clothing as you cool.

Keep clothes **DRY**. Moisture will soak into your clothes from both inside and outside. Frost or snow that collects on your clothes will melt, making your clothes wet.

FOOTWEAR

Footwear is an important aspect of dressing for expedition training. Properly fitting, comfortable shoes / boots will make the cadet more comfortable during training. Low-ankle hiking boots are the ideal footwear. Finding shoes / boots that provide adequate ankle protection is important.

Combat boots or other military issue high-ankle support boots should not be worn during expedition training. Also, never wear new boots for the first time during an expedition.

Where the expedition will be held in cold weather, ensure cadets are aware that feet are vulnerable to the cold because they get wet easily, both externally and from perspiration.

The following principles are valuable when choosing and wearing footwear:

- **Ensure footwear is loose and in layers.** The layers are made up by the boot and the different combinations of socks and insoles.
- **Avoid restriction of circulation.** Two or more pairs of socks worn too tightly or tying the boot too tightly can restrict the circulation of warm blood from the body core and allow the feet to become cold.
- **Change socks and insoles as often as possible.** Since footwear often gets wetter than other types of equipment, select footwear designed to help decrease this, eg, with a rubber lower and material upper. Dry socks should always be carried, and socks should be changed as soon as possible when they become wet. If wearing heavy footwear equipped with removable insoles, such as mukluks, both socks and insoles should be changed.
- **Dry footwear when wet.** Footwear should be dried thoroughly at the first opportunity available.
- **Ensure footgear and feet are kept clean.** Footgear should be kept clean of mud and dirt, and feet should be cleaned frequently. Feet should always be exercised and massaged when changing socks.
- **Ensure all footwear fits properly to avoid chafing and blisters.** Ski and snowshoe bindings must be adjusted carefully. Improperly adjusted bindings may chafe the feet or cause excess wear and tear to the boot.

PERSONAL EQUIPMENT

Consult the joining instructions for a specific list of requisite personal kit.

Personal expedition equipment are items that benefit the participant and should be maintained by that person. Personal equipment is the kit the cadets need to carry on them.

Items to bring from home:

- **Hygiene kit.** Includes all personal items required to maintain good health and hygiene. A hygiene kit should include:
    - camp soap (biodegradable),
    - toothbrush,
    - toothpaste,
    - toilet paper, and
    - facecloth or small towel.
- **Insect repellent.** The active ingredient in most bug repellent is DEET. Many brands are available and can be purchased at most grocery stores.
- **Lip balm.** Lip balm with sunscreen will help protect lips. Lips burn easily at any elevation and cold dry winds can make lips crack and bleed.
- **Sunscreen.** A Sun Protection Factor (SPF) of 4 means that it will take four times longer to burn as when unprotected. Most sunburns can be prevented with an SPF of 15 with ultraviolet A (UVA) and ultraviolet B (UVB) protection, however an SPF of 30 or higher is recommended for most activities.
- **Sunglasses.** Protective eyewear. Sunglasses will protect the eyes from the sun.
- **Notepad and pencil.** Allows for note taking / leaving a message in any situation.
- **Water carrier.** A leak-proof water bottle or canteen to carry water.
- **Camera.** Cameras are great to record experiences.

Items that the expedition centre may provide:

- **Flashlight / headlamp.** A flashlight / headlamp should always be carried; smaller is better to control weight (be sure to have a spare set of batteries and bulb before each trip). Headlamps allow for hands-free operation.
- **Matches.** At least 20 matches that can strike anywhere and are waterproof. Store matches with a striker in a separate container inside the kit (35 mm film cases would suffice).
- **Knife / multi-tool.** Useful tool for many applications in the field. Hunting-type knives with long fixed blades are not appropriate for cadet activities.
- **Survival kit.** A kit with beneficial items to have in a survival situation. Items should be specific for the environment you will be travelling in.
- **Whistle.** For use as a signalling device in emergencies.
- **High-energy snacks.** As detailed below.

There may be a requirement for each participant to have a plate, a bowl and cutlery depending on food being consumed during expedition training.

GROUP EQUIPMENT

Group equipment should be selected for its versatility, weight, ease of use and packing. The more compact an item is or can become, the easier it will be to pack and carry.

Group equipment will be given to cadets upon arrival at the expedition centre.

HIGH-ENERGY SNACKS

Expedition centres may provide high-energy snacks. If the cadets are bringing their own snacks, encourage careful selection, as they will need to be carried.

Food is one of the most important factors to consider when expending large amounts of energy during activities. Choosing the right snacks to supplement meals is important to maintain energy and nutrition.

People are more prone to injuries at around 1100 hours and 1500 hours when blood sugar is low and people are tired from activities.

Granola Bars

Granola bars are an easy snack that can be brought on the trail with little waste. The wrapper of the granola bar can be folded and placed in a resealable plastic bag for disposal. When eating on the move, the wrapper can simply be placed in a pocket.

Granola bars come in a variety of flavours and often include chocolate. The nutrition in granola bars is largely grain based and provides a high calorie count. Granola bars often have 10–14 g of sugar and 11–16 g of fat.

Stay away from granola bars with more than 20 percent fat. These bars will only impede energy levels.

Dried Fruit and Nuts

Dried fruits last for months and keep most of their nutritional value. Dried fruit provides energy benefits without the added weight of 80 percent water content. Most grocery stores have varieties of mixed fruit, which can be dried at home.

To make homemade dried apples:

1. Slice the apples thinly.
2. Place on baking tray in a single layer.
3. Place in oven on a low temperature setting (60 degrees Celsius [140 degrees Fahrenheit]).
4. Check dryness every 20 minutes.
5. Crack open the oven door to remove moist air and improve result.

This process can take up to four hours.

Seeds and nuts are great sources of carbohydrates, protein and fat. Proteins are an essential part of any diet; known as the "don't leave home without it" snack. The high fat content will slow digestion so seeds and nuts are best used for refuelling during longer breaks. Nuts also provide magnesium, guarding the muscles against burn from lactic acid.

Cheese

A good source of dairy on the trail, cheese is a great form of calcium.

Cheese with a high moisture content does not keep well when not refrigerated for extended periods of time. Cheeses with low moisture content can keep longer. The liquefied milk fat will run off at high temperatures. While this is not a pleasant sight, it is not a sign of spoilage.

Cheeses with a high moisture content include:

- mozzarella, and
- parmesan.

Cheeses with a low moisture content include:

- cheddar,
- colby, and
- swiss.

"Good Old Raisins and Peanuts" (Gorp)

"Good old raisins and peanuts" is just that— a mixture of raisins, peanuts and anything else a person might want to add. There is often a sugar source like chocolate chips added to a dried fruit.

There are many varieties of GORP recipes. GORP can be bought in most groceries stores—pre-made—or made at home. Everyone has their favourite recipe. A person's GORP may change every expedition depending on what is available, or what they feel like eating.

Small items like sunflower seeds will settle to the bottom of the bag while larger items will float to the top. Mix up the contents of the bag before eating.

To make a simple GORP recipe:

- 118 mL (1/2 cup) peanuts,
- 118 mL (1/2 cup) raisins,
- 59 mL (1/4 cup) chocolate chips*, and
- 59 mL (1/4 cup) dried cranberries.

*In warmer weather, chocolate chips can be substituted with candy-coated chocolate that will not melt.

Mix in a bowl and store in an airtight container or resealable bag. This recipe will make 354 mL (1 1/2 cups). Substitute or add items as desired.

Examples of food items to put in GORP:

- dried apples,
- banana chips,
- dried papaya,
- dates,
- dried cranberries,
- coconut,
- almonds,
- cashews,
- peanuts,
- chocolate,
- carob chips,
- candy-coated chocolate,
- chocolate- or yogurt-covered raisins,
- sunflower seeds,
- dried green peas, and
- pretzels.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What is the most effective way to maintain warmth and comfort in varying conditions?

Q2. What are the personal items a cadet should bring to the expedition centre?

Q3. What nutrients are in nuts?

Q4. When are people more prone to injuries on the trail?

ANTICIPATED ANSWERS:

A1. The most effective way to maintain warmth and comfort in varying conditions is by using multiple layers of clothing.

A2. The personal items that should be brought to the expedition centre are:

- hygiene kit,
- insect repellent,
- lip balm,
- sunscreen,

- sunglasses,
- notepad and pencil,
- water carrier, and
- camera.

A3. Nuts are a great source of carbohydrates, protein and fat.

A4. People are more prone to injuries around 1100 hours and 1500 hours when blood sugar is low and people are tired from activities.

Teaching Point 2 **Brief the cadets on the joining instructions and training schedule for Gold Star expedition training.**

Time: 10 min Method: Interactive Lecture

This TP is designed to introduce and brief cadets on what is required during training at the expedition centre.

Review the joining instructions and after briefing cadets, answer any questions.

RISKS IN EXPEDITION TRAINING

Activities conducted at the expedition centres will likely include hiking, biking, canoeing and camping. Risk is the chance or possibility of danger, loss or injury. Each activity has its own risks.

Hiking is the activity of walking outdoors on unpaved trails in a wilderness environment and may include many types of terrain and environments. It is not uncommon for cadets to be injured by tripping, falling and slipping over wet roots or rocks, or falling down a small slope.

Mountain biking is riding a bike on trails and secondary roads, using specialized equipment. Cadets are at risk of falling off the bike or not using the bike properly, which may cause injury. Injuries that may occur while mountain biking are cuts and scrapes, bruising, flesh wounds, or broken bones.

Canoeing is travelling on water using a canoe. Cadets should be seated, wearing a personal floatation device (PFD) and acting responsibly. These actions will minimize the risks associated with canoeing.

Snowshoeing is the activity of walking outdoors on snow using specialized shoes. It is not uncommon for cadets to be injured by tripping, falling and slipping over ice and uneven snow or falling down a small slope. Also, with cold weather comes the risk of frostbite, hypothermia and snow blindness.

Backcountry skiing will sometimes be done on rough terrain and difficult snow. Cadets are at risk of falling and tripping. Backcountry skiing excursions require attention to traffic, road and trail conditions, weather, terrain and the capabilities of the cadets involved. Also, with cold weather comes the risk of frostbite, hypothermia and snow blindness.

Canoeing is of great cultural significance to Canadians. Canoeing in expedition training allows cadets to see Canada's wilderness from a different perspective.

Refer to CATO 40-01, *Army Cadet Expedition Program* for general expedition information.

Medical Information

Located at Chapter 1, Annex B of A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards* is the Medical Information Form. This form must be completed by all cadets prior to undertaking expedition training. This form asks general questions regarding health.

Consent to Adventure Training

In addition to the medical form, the Consent to Adventure Training Form, located at Chapter 1, Annex A to A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards* must be filled out by participating cadets. This form advises instructors and organizers that the cadet understands what they are undertaking and will comply with all rules and regulations.

Policies

Prior to participating in expedition training, all cadets shall be reminded of the following policies:

- CATO 11-08, *Environmental Stewardship Policy*,
- CATO 13-23, *Drug and Alcohol Policy*,
- CATO 13-24, *Harassment Prevention and Resolution Policy*,
- CATO 13-26, *Return To Unit Policy*, and
- CATO 15-22, *Cadet Conduct and Discipline Policy*.

JOINING INSTRUCTIONS

Joining instructions are issued to provide cadets with all the required information they may need to arrive at the expedition centre prepared and capable of performing the required training. They are issued for all activities outside of the local cadet corps.

Each region will have different joining instructions for each expedition centre.

Joining instructions for expedition training can be found at the regional website.

The joining instructions will have information such as:

- general information on the activity,
- directions to the expedition centre,
- dates of training,
- transportation requirements,
- what identification is required,

- administrative and claim information,
- rations and quarters information,
- uniform requirements,
- expected cadet conduct, and
- required kit list.

Joining instructions will often have a schedule / timetable included.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the briefing for the expedition centre training weekend will serve as the confirmation of this TP.

Teaching Point 3 **Describe the instructions for the Navigation Review Package.**

Time: 5 min Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity to have the cadets become familiar with and receive instructions for the Navigation Review Package.

RESOURCES

Navigation Review Package located at Attachment A.

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Distribute a Navigation Review Package to each cadet.
2. Allow the cadets two minutes to review the package.
3. Explain to the cadets that the Navigation Review Package is to be completed prior to attending the Gold Star expedition. The package is to be used as a self-assessment tool. If cadets experience difficulty in an area, they should review the material and seek assistance prior to attending the expedition.

There is no time allocated for the completion of the package. Each cadet is to complete the self-study package and bring it with them to the expedition centre.

Though there is no time allocated to review answers in the Navigation Review Package, the answers are located at Attachment B. Answers should be reviewed prior to the cadet attending the Gold Star expedition.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the orientation to the Navigation Review Package will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the briefing for the expedition centre training weekend will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Cadets are to complete and take the following to the expedition centre:

- the Navigation Review Package;
- the Medical Information Form; and
- the Consent to Adventure Training Form.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Participating in a briefing on the local expedition centre, wearing proper clothing, bringing equipment and snacks, and reviewing navigation will help ensure all personnel are prepared for the upcoming challenges of expedition training.

INSTRUCTOR NOTES / REMARKS

This EO shall be conducted a minimum of two weeks prior to the Gold Star expedition.

Where expedition centres are completing the Gold Star expedition in cold weather, it is advised that the cadets receive cold weather training at the corps.

The joining instructions and timetable referred to in TP 2 will vary depending on the region. Instructors should acquire these from the local expedition centre.

There is no time allocated for the cadet to complete the Navigation Review Package. This package is to be completed by the cadet on their own time. Corps staff should review the completed package with the cadet prior to the Gold Star expedition.

The Navigation Review Package shall be completed and brought to the expedition centre by the cadet.

REFERENCES

A2-001 A-CR-CCP-951/PT-002 Director Cadets 3. (2006). *Royal Canadian Army Cadets adventure training and safety standards*. Ottawa, ON: Department of National Defence.

C2-051 ISBN 978-0-7153-2254-3 Bagshaw, C. (2006). *The ultimate hiking skills manual*. Cincinnati, OH: David and Charles.

C2-066 ISBN 1-4000-5309-9 Curtis, R. (2005). *The backpacker's field manual: A comprehensive guide to mastering backcountry skills*. New York, NY: Three Rivers Press.

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NAVIGATION REVIEW PACKAGE

Name: _____

Use the Sydenham Map (Figures A-1, A-2 and A-3) to answer Questions 1–7 and the Mission Map (Figure A-4) to answer Questions 8 and 9.

1. Find grid reference (GR) 551 187 and mark it as the start point (point A) on the Sydenham map. What conventional sign is located at the GR?

   Answer: _____

2. Find GR 505 247 and mark it as the finish point (point B) on the Sydenham map.

3. Select a route to hike from point A to point B on the Sydenham map. Consider distance, terrain, obstacles, etc. Clearly mark the route chosen on the map and give a brief explanation below as to why the route was chosen.

   _____

   _____

   _____

   _____

   _____

4. Measure the distance along the route from point A to point B on the Sydenham map.

   Answer: _____

5. Estimate the time it will take to hike the route on the Sydenham map. Remember that rates of travel will differ, depending on factors such as the group, equipment, terrain, elevation above sea level, etc.

   On average, a person walks 4 km per hour, 1 km per 15 minutes or 100 m per 1.5 minutes. When off trail in open terrain, a person can be expected to travel 3 km / h. On rough, difficult terrain a person can be expected to travel 1–1.5 km / h. When gaining elevation, there should be an extra allowance of 1 hour per every 300 m. When above 3 000 m, the rate of travel will greatly decrease. Give a brief explanation as to why the answer was chosen.

   _____

   _____

   _____

   _____

   _____

6. Calculate the magnetic declination of the Sydenham map. Show all workings below.

7. Determine the magnetic bearing from point A to point B on the Sydenham map.

   Answer: _____

8. Determine the contour interval of the Mission map.

   Answer: _____

9. Determine the elevation at GR 390 540 on the Mission map.

   Answer: _____

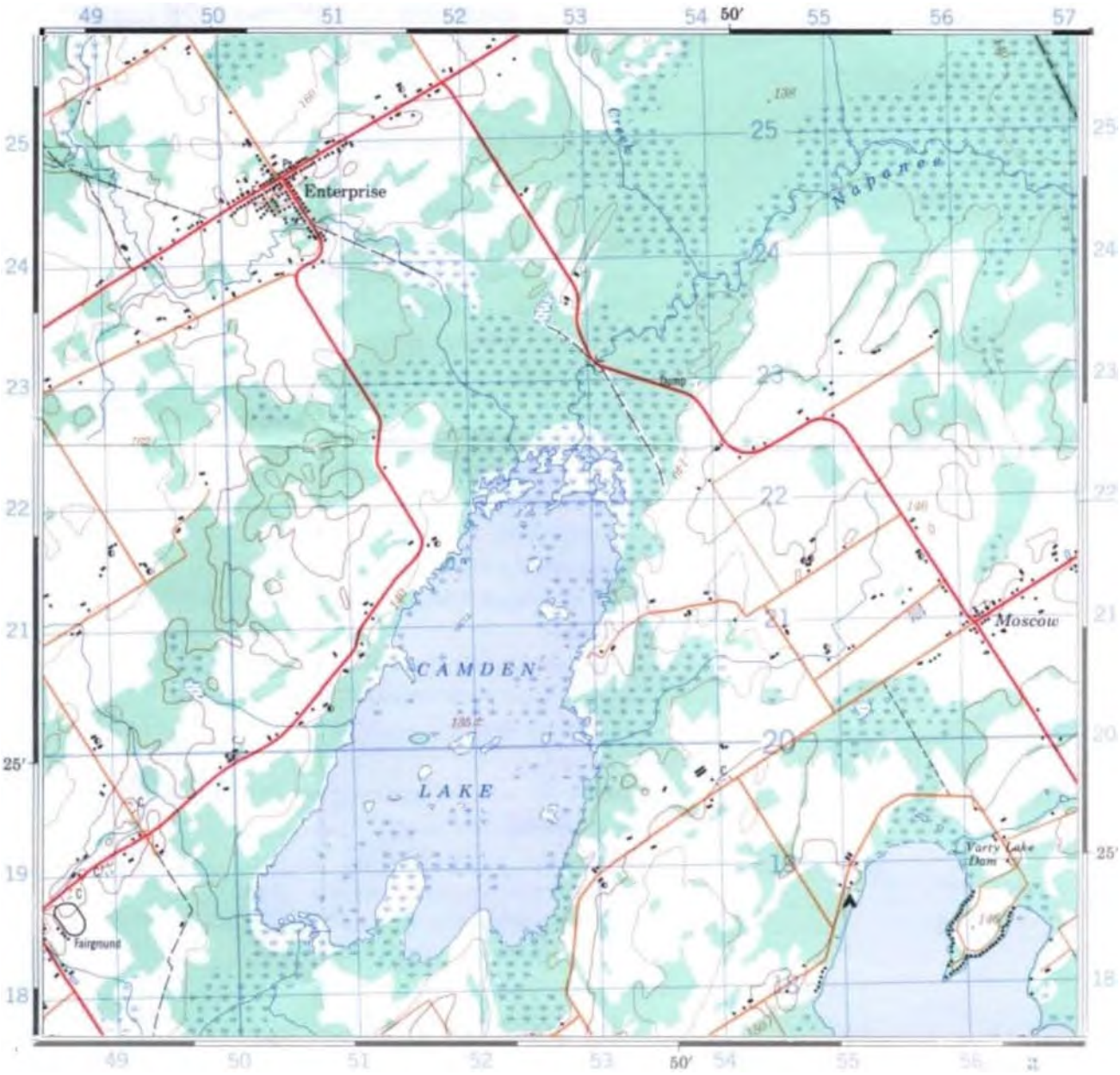

Figure A-1 Section of Sydenham Map

Note. From *Sydenham 31 C/7* (8th ed.), by Canada Centre for Mapping, 1988, Department of Energy, Mines and Resources. Copyright 1988 by Her Majesty the Queen in Right of Canada, Department of Energy, Mines and Resources.

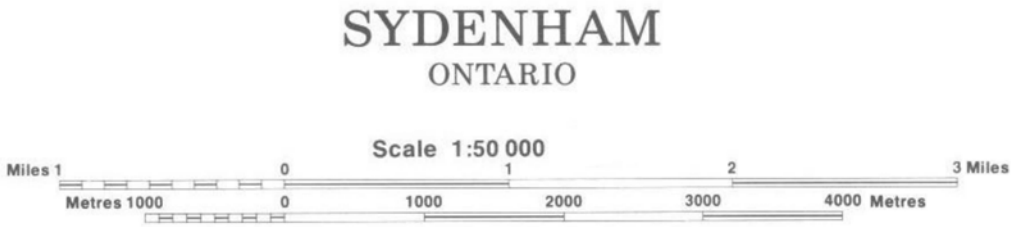

Figure A-2 Sydenham Map Scale

Note. From *Sydenham 31 C/7* (8th ed.), by Canada Centre for Mapping, 1988, Department of Energy, Mines and Resources. Copyright 1988 by Her Majesty the Queen in Right of Canada, Department of Energy, Mines and Resources.

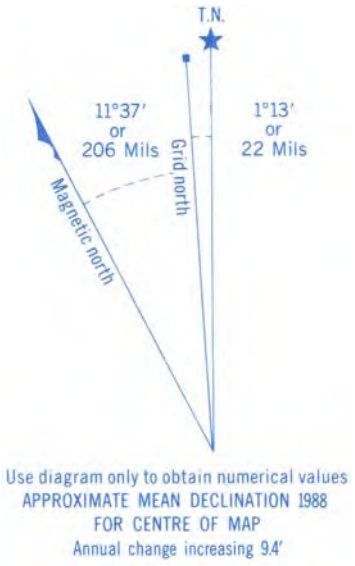

Figure A-3 Sydenham Map Declination Diagram and Information

Note. From *Sydenham 31 C/7* (8th ed.), by Canada Centre for Mapping, 1988, Department of Energy, Mines and Resources. Copyright 1988 by Her Majesty the Queen in Right of Canada, Department of Energy, Mines and Resources.

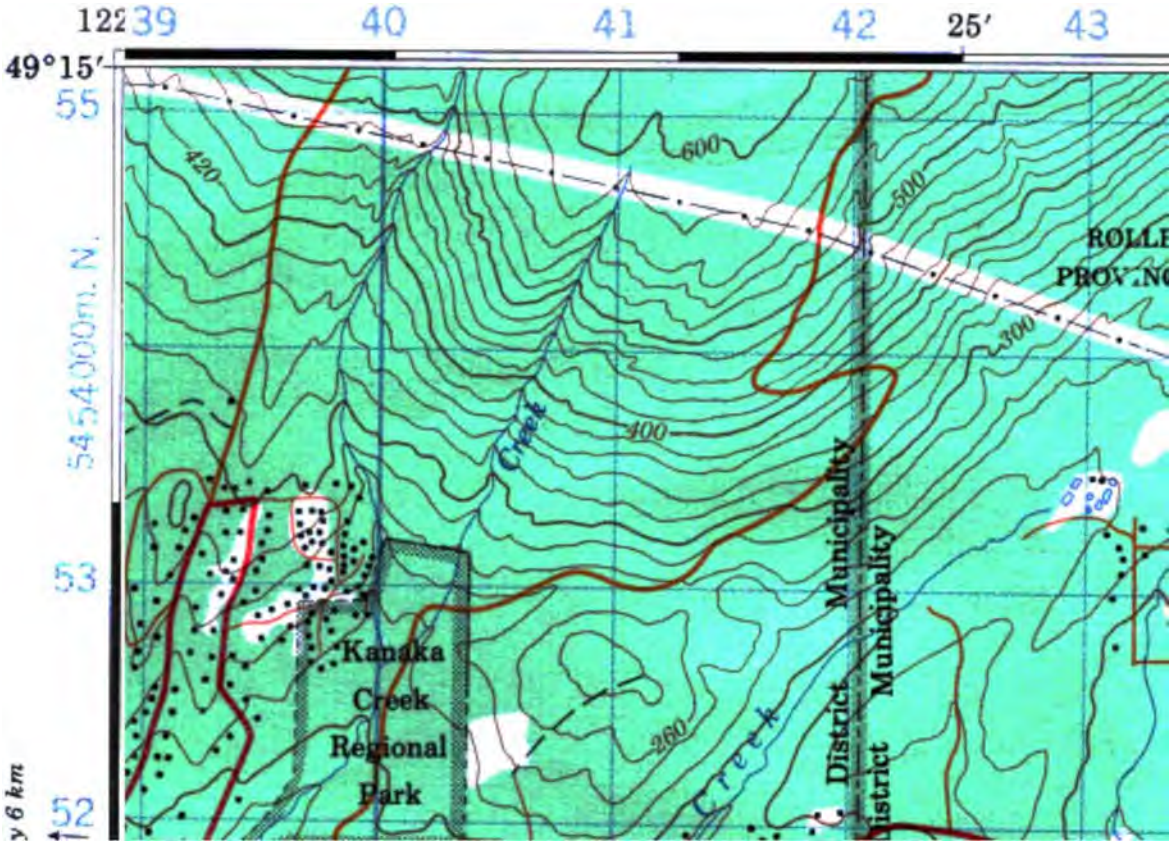

Figure A-4 Section of Mission Map

Note. From *Mission 92 G/1* (5th ed.), by Canada Centre for Mapping, 1992, Department of Energy, Mines and Resources. Copyright 1992 by Her Majesty the Queen in Right of Canada, Department of Energy, Mines and Resources.

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NAVIGATION REVIEW PACKAGE ANSWERS

1. See Figure B-1. The conventional sign is a **campsite**.

2. See Figure B-1.

3. Routes may vary. The answer provided is based on the route illustrated in Figure B-1.

The route chosen was the shortest distance. Leave the campsite and head south. Take the first road heading northwest. At intersection, head northwest. Take the trails / roads heading northwest until the intersection at GR 518 254. Head southwest until the Enterprise Intersection.

4. The distance along the route from point A to point B is **11 000 m or 11 km**.

5. The estimated time (based on the route illustrated in Figure B-1)

The terrain does not seem difficult and there are some elevation changes. The estimated time is 3 hours.

6. The magnetic declination is as follows:

Current year:	2011
Year of declination information:	- 1988
Difference in years:	23
Difference in years:	23
Annual change:	x 9.4'
Total change:	216.2' or 3°36.2'

Annual change is increasing so it is added to the original declination:

Original declination:	W 11° 37'
Total change:	+3° 36.2'
Current declination:	W 14° 73.2' or **W 15° 13'**

7. The magnetic bearing is **5750 mils or 323 degrees**.

8. The contour interval is **20 m**.

9. The elevation is **320 m**.

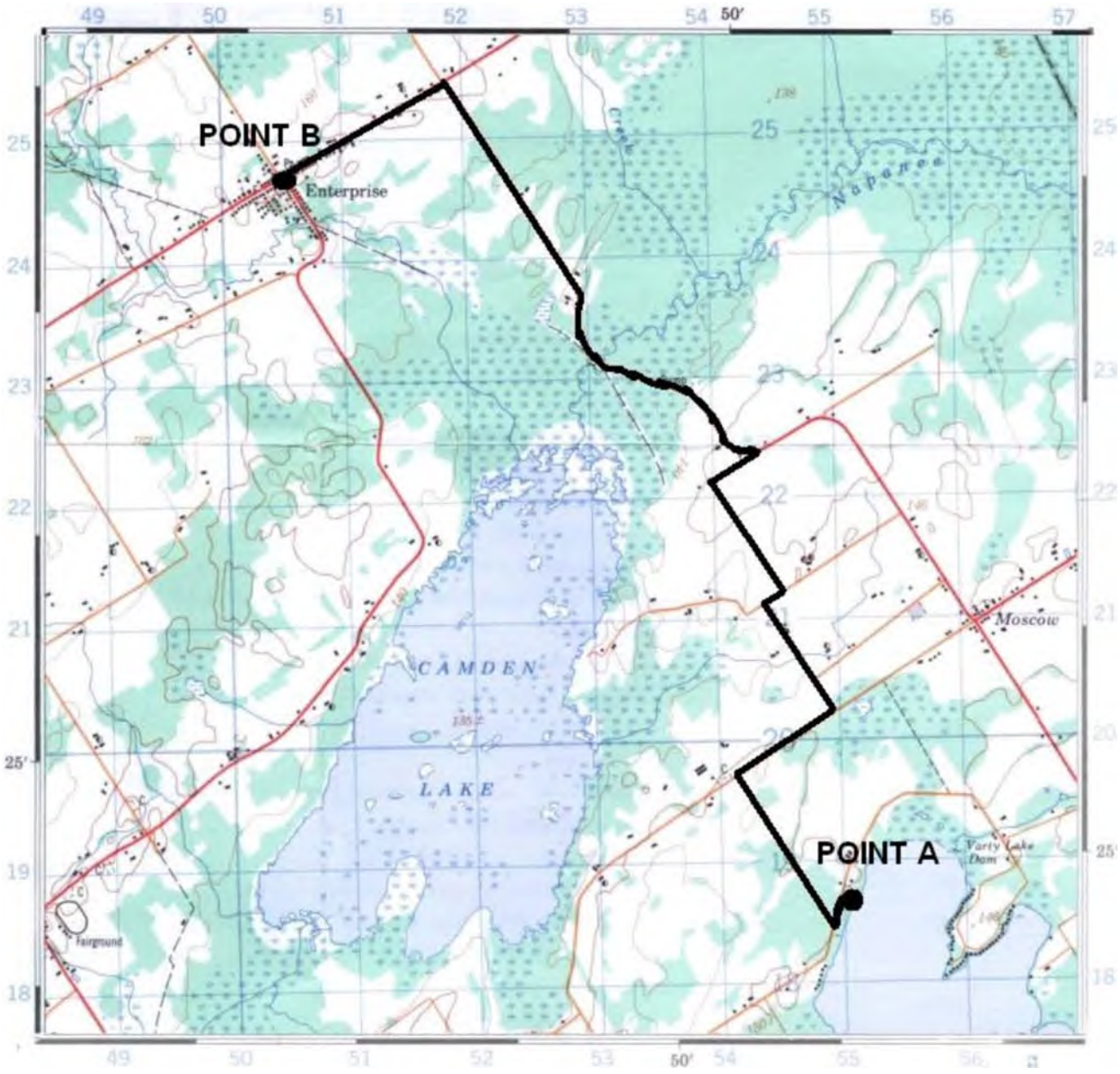

Figure B-1 Section of Sydenham Map (With Route)

Note. From *Sydenham 31 C/7* (8th ed.), by Canada Centre for Mapping, 1988, Department of Energy, Mines and Resources. Copyright 1988 by Her Majesty the Queen in Right of Canada, Department of Energy, Mines and Resources.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 2

EO M426.02a – PADDLE A CANOE

Total Time: 270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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.

Every cadet must have a water carrier prior to the start of this lesson.

All canoes, canoe safety equipment, personal canoe equipment, and group canoe equipment should be organized prior to the start of the lesson.

Review the canoe route. Be aware of locations where cadets may require additional supervision, such as portages.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

The experiential approach was chosen for this activity as it allows the cadet to acquire new knowledge and skills through a direct experience. The cadet experiences paddling a canoe on flatwater during an expedition and defines that experience on a personal level. The cadet will be given the opportunity to reflect on and examine what they saw, felt and thought while canoeing and consider how it relates to what they already learned and experienced as well as how it will relate to future experiences.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have paddled a tandem canoe on flatwater during an expedition.

IMPORTANCE

It is important for cadets to be able to paddle a tandem canoe on flatwater during an expedition because it can provide opportunities for exploration of new places, relaxation, wildlife-watching and physical fitness. Cadets will be required to work with their canoe partner to paddle a significant distance during the expedition. Understanding stroke mechanics and being able to manoeuvre their canoe will make the expedition more enjoyable and less strenuous. The expedition will provide an opportunity to further develop paddling skills in an environment that challenges them both physically and mentally.

Teaching Point 1 **Paddle a tandem canoe on flatwater during an expedition.**

Time: 270 min Method: Experiential Learning

BACKGROUND KNOWLEDGE

The TP for this lesson will occur during the canoe portion of the expedition. In some situations, cadets will have already received instruction and been provided the opportunity to practice canoe skills during the Silver Star Expedition / at the CSTC. The requirement to review skills will be based on the experience level of the cadets and the expedition training centre. Should a review be required, it is suggested that it is completed on-water as the need arises.

IDENTIFY THE PARTS OF A CANOE

There are many different styles of canoes. The technological improvements in canoe building have made it quite difficult to choose an ineffective canoe. Despite the advances in design, the basic elements of the canoe remain the same. The parts of the canoe are:

Bow. The front section of the canoe. The bow can be easily spotted by looking at the seats. There is more leg room between the end of the canoe and the bow seat.

Stern. The back section of the canoe. Most of the steering is done from the stern.

Gunwales. The upper edges of the sides of the canoe.

Gunwales is pronounced 'gunnels'.

Thwart. A crosspiece that is attached on either side to the gunwales, two-thirds of the way back from the bow. The thwart provides structure and support to the gunwales and the hull.

Hull. The body of the canoe, which displaces water and provides the buoyancy for the canoe.

Keel. A narrow strip that runs along the centre of the bottom of the hull from bow to stern. The keel helps to provide better tracking (movement in a straight line) and stability; as well as providing a small barrier between the ground and the hull.

Bow seat. Located in the front (bow) of the canoe. It is further from the end of the canoe to provide leg room for the bow paddler.

Stern seat. Located in the back (stern) of the canoe. It is narrow and fastened to the gunwales closest to the rear of the canoe.

Bow handle. A handhold at the bow, used for lifting and carrying. It is sometimes called the bow carrying thwart.

Stern handle. A handhold at the stern, used for lifting and carrying. It is sometimes called the stern carrying thwart.

Deck plate. A triangle piece of material that is fastened between the gunwales at both ends of the canoe. It is often called the bow deck and the stern deck. The deck plate provides a convenient handhold in the case of no bow or stern handle, as well as a place to attach a painter line.

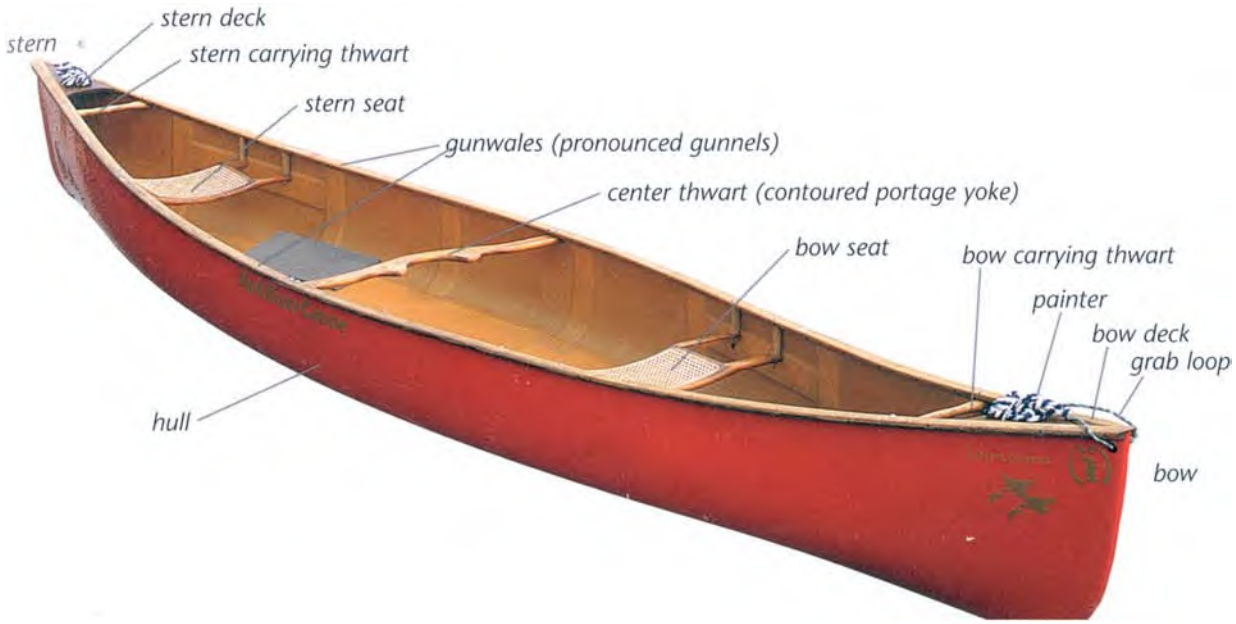

Figure 1 Parts of the Canoe

Note. From *Paddle Your Own Canoe* (p. 13), by G. McGuffin & J. McGuffin, 2005, Erin, ON: The Boston Mills Press. Copyright 2005 by The Boston Mills Press.

OUTFIT A CANOE WITH SAFETY EQUIPMENT

Every boat that enters the water has to be outfitted with certain safety equipment that is required by law. The Canadian Coast Guard and Transport Canada deem every canoe must have the following safety equipment:

Buoyant Heaving Line or Throw Bag

One buoyant heaving line not less than 15 m (49 feet) in length must be available for use in emergencies such as capsized paddlers. The heaving line shall be capable of floating and shall be attached using a figure-of-eight knot, or by clipping the throw bag to the thwart or bow handle.

A throw bag is a nylon rescue bag with a length of rope stuffed loosely inside, so it can pay out through the top when thrown to a person in the water.

Bailer

A bailer is any container capable of removing water from a canoe. It must be made of plastic or metal, with an opening of 65 cm^2 and a minimum volume of 750 mL. The bailer will be attached to the thwart of the canoe using a clove hitch.

Spare Paddle

In addition to the paddles used by the paddlers, a third paddle is required in the case that one is lost, broken or forgotten on shore. The spare paddle should be secured, but immediately available in an emergency. Lashing the paddle into the canoe is not recommended.

Whistle

A pealess whistle or noise-making device is required to communicate with other paddlers and to signal in case of emergency. The whistle is often attached to the paddler's PFD; if not, it should be worn on a cord around the paddler's neck.

White Navigation Light

The white navigation light is a watertight flashlight complete with working batteries. This light can be used to signal other paddlers or during an emergency. It is attached to the bow plate using a carabiner or a piece of cordage.

Painter Lines

Painter lines are two lines 6 m (19 feet) in length made of 10 mm buoyant polypropylene rope, with no knots. The lines are attached to the bow (bow line) and stern (stern line) of a canoe. They are used for pulling the canoe through shallow water and securing it to the shoreline or other stationary object. Painter lines will be attached to the bow and stern handles using a re-woven figure-of-eight knot.

PFD

A vest style jacket filled with foam panels or tubes that provide buoyancy. A PFD must be worn when an individual is within 3 m (10 feet) or less of the shoreline, prior to or upon completion of an on-water activity and when they are on the water. It is important to ensure that the PFD is properly zipped and buckled prior to moving to the waters edge.

The A-CR-CCP-030/PT-001, *Water Safety Orders*, states "the PFD shall always be worn over the outer layer of clothing. When worn, the PFD must have all fasteners and tighteners secured as they are intended to be used. A properly fitted PFD should be snug around the cadet's upper body when in or out of the water. The PFD should not ride up to the cadet's face when all fasteners and tighteners are fitted and secured. If it is riding up under these conditions, a smaller size is required."

The A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*, states that one Canadian-approved PFD or lifejacket of appropriate size must be available for each person participating in on-water activities.

IDENTIFY THE PARTS OF A PADDLE

The paddle is the most important piece of equipment required to canoe, with the exception of the canoe itself. The paddle provides the momentum to move the canoe.

Shaft. The narrow neck of the paddle between the grip and the blade.

Grip. Found at the top of the paddle shaft, where the paddler holds the paddle.

Throat. Located at the bottom of the shaft, where the paddler's shaft hand holds the paddle.

Blade. The part of the paddle that is placed in the water. The blade has two sides:

- **Power face.** The side of the paddle blade that presses against the water during a forward stroke.
- **Back face.** The side of the paddle blade that has no pressure against it during a forward stroke. The back face is the opposite side of the power face.

Tip. The very bottom edge of the paddle blade.

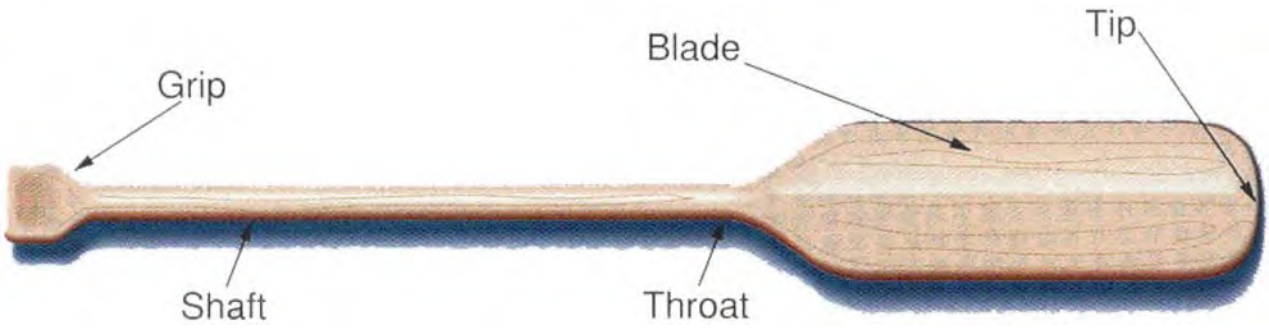

Figure 2 Parts of a Paddle

Note. From *Outdoor Pursuits Series: Canoeing* (p. 21), by L. Guillon, 1994, Champaign, IL: Human Kinetics Publishers. Copyright 1994 by Human Kinetics Publishers.

Sizing a Paddle

When selecting a paddle, it is important to size it correctly. Torso length, canoe seat height and paddling style will determine the proper paddle length.

Most tandem paddlers will require a paddle length between 137 cm and 147 cm. Shorter paddles allow for higher tempo strokes. If the grip hand is above the head during strokes, the paddle is too long.

Paddle length will differ with individual preference, based on comfort and efficiency.

When choosing a paddle from a group of paddles, there are two ways to size a paddle.

1. Hold the paddle in both hands over your head with one hand on the grip and the other on the shaft, close to the throat. With the paddle rested on the head, the arms should be able to bend comfortably at the elbow in a 90-degree bend.

2. Hold the paddle in one hand and rest the blade on the top of the foot. The grip should come to the chin.

Holding a Paddle

The paddle is held in both hands. One hand will hold the grip (control hand) and the second hand, called the shaft hand, will hold the paddle somewhere between the shaft and the throat of the paddle. If the paddler has shorter arms, the shaft hand will be higher up on the shaft.

Fitting a PFD

Fit is the most important thing when selecting a PFD. A PFD should:

- not be able to be pulled off easily,
- fit snugly, and
- be properly fastened.

A PFD must always be worn on and near water, and worn as the top layer.

Refer to A-CR-CCP-030/PT-001 *Water Safety Orders* for more information.

DISCUSS SAFETY CONCERNS WHILE CANOEING

Understand Personal Responsibilities

Skill Level. It is the responsibility of the paddler to ensure that they have the proper skill set for paddling. Participants should always advise staff when they feel uncomfortable or unprepared for any aspect of canoe training.

Physical Fitness. Fitness and well-being are an important part of canoeing. Individuals must take responsibility for themselves. Every paddler must make sure they are physically and mentally prepared for paddling. Physical preparedness includes having the endurance to be able to paddle the entire trip. The paddler should not be suffering from a cold or illness, and should not have any physical injuries, such as cramped or sore muscles.

Identify Paddle Signals

The water can be a noisy place. Using a whistle, paddle or gestures are the best ways of getting the attention of other paddlers.

Before heading out on any body of water, it is important to know and understand universal paddle signals. Paddle signals are important in times when there is distance between canoes and it is difficult to hear. Good communication on the water is essential to prevent accidents and ensure swift emergency response.

When receiving a signal, it is important to repeat the signal to the sender and pass the signal on to paddlers behind.

Paddle signals are used to alert the entire group to the direction of travel or to an unexpected situation, such as an overturned canoe.

Stop. Form a horizontal bar with the paddle and move with an up and down motion until remaining paddlers see it. If you are already stationary, stay where you are. Wait for the all clear signal before proceeding.

Figure 3 Stop

Note. From *Basic Kayaking: All the Skills and Gear You Need to Get Started* (p. 83), by J. Rounds, 2005, Mechanicsburg, PA: Stackpole Books. Copyright 2005 by Stackpole Books.

Paddle signals should be given to indicate the direction of travel; not the location of the obstacles.

Help required / emergency. A paddle, helmet or a bright object (not a PFD) are waved in a continuous motion side to side above the head. This means "assist the signaller as quickly as possible".

Figure 4 Emergency

Note. From *Basic Kayaking: All the Skills and Gear You Need to Get Started* (p. 83), by J. Rounds, 2005, Mechanicsburg, PA: Stackpole Books. Copyright 2005 by Stackpole Books.

Raft up. Raise the paddle vertically above the head and move in a circular motion. This signal means "come to me".

All clear. Extend the paddle over the head vertically. Maintain the paddle in the air in order to ensure that all members of the group have seen the signal. This signal is used when it is safe to continue on and indicates that there are no obstructions or danger ahead.

Figure 5 All Clear

Note. From *Basic Kayaking: All the Skills and Gear You Need to Get Started* (p. 83), by J. Rounds, 2005, Mechanicsburg, PA: Stackpole Books. Copyright 2005 by Stackpole Books.

Identify Whistle Signals

A whistle is an effective way to get the attention of other paddlers when visibility is limited and there is a lot of noise. Before heading out on any body of water, it is important to know and understand universal whistle signals. Good communication on the water is essential to prevent accidents and ensure swift emergency response.

Cadets shall be reminded that they will not play with or blow whistles unless they are in an emergency situation.

Universal distress signal. Three whistle blasts indicate that there is an emergency. All action should stop, and action should be taken for the emergency. This signal means assist the signaller as quickly as possible.

Figure 6 Universal Distress Signal

Note. From *Basic Kayaking: All the Skills and Gear You Need to Get Started* (p. 83), by J. Rounds, 2005, Mechanicsburg, PA: Stackpole Books. Copyright 2005 by Stackpole Books.

Move to shore / raft up. Two whistle blasts indicates that there is a need for the group to get together. When two whistle blasts are heard, all personnel will look to the instructor or group leader for instructions and guidance on where to meet up, whether to move to the shore or to raft up at a given point. It should only be used when other forms of communication are not working.

All clear / look at me. When one whistle blast is heard, focus attention on the instructor (look at me). It is used to get the attention of the group. This signal could also mean all clear.

As there are alternative meanings for one and two whistle blasts, it is imperative that the group understands what the signal means for their group. The team / group leader will specify before moving to the water.

Any series of three signals such as three whistle blasts or three horn blasts indicates an emergency. Immediately stop all activity and assist.

IDENTIFY ACTION ON CAPSIZING

Although strong rescue skills are important, preventing rescues by making careful, informed decisions will reduce the chances of capsizing. Anticipating changes in weather, actions of other paddlers and being properly trained will aid in the prevention of accidents.

Discuss Rescue Priorities

The priority of rescue is listed below, but rescuers will only initiate rescue if it is safe to do so without harm to themselves.

When carrying out rescues, it is imperative that every individual involved be aware of the priorities of rescue. The rescue priorities are:

Rescuer. Rescuer safety is priority. The rescuer should not complete any part of the rescue that is beyond the scope of the rescuer's ability. Another casualty will only escalate the emergency.

People. The paddler(s) in the water. Each paddler will make sure they are okay, and that their partner is okay. If they cannot see their partner, they must establish voice contact to confirm that their partner is conscious, is not seriously injured and is preparing to self-rescue.

Canoes. Canoes will be retrieved once all the paddlers in the water are safe.

Equipment. Equipment is the last thing to be retrieved as it is not essential. Clothing and food can be shared if need be.

If involved in a high risk rescue, the rescuer or rescue team should be prepared and trained to perform effectively and efficiently and to follow the procedures.

Cold water and wind will accelerate the loss of body heat. People can become hypothermic very quickly, even in warm weather.

Canoe Over Canoe Assisted Rescue

The canoe over canoe assisted rescue is the universal rescue means.

The figures below depict two solo paddlers completing a canoe over canoe assisted rescue. The procedure is virtually the same as a tandem rescue with only minor adjustments, which are detailed in the numbered procedure. Use the figures as a guideline.

Step 1

Step 2

Step 3

Step 4

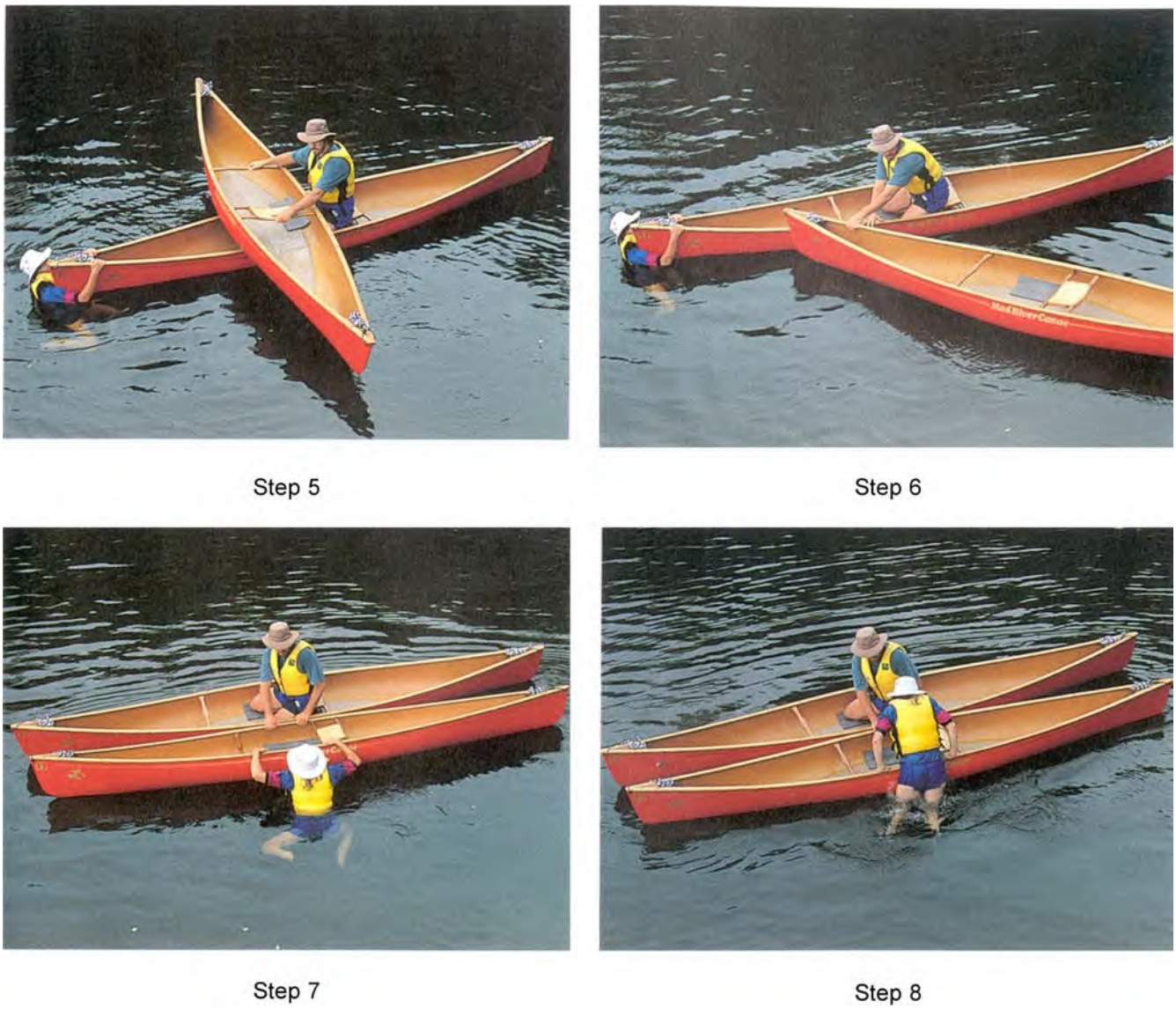

Figure 7 Canoe Over Canoe Assisted Rescue (Solo Paddlers)

Note. From *Paddle Your Own Canoe* (p. 36), by G. McGuffin & J. McGuffin, 2005, Erin, ON: The Boston Mills Press. Copyright 2005 by The Boston Mills Press.

The procedure to follow in a tandem canoe over canoe assisted rescue is:

1. One paddler will swim to the stern of a rescue canoe, hang on and get as much of the body out of the water as possible.
2. The second paddler will swim to the far end of the capsized canoe.
3. The rescuers will lift up on the capsized canoe as the second paddler pushes down on the opposite end of the capsized canoe to break the suction.
4. The second paddler will then move to the bow of the rescue canoe, hang on and get as much of the body out of the water as possible.

5. Both paddlers will remain in that position until told to move by the rescuers. The rescuers will move the canoe across the gunwales of their canoe. Once it is centred they will flip it over and gently continue to slide it into the water.

6. Maintain communication and when instructed to do so the paddlers will, one at a time, get back into the canoe by one of two ways:

   a. hook one leg over each canoe and pull up out of the water and climb into the canoe; or

   b. propel themselves upward by scissor kicking, tucking the shoulder in and rolling into the canoe.

7. Return to the paddling position.

PORTAGING A CANOE

Carrying a Canoe to The Water

Once a canoe is off the vehicle or trailer, it still needs to get to the water. There are several ways to carry a canoe; having one person at each end is a typical way. Hand and arm placement should allow for maximum comfort and provide balance and security against dropping.

It is critical that the canoe is not dragged along the ground. This damages the keel and the bottom of the canoe which may result in holes.

Tandem Hand Carry

For a short distance over relatively flat ground, a canoe can be carried much like a briefcase. This is referred to as the tandem hand carry.

To execute the tandem hand carry:

1. The bow paddler will stand at the bow on the left or right of the canoe.

2. The stern paddler will stand at the stern on the side opposite to the bow paddler.

3. Each paddler will lift the canoe by the handle at their end.

Figure 8 Tandem Hand Carry

Note. From *Outdoor Pursuits Series: Canoeing* (p. 36), by L. Guillon, 1994, Champaign, IL: Human Kinetics Publishers. Copyright 1994 by Human Kinetics Publishers.

Tandem Portage Carry

For longer distances, a canoe can be carried on the shoulders in the tandem portage carry. The canoe is lifted over the head and carried in such a manner that the stern seat rests across the shoulders of the person at the rear and the bow deck rests on one shoulder of the person in front.

To execute the tandem portage carry:

1. Stand up straight, with the legs slightly apart and knees bent. Grasp the gunwale closest to the body, near the bow and stern seats respectively. Place the fingers inside the gunwale and the thumbs outside the gunwale.
2. Keeping the back straight and knees bent, lift the canoe to the thighs in a rocking motion.
3. Reach across the canoe and grasp the far gunwale. The fingers are pointing out and the thumb is in. Re-position the hand from step one so that the fingers are out and the thumb is in.
4. Rocking the canoe again, use your legs to launch and lift the canoe over the head.
5. As the canoe is raised, turn to face the bow and then guide the bow and stern seats onto the shoulders.
6. Rest the weight of the canoe on the shoulders. The bow person will move further forward to improve visibility.
7. To move forward, the bow paddler hand-walks along the gunwale toward the front of the canoe. Balance the canoe's weight side to side and bow to stern.
8. Rest the deck plate on the bow paddler's shoulder.


1


2


3


4

Figure 9 Tandem Portage Carry Steps 1–8

Note. From *Canoeing: The Essential Skills and Safety* (p. 136), by A. Westwood, 2007, Beachburg, ON: The Heliconia Press. Copyright 2007 by The Heliconia Press.

To lower the canoe, complete the procedure in reverse. It is important to lower the canoe onto the thighs, then onto the ground.

LOADING AND UNLOADING EQUIPMENT FROM A CANOE

Weight Distribution and Stability

Stability is the first consideration when canoeing. Canoes are floats and their stability depends primarily on their shape and the position of the centre of gravity. The more expansive the float over the water and the lower the centre of gravity, the more stable a float becomes.

An empty canoe resting on the water has two centres on the same vertical plane, the centre of gravity and the centre of buoyancy. The canoe is evenly trimmed bow and stern and side to side.

Centre of gravity is the point around which a person's body weight is equally balanced in all directions. The total weight of the person is concentrated at this point. The position of the centre of gravity of an object depends on the shape of the object and the distribution of its weight.

If weight is added to the canoe, such as a heavy pack, the centre of buoyancy changes to stay on the same vertical plane as the centre of gravity.

Loads should not be higher than the gunwales of the canoe and must be evenly distributed over the keel line. Weight should be adjusted so that the canoe is neither bow nor stern heavy.

Canoe Trim

Trim is the way the canoe rides in the water once it has been loaded. It is important to keep the gunwale line parallel to the water surface. In addition, it is crucial that the stern does not ride lower than the bow.

Weight of Paddlers

The weight of the paddlers is often overlooked and must be taken into consideration. Most canoes are rated with a maximum capacity, normally between 500–635 kgs (1100–1400 pounds) with a load range of 135–270 kgs (300–600 pounds). The paddlers' weight must be considered, as this will limit the weight of equipment that can be loaded in the canoe. This weight will also affect the trim of the canoe.

Packs and equipment are tied to the centre thwart using a tether line. This will ensure the equipment is not separated from the canoe. The equipment should be placed in the middle section of the canoe. By trial and error, adjustments may have to be made so that the canoe will be trimmed evenly.

LAUNCHING AND LANDING A CANOE

Identifying a Location

Putting a canoe on water and taking it out of water should be done carefully, smoothly and without damage to the canoe.

The ideal location to launch a canoe is a soft shore or beach where the water is calm. Avoid locations where there are large rocks, stumps and roots, strong wind or large waves.

If you are launching from a shallow beach, launch the canoe at a right angle to the beach and hold it with its stern touching the bottom at the water's edge.

Avoiding Equipment Damage

A canoe should not be pushed, pulled or slid in or out of the water on a beach, bank, or dock. When launching, it is best to lay the canoe in the water from a lift position. It should be raised with the same care when being taken out of the water.

The canoe should be empty when launching. Once the canoe is placed on the water, it can be loaded with equipment while it is floating.

Entering a Canoe

Getting into a canoe for the first time is difficult; with practice, it will become easier. The stern paddler should always hold the canoe steady while the bow paddler enters. Likewise, once the bow paddler has entered the canoe, they will steady the canoe, using their paddle and body, while the stern paddler enters.

The steps for getting into a canoe are:

1. Keep the body low at all times, to lower the centre of gravity; never stand in a canoe.

2. Place the paddle shaft across the gunwales for stability.

3. Grasp both gunwales and step into the canoe over the centreline.

4. Step along the centreline and slide the hands and paddle along the gunwales to move to the seat.

Launching a Canoe at a Shoreline

Launching and landing a canoe in waves is inadvisable. Wait for a lull and keep the canoe at a right angle to the water.

If the canoe swamps at any time, avoid getting between the canoe and the shore. A canoe full of water weighs approximately 1 ton (1 000 kg) and can seriously injure a paddler.

There are several ways to launch a canoe from shore. The most common is the bow first launch:

Procedure for the bow first launch:

1. Put on a PFD and have paddles in the canoe or on the shoreline. Set the canoe at a right angle to the shore.

2. Place the spare paddle and stern paddle in the centre of the canoe. Have the stern paddler hold the canoe while the bow paddler walks up the length of the canoe keeping their weight low and balanced over the centreline. Stability is maintained by keeping the paddle shaft across the gunwales.

3. Have the bow paddler sit or kneel and place the paddle in the ready position as detailed in Figure 10. The stern paddler will hold the paddle shaft across the gunwales for stability.

4. Have the stern paddler slide their paddle forward along the gunwales, continuing to hold both paddle shaft and gunwales while keeping their weight low and balanced over the centreline. The blade is positioned on the side opposite to the bow paddlers' paddling side.

5. Once the stern paddler is kneeling and in the ready position, move the canoe away from the shore.

Figure 10 Bow First Launch

Note. From *Paddle Your Own Canoe* (p. 36), by G. McGuffin & J. McGuffin, 2005, Erin, ON: The Boston Mills Press. Copyright 2005 by The Boston Mills Press.

On windy days, face the canoe directly into the wind when launching.

Landing a Canoe at a Shoreline

When a suitable location to exit the canoe is found, the following procedure shall be followed:

1. Bring the canoe into landing without running up on shore.
2. Have the bow paddler exit first to steady the canoe for the stern paddler.
3. Have the stern paddler move forward, keeping their weight low in the canoe.
4. Have the stern paddler exit at the bow.

Exiting a Canoe

To exit the canoe, reverse the entry procedures:

1. Bring the canoe into the landing slowly and carefully.
2. Keep the body low at all times, lowering the centre of gravity.
3. Place the paddle shaft across the gunwales for stability.
4. Grasp both gunwales and the paddle shaft, and move to the bow of the canoe.
5. Step out of the canoe, keeping weight low.

EXECUTE CANOE STROKES

Kneeling is the position of choice for paddling because it provides increased canoe stability. When a person kneels, their centre of gravity is lowered. To give sore knees a break, a paddler can sit on the seat.

There are four phases of a stroke that help ensure the transition between each stroke is natural and smooth.

Catch. The beginning of the stroke where the blade is inserted into the water.

Power. The movement of the paddle through the water by rotating the torso to transmit power to the blade. When paddling, it is important to use the muscles of the torso, which have more strength and endurance than the arm muscles.

Exit. When the paddle leaves the water.

Recovery. When the paddle is returned to the catch position. This is completed by feathering the blade (keeping it flat and just above the water surface) to minimize wind resistance.

The stern paddler will control the direction of the canoe using corrective strokes where applicable. The bow paddler will complete mostly power strokes when canoeing, unless the stern paddler requires assistance with corrective strokes.

Power Stroke

The power stroke is used to move the canoe forward. It is the foundation stroke on which most other strokes are built. The power stroke is made close to the side of the canoe and parallel to the keel, with the shaft of the paddle moving in a vertical or near-vertical plane. To complete the power stroke:

1. Rotate the torso forward toward the bow to engage the muscles for the stroke.
2. Place the blade deep into the water with as little splash as possible.
3. Unwind the torso while pulling on the shaft hand (lower hand) and pushing with the control hand (upper hand).
4. Power the stroke through the water until the blade of the paddle is in line with the knee.
5. Lift the paddle out of the water by slicing it out to the side.
6. Recover the stroke with the blade clear and flat across the water (to reduce wind resistance) and complete another stroke.

Figure 11 Power Stroke

Note. From *Canoeing: The Essential Skills and Safety* (p. 71), by A. Westwood, 2007, Beachburg, ON: The Heliconia Press. Copyright 2007 by The Heliconia Press.

J-Stroke

Watch for ruddering as the cadets' practice the J-stroke. Ruddering is when the stern paddler places their paddle in the water behind the hip and manoeuvres it back and forth to turn the canoe. This will create drag and slow the forward momentum of the canoe.

The J-stroke is a version of the power stroke used as a corrective stroke by the stern paddler to help keep the canoe travelling in a straight line. When applied with force, it can be used to turn the canoe to the stern paddler's side (the side they are paddling on). To complete the J-stroke:

1. Complete the first four steps of the power stroke, ending with the control hand above the gunwale and the shaft hand at the hip.
2. Twist the control hand thumb forward and down while pulling the shaft hand inward, forming a "J".
3. Recover to complete another stroke.

Figure 12 J-Stroke

Note. From *Canoeing: The Essential Skills and Safety* (p. 74 and p. 75), by A. Westwood, 2007, Beachburg, ON: The Heliconia Press. Copyright 2007 by The Heliconia Press.

Forward Sweep

The purpose of the forward sweep is to turn the canoe away from the canoeist's paddling side. It is a wide sweep of the paddle, using the power face of the blade. There are many occasions when this stroke would be used, such as:

- swinging the canoe for pivot turns or partial turns;
- manoeuvring the canoe around obstacles;

- following along the bends of streams or rivers;
- making sudden changes of direction in paddling;
- aiding in holding a straight course in crosswinds; and
- incorporating with other strokes as necessary to control the canoe.

Reverse sweeps use the back face of the blade and are the opposite of forward sweeps. Both sweeps have many of the same functions.

As the bow paddler, to complete the forward sweep:

1. Rotate the torso and bend forward slightly while immersing the blade of the paddle almost horizontally by the bow of the canoe.
2. Push the shaft hand out slightly from the waist while swinging in a 90-degree arc until the arm extends out from the hip (the paddle should be at a right angle to the side of the canoe).
3. Recover to complete another stroke.

As the stern paddler, to complete the forward sweep:

1. Lean back slightly as the upper body rotates while extending and immersing the paddle almost horizontally at a right angle to the side of the canoe at the hip, keeping the lower hand at waist height with the thumb pointing up.
2. Push out slightly with the shaft hand while swinging in a 90-degree arc (the paddle should be almost touching the stern).
3. Recover to complete another stroke.

When the bow paddler is completing a forward sweep, the stroke should never move past the paddler’s body. Any further movement will result in drag and loss of momentum.

Step 1

Step 2

Step 3

Figure 13 Forward Sweep

Note. From *Paddle Your Own Canoe* (p. 51), by G. McGuffin & J. McGuffin, 2005, Erin, ON: The Boston Mills Press. Copyright 2005 by The Boston Mills Press.

Draw

The purpose of the draw is to turn the canoe or to move it sideways. The draw stroke can be completed by both the bow and stern paddler. To complete the draw stroke:

1. Rotate the torso and extend the arms fully to position the paddle at the side of the canoe, adjacent to the knee.
2. Reach across the canoe with the control hand and place the paddle vertically into the water.
3. Plant the blade deeply in the water and pull the power face toward the body.
4. Twist the control hand thumb away from the body and rotate the blade 90 degrees (before the blade hits the canoe).

5. Bring the paddle back to the beginning position by slicing it through the water.
6. Twist the blade back into the original position to complete another stroke.

Figure 14 Draw

Note. From *Canoeing: The Essential Skills and Safety* (p. 95), by A. Westwood, 2007, Beachburg, ON: The Heliconia Press. Copyright 2007 by The Heliconia Press.

Pry

The pry is a powerful, deep-water stroke that can be applied by the bow or the stern paddler to move the canoe away from the paddler's side. To complete the pry stroke:

1. Place the paddle vertically against the gunwale adjacent to the knee with both hands above the gunwale.
2. Pull inward with the control hand to force the paddle away from the canoe.
3. Rotate the blade 90 degrees by twisting the thumb of the control hand away from the body and slicing the blade back to the beginning point.

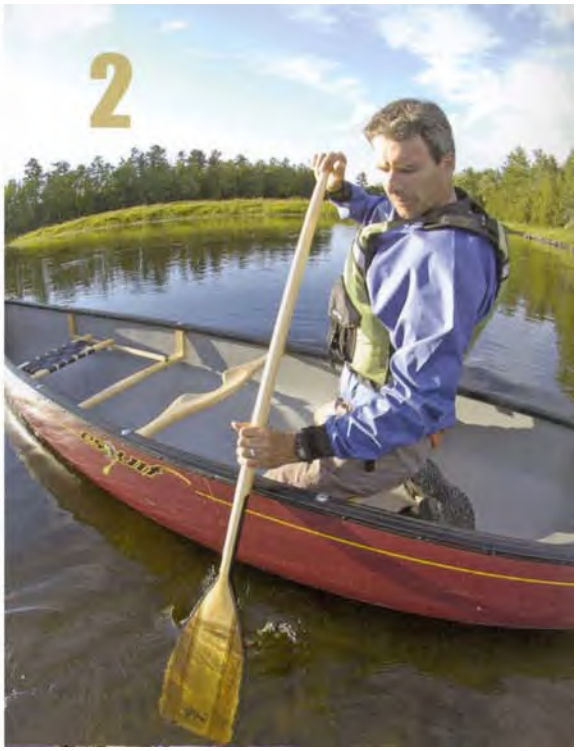

Figure 15 Pry

Note. From *Canoeing: The Essential Skills and Safety* (p. 96), by A. Westwood, 2007, Beachburg, ON: The Heliconia Press. Copyright 2007 by The Heliconia Press.

If the bow paddler completes a pry and the stern paddler completes a draw, the canoe will move sideways. This combination of strokes is useful if trying to move a canoe parallel to a dock or when rafting up.

Low Brace

The low brace will assist in righting a canoe from capsizing or if it begins to tip. This stroke will also help a paddler rely on the paddle to steady the canoe as well as lean into turns. It can also be used by the stern paddler to steady the canoe when the bow paddler is initiating a turn. To complete a low brace:

1. Twist the upper body to face the water, with the paddle out at a 90-degree angle to the canoe.
2. Smack the water with the flat backside of the paddle to provide support to balance the body in the canoe.
3. Begin to get the knees level in the canoe by dropping the head towards the shaft of the paddle.
4. Assume a stable posture with the head centred inside the canoe once the canoe has levelled.

Figure 16 Low Brace

Note. From *Canoeing: The Essential Skills and Safety* (p. 98 and p. 99), by A. Westwood, 2007, Beachburg, ON: The Heliconia Press. Copyright 2007 by The Heliconia Press.

Jam

The jam stroke will stop a canoe's forward momentum quickly when applied. To execute the jam, the paddler will shove the paddle into the water at a right angle to the canoe in a vertical position.

Backpaddle

To go backward, the bow paddler can complete a reverse power stroke. If necessary, the stern paddler can do a pry in the beginning to steady the canoe. To backpaddle:

1. Lean slightly back, rotate the shoulders back and place the blade of the paddle vertically in the water at the rear of the canoe up to the throat.

2. Unwind the body while pushing forward with the shaft hand and pulling with the control hand.

3. Continue with the stroke until the shoulders are square with the gunwales.
4. Lift the blade out of the water and recover to complete another stroke.

Figure 17 Backpaddle

Note. From *Canoeing: The Essential Skills and Safety* (p. 98–99), by A. Westwood, 2007, Beachburg, ON: The Heliconia Press. Copyright 2007 by The Heliconia Press.

If both paddlers are backpaddling, the canoe will turn away from the bow paddler's side.

ACTIVITY

Time: 270 min

OBJECTIVE

The objective of this activity is to have the cadets, in teams of no more than six, paddle a tandem canoe on flatwater, for 15–20 km, during an expedition.

RESOURCES

- Fully equipped tandem canoe (one per two cadets),
- Personal canoe equipment (one per cadet),
- Group canoe equipment (one per team), and
- Water carrier (one per cadet).

ACTIVITY LAYOUT

Designate a flatwater canoe route, IAW A-CR-CCP-030/PT-001, *Water Safety Orders*.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing, to include an explanation of:
    a. the objectives and importance of the activity;
    b. the resources that may be required to perform the activity; and
    c. any safety guidelines that must be followed while performing the activity.
2. Have cadets size and fit paddles and PFDs.
3. Place cadets in canoe partners.
4. Assign a bow and stern paddler (groups will be required to switch at the half-way point of the route).
5. Have cadets outfit their canoes with safety equipment.
6. Have cadets, in teams of no more than six, paddle a tandem canoe on flatwater, following the designated route for a distance of 15–20 km during an expedition to practice:
    a. launching and landing the canoe;
    b. turning the canoe;
    c. pivoting the canoe;
    d. moving the canoe laterally;
    e. paddling in a straight line; and
    f. stopping the canoe.
7. Upon arrival at the end point, have the cadets store / return all equipment.

8. Conduct a debriefing by asking the cadets:

   a. how they felt about the activity;

   b. how they felt their team worked together;

   c. what portion of the activity challenged them the most;

   d. how their teammates assisted them when they were challenged;

   e. if there are any specific examples of when their team bonded;

   f. how the team made decisions;

   g. whether or not all team members ideas / suggestions were considered; and

   h. what they would do as a leader of this type of activity to ensure their subordinates enjoyed the experience.

SAFETY

- Cadets must wear their PFDs at all times.
- Each team will be led by the assigned team leader.
- All canoes in a team must travel together—there can be no more than two canoe lengths between team canoes.
- Team Instructor(s) (TIs) must be in sight / sound of the team at all times.
- Teams will travel separately along the canoe route.
- There will be a minimum of 500 m between teams at all times.
- Cadets must carry at least 1 L of water.
- Water re-supply points will be located along the route.
- Meals will be provided at a pre-determined location(s) and detailed in the route instructions.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in paddling a canoe will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the expedition will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 426 PC.

CLOSING STATEMENT

Canoeing is a fun and challenging mode of travel that can be used during expedition training. Being able to efficiently manoeuvre a canoe while on expedition provides a great sense of freedom and accomplishment. Canoe strokes only improve with practice, it is important to make an effort to continue the development of the skills.

INSTRUCTOR NOTES / REMARKS

Expedition centres are required to select two dynamic modes of travel from EO M426.02a (Paddle a Canoe), EO M426.02b (Ride a Mountain Bike), EO M426.02c (Hike Along a Route), EO M426.02d (Snowshoe Along a Route) and EO M426.02e (Ski Along a Route) to incorporate into the expedition training.

This EO has been allocated nine periods in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources in the expedition centre.

Upon arrival at the expedition centre, cadets will be divided into teams. Cadets will be given an opportunity to navigate and lead peers. These teams will remain the same for the duration of the expedition.

IAW A-CR-CCP-030/PT-001, *Water Safety Orders*:

1. a fully equipped tandem canoe is described as having the following items:
    a. bailer,
    b. buoyant heaving line or throw bag,
    c. sound signalling device,
    d. spare paddle, and
    e. painter lines;
2. the following personal canoe equipment is required when paddling a canoe:
    a. PFD, and
    b. paddle; and
3. the following group canoe equipment is required when paddling a canoe:
    a. topographical or river map of area as required,
    b. compass,
    c. GPS receiver,
    d. first aid kit,
    e. communication device (eg, cellular phone or hand-held radio), and
    f. canoe repair kit.

The intensity level of the activity shall follow the progression matrix outlined in A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*.

IAW A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*, there are pre-training requirements for canoeing. Assess the level of pre-training required and plan time into the expedition as necessary.

Ensure that each cadet has an ample supply of drinking water when canoeing.

REFERENCES

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 3

EO M426.02b – RIDE A MOUNTAIN BIKE

Total Time: 270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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.

Every cadet must have a water carrier prior to the start of this lesson.

All mountain bikes and helmets being used should be organized by size prior to the start of this lesson.

Have mountain bike pumps and mountain bike repair kits available to complete the pre-ride check.

Have cleaning materials available to complete the post-ride check.

Review the terrain and trail features of the mountain bike route. Be aware of challenging areas where cadets may require additional supervision.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

The experiential approach was chosen for this activity as it allows the cadet to acquire new knowledge and skills through a direct experience. The cadet experiences mountain biking on familiarization / intermediate trails during an expedition and defines the experience on a personal level. The cadet will be given the opportunity to reflect on and examine what they saw, felt and thought while mountain biking and consider how it relates to what they already learned and experienced as well as how it will relate to future experiences.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have ridden a mountain bike on familiarization / intermediate trails during an expedition.

IMPORTANCE

It is important for cadets to be able to ride a mountain bike on familiarization / intermediate trails during an expedition. Cadets will be required to work as a member of an expedition team to travel a significant distance during the expedition. Being able to perform basic mountain bike skills will assist them in keeping up with their team. Mountain biking over more difficult terrain features will provide cadets the opportunity to put into practice new mountain bike skills while further developing their basic mountain bike skills in an environment that challenges them both physically and mentally.

Teaching Point 1 **Ride a mountain bike on familiarization / intermediate trails during an expedition.**

Time: 270 min Method: Experiential Learning

BACKGROUND KNOWLEDGE

The TP for this lesson will occur during the mountain bike portion of the expedition. In most situations cadets will have already received instruction and been provided the opportunity to practice basic mountain bike skills during the Silver Star Expedition / at the CSTC. The requirement to review skills will be based on the experience level of the cadets and the expedition training centre. Should a review be required, it is suggested that it is completed along the route as the need arises.

SELECTING AND ADJUSTING A MOUNTAIN BIKE

Since the first introduction of the mountain bike in the mid- to late-1970s, the design of bikes has evolved. The quest for improved products has led to continued improvements and advancements in materials being used to construct the bikes, as well as the overall design of the bikes themselves. With the introduction of new bikes each year by key manufacturers the use of stronger and lighter materials, and cutting edge designs compete to maximize speed, power and strength.

While it is important to have a well-designed mountain bike, if the bike chosen does not fit the mountain biker the excellence in design will be lost. Having a properly-fitted mountain bike is important for riding efficiency and power, as well as safety. When a mountain bike does not fit the mountain biker properly, injuries are more likely.

Selecting a Helmet

A properly-fitted helmet should:

- fit level and square on the head;
- cover the front of the forehead;
- sit snug on the head, without fastening the chin strap;
- not slip when the head moves; and
- have straps adjusted to meet just below the ear and fastened tightly.

Figure 1 Proper Fit of a Helmet

Note. From *Cycling Skills: Cycling Safety for Teen and Adult Cyclists* by Ministry of Transportation Ontario, 2005, Copyright 2005 by Government of Ontario. Retrieved October 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/cyclingskills.htm

Helmet sizes vary from extra small to extra large. It is important to try on a variety of sizes to make sure the fit is correct.

Adjusting the Helmet

A helmet will not necessarily fit without making some minor adjustments. The following are some basic adjustments that can be made to ensure the helmet will protect the mountain biker in an accident:

1. Adjust removable pads, if required, to make the fit firm and comfortable.
2. Centre the chin clip so it is just under the chin and so the strap is even on both sides. This is done by pulling the strap from one side to another through the underside of the helmet.
3. Adjust the side straps by pulling or pushing them through the sliders. The slider should sit just below the ears, forming a 'V'.
4. Use the rear adjuster (if there is one) by sliding the mechanism to make it bigger or smaller.
5. Buckle the chin clip and ensure no more than two fingers can fit under it.

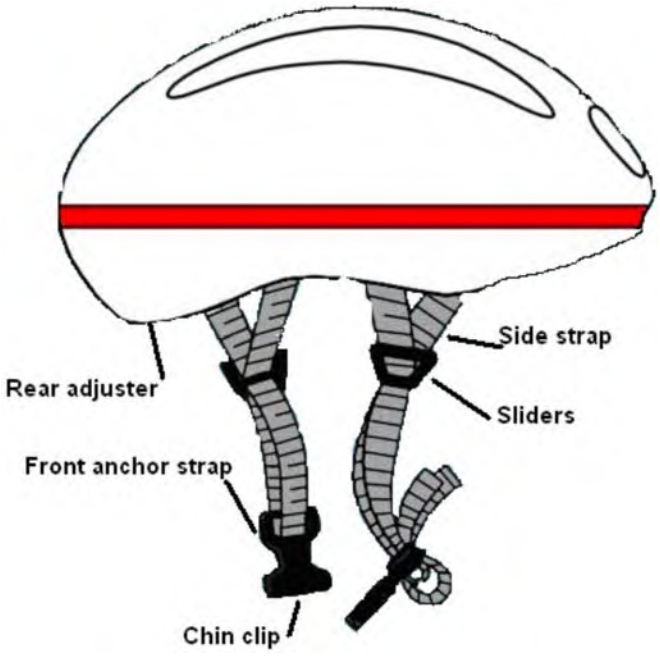

Figure 2 Parts of a Helmet

Note. From *CPSC Issues New Safety Standard for Bike Helmets* by U.S. Consumer Product Safety Commission. Retrieved October 30, 2007, from http://www.cpsc.gov/cpscpub/prerel/prhtml98/98062.html

Selecting a Mountain Bike

While some manufacturers size their mountain bikes by labelling them as small, medium, large and extra large, in most cases mountain bike size is given in inches and is based on leg length. The frame size is determined by measuring the distance from where the crank attaches to the mountain bike to the intersection of the seat tube and the top tube.

Figure 3 Sizing Measurements

Note. From *Bike Sizing Guide* by Dynamic Bicycles, 2005 , Copyright 2005 from Dynamic Bicycles, Inc. Retrieved October 31, 2007, from http://www.dynamicbicycles.com/bikes/sizing.php

The following steps should be followed when sizing a mountain bike:

1. **Size by eye.** The initial step in sizing a mountain bike is to select a mountain bike with a frame size that coincides with the height of the mountain biker.

2. **Stand-over test.** The next step is to straddle the mountain bike. There should be minimum 5-cm (2-inch) clearance between the top tube and the crotch when the mountain biker is straddling the mountain bike.

3. **Saddle adjustment.** Standing next to the mountain bike, the mountain biker will adjust the saddle height to just above their hip by opening the seat post release, raising or lowering the saddle, and closing the release. The mountain biker will then sit on the saddle, and place their left foot on the pedal with the ball of the foot over the centre of the pedal. The left leg should be almost perpendicular, without the knee locking.

COMPLETE A PRE-RIDE BIKE CHECK

Mountain biking is incredibly hard on the mountain bikes and equipment. Before the start of a ride it is important to run through a pre-ride check to ensure the mountain bike is in the best possible condition for riding. It may seem redundant to do this before every ride, especially when a post-ride check was completed; however, it only takes one broken cable or one flat tire to ruin a ride.

The ABC Quick Check is an easy way to remember what parts of the mountain bike should be checked during a pre-ride check. The check is a series of questions that the mountain biker must ask themselves, in relation to five areas of the mountain bike. The ABC Quick Check should be practiced so that it can be done quickly and efficiently. The mountain biker will correct any minor issues at the time of the pre-ride check; any major issues, or those that require a mountain bike tool, will have to be brought to the attention of the ride leader.

Air

The first step in the ABC Quick Check begins by focusing the mountain biker's attention on the wheels and tires of the mountain bike.

Do the tires have enough air?

This can be checked using a bicycle pump that has a built-in tire pressure gauge. The tire pressure for mountain bike tires should be between 35 pounds per square inch (psi) (240 kpa) and 65 psi (448 kpa).

When pumping the tires, aim to ensure the tire pressure is between 45–50 psi (310–345 kpa). This will allow for a variety of trail conditions.

Different trail conditions require different tire pressures. Harder surfaces are easier to ride with harder tires; (50–65 psi [345–448 kpa]), and conversely, softer surfaces are easier with softer tires; (35–40 psi [240–275 kpa]).

Is there any excessive wear on the tread or any cuts on the side walls of the tires?

Any loose or engrained mud or debris that is lodged in the tread should be removed. This will help eliminate the possibility of sharp objects working their way through the tire casing into the inner tube, causing a flat.

Brakes

Next the mountain biker will inspect the front and rear brakes of the mountain bike. It is important to spend time inspecting the brake levers, as well as the actual braking mechanism.

Do the brake levers work effectively?

There should be at least two finger's distance between each brake lever and the handlebar when pulled. It should require little effort to engage the brake lever. If it is hard to pull then the brake cables require adjustment.

Figure 4 Brake Lever Positioning

Note. From *Young Cyclists Guide* by Ministry of Transportation Ontario, 2005, Copyright 2005 by Government of Ontario. Retrieved November 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Do the brakes function as they are supposed to?

The front and rear brakes should be checked independently. The mountain biker should stand beside the mountain bike and push it forward by the handlebars. When the front brake lever is pulled, on its own, the rear wheel should lift up as the front wheel locks. When the rear brake lever is pulled, on its own, the rear wheel should lock and slide across the ground.

Chain and Crank

The chain and crank are what make the mountain bike move forward. If they are not in good working order the mountain bike will be difficult to manoeuvre and will most likely not get very far.

Is the chain on and lubricated?

The chain should be able to move freely around the front and rear sprockets when the pedals are moved with no visible signs of bends or kinks. There should be no evidence of rust on the chain. If there is, an application of lubricant should work out the rust.

Figure 5 Lubricating the Chain

Note. From *Young Cyclists Guide* by Ministry of Transportation Ontario, 2005, Copyright 2005 by Government of Ontario. Retrieved November 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Do the pedals spin freely?

The mountain biker should lift up the rear wheel and move the pedals with one hand to check the functionality.

Quick Release

Quick release levers are located on the front and rear wheels, as well as the seat post.

Are the wheel quick releases working?

Open and close both the front and rear tire quick release levers. They should be easy to open and close. If not, lubricant should be applied. Ensure they are fully tightened following the check and that the lever is flush with the fork of the mountain bike.

Figure 6 Quick Release Incorrect Position–Example 1

Note. From *Young Cyclists Guide* by Ministry of Transportation Ontario, 2005, Copyright 2005 by Government of Ontario. Retrieved November 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Figure 7 Quick Release Incorrect Position–Example 2

Note. From *Young Cyclists Guide* by Ministry of Transportation Ontario, 2005, Copyright 2005 by Government of Ontario. Retrieved November 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

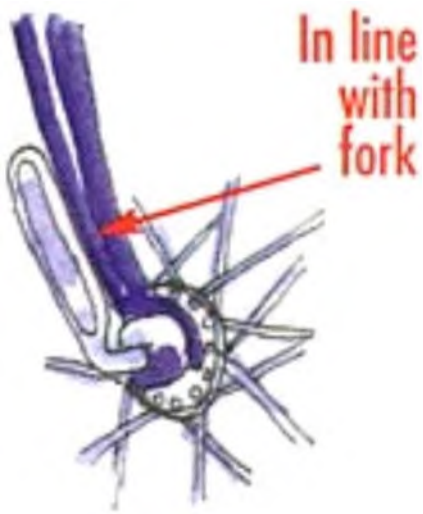

Figure 8 Quick Release Correct Position

Note. From *Young Cyclists Guide* by Ministry of Transportation Ontario, 2005, Copyright 2005 by Government of Ontario. Retrieved November 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Is the saddle quick release working?

Open and close the lever to ensure that it is in good working order. It should be easy to open and close. If not, lubricant should be applied. When closed the lever should be flush with the seat post, pointing towards the back of the mountain bike.

Final Check

Finally, the mountain biker should complete a final check of their mountain bike. The mountain bike should be lifted five to seven centimetres (two to three inches) off the ground and then dropped in a controlled manner. When it drops the mountain biker should be listening for sounds associated with loose parts (clings / clangs / pings).

IDENTIFY SAFETY PERCAUTIONS WHICH MUST BE ADHERED TO WHEN MOUNTAIN BIKING

Keeping safe on mountain bikes is part common sense and part informed risk-taking, together with a healthy dose of good judgment. Preventing injuries is far easier than seeking medical attention after the fact. Following basic trail and road safety rules will ensure that the ride is safe, not only for the mountain biker but for all trail users.

Investigate the specific rules and regulations associated with mountain bike safety for your province or territory to pass along to cadets in conjunction with the material presented in this TP.

Each province and territory has specific rules and regulations in relation to mountain bike safety. Bikes are the smallest vehicles on the road which makes it very important for mountain bikers to be as visible as possible to other road users at all times.

Rules of the Road

Each province has specific rules of the road which form laws within the province. In Ontario, these rules are stated in the *Highway Traffic Act* (HTA).

Some important rules that cyclists should know are:

- A mountain bike is a vehicle and as a cyclist, the same rights and responsibilities apply as to other road users.
- Stop at red lights and stop signs, and travel in the designated direction on one-way streets.
- A mountain bike is a slow vehicle and must travel as far to the right as possible, except when preparing for a left turn or passing. Ride out from the curb far enough to maintain a straight-line path.
- Never compromise safety for the convenience of a motorist; use any part of a lane if the safety of the mountain biker requires it.
- Stop for pedestrians at crosswalks, and walk the mountain bike across crosswalks.
- Stop for school buses when the upper red lights are flashing and the stop arm is out.
- Stop 2 m (6.5 feet) behind streetcar doors and wait until the passengers have boarded or reached the curb.
- Do not attach a mountain bike to a vehicle to hitch a ride.
- Do not ride on expressways, freeways or on roads where "No Bicycle" signs are posted.
- Mountain bikers must correctly identify themselves when stopped by the police for breaking traffic laws.

Signalling

When riding a mountain bike on the road it is important to ensure that drivers of motor vehicles are aware of the biker's direction of travel at all times. Making a surprise turn in front of a car is dangerous to both the mountain biker and the driver. Demonstrating proper hand signals will help to eliminate some of the risk associated with riding a mountain bike on roadways.

Figure 9 Hand Signals

Note. From *Young Cyclists Guide* by Ministry of Transportation Ontario, 2005, Copyright 2005 by Government of Ontario. Retrieved October 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Riding Discipline

Whether riding a mountain bike on the side streets of town or on a double track in a conservation area, demonstrating awareness for the other mountain bikers will ensure that everyone has a safe ride. Ride discipline is a multi-faceted term that coincides with a variety of aspects of mountain biking, from personal and group organization, to stopping and starting procedures.

Riding in a group is one of the safest ways to ride. It is important to remember that each mountain biker is responsible for the person following them. Always have visual contact with the mountain biker behind. If, when looking back, the other mountain biker is not visible, stop and wait for a moment. If the mountain biker does not appear in a reasonable amount of time, call a halt to the mountain bikers ahead, and go back and look for the other mountain biker.

There are a few safety tips to keep in mind when travelling in groups:

- Ride in single file on roads and trails as much as possible.
- The lead mountain biker must communicate turns, obstacles and changes in momentum to the remainder of the group through hand signals and voice commands.
- Keep at least 1 m (3.2 feet) between mountain bikers in the group on flat ground.
- When descending hills, keep at least 3 m (9.8 feet) between mountain bikers.
- When ascending hills, stay in single file and keep to the right.
- When stopping, ensure the entire group is completely off the trail or road.
- When stopped, all group members should get off their mountain bikes, turn mountain bikes so they are facing the road, close in ranks and stand to the left of their mountain bikes.
- If travelling on roads in a large group, break into smaller groups of about 10 with at least 1 km (0.62 miles) between each group to allow traffic to pass.
- Road crossings should be completed with the group lining up parallel to the other side of the road and then, in line, walking their mountain bikes across.

PERFORM MOUNTAIN BIKE SKILLS

Braking

Braking is used not only for stopping, but for slowing down and controlling the mountain bike on roads and trails. It is important for a mountain biker to be able to judge the amount of pressure to use and when to brake for various situations while on the roads and trails. This knowledge will ensure personal safety as well as the safety of other mountain bikers and trail users.

The left-hand brake lever controls the front brake while the right-hand lever controls the rear. Most braking is completed by the right hand, rear brakes, with the left adding assistance as required.

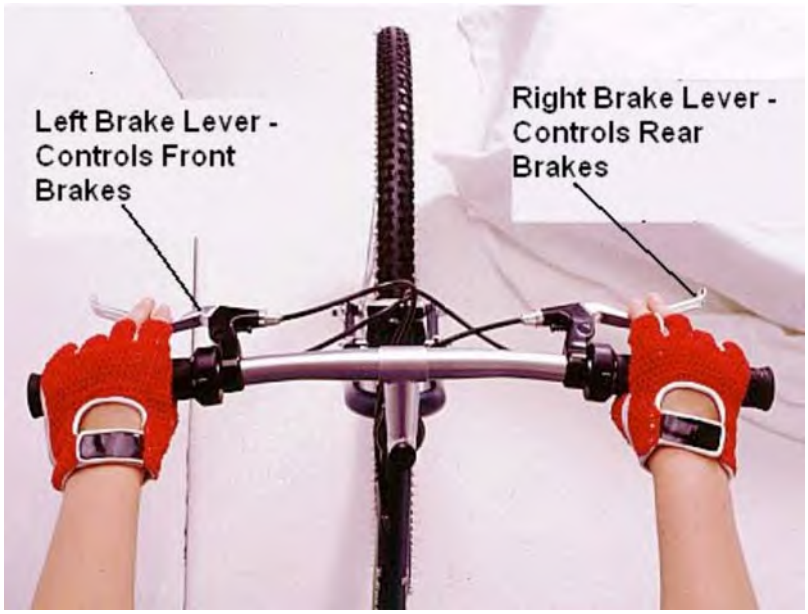

Figure 10 Braking Hand Position

Note. From *Sports, Games, Recreation, Mountain Biking* by DK Images, 2007, Copyright 2007 by DK Limited. Retrieved November 5, 2007, from http://www.dkimages.com/discover/Home/Sports-Games-Recreation/Outdoor-Adventure/Mountain-Biking/index.html

Riders should be cautioned against using the left brake lever by itself. While this will stop the mountain bike, the forward momentum may cause the mountain biker to continue over the front of the handlebars and mountain bike, resulting in a possible injury.

Shifting Gears

Terrain can change quickly when mountain biking. The ability to time a perfect gear shift is a crucial mountain bike technique to master. Smooth shifting makes the difference between a smooth, easy ride and a rough, hard ride. Gear components are equipped with pre-set gears and ramps built into the chainrings and cogs to help the chain move smoothly from one to another. The mountain biker has to shift to the correct gear at the appropriate time.

Gearing adjusts the pedalling load so the mountain biker can adapt to changes in terrain. A gear is described by the number of teeth on the sprocket that is being used.

Gear Ratio

The gear ratio is the relationship between the front chainring and the rear cassette being used. If the chainring and the cog have the same number of teeth the rear wheel would turn once for every pedal stroke and the ratio would be 1 : 1. If the chainring has more teeth than the cog, for example, 34 versus 17, then the ratio would be 2 : 1 and the rear wheel would revolve twice for every pedal stroke. There can also be negative gear ratios where the rear cog has more teeth than the smallest chainring, which makes the rear wheel turn slower than the pedal stroke.

Figure 11 Front Chainset and Rear Cassette

Note. From *Sports, Games, Recreation, Mountain Biking* by DK Images, 2007, Copyright 2007 by DK Limited. Retrieved November 5, 2007, from http://www.dkimages.com/discover/Home/Sports-Games-Recreation/Outdoor-Adventure/Mountain-Biking/index.html

Typically, mountain bikes have two or three chainrings in the front and seven to nine cogs in the back. Each of these sprockets is attached to a numerical value, which corresponds to the numbers on the gear-shifting mechanism attached to the handlebars.

Chainset

The chainset is numbered one through three. The biggest chainring in the chainset—three—is located on the outside of the set while the smallest chainring in the chainset—one—is located on the inside of the set.

The biggest chainring in the chainset is used for flat terrain, high speeds, downhill and road pedalling. The middle chainring in the chainset is for most off-road situations including single track, small hills and bumpy downhills. The smallest chainring in the chainset is used for steep uphills and very difficult technical terrain.

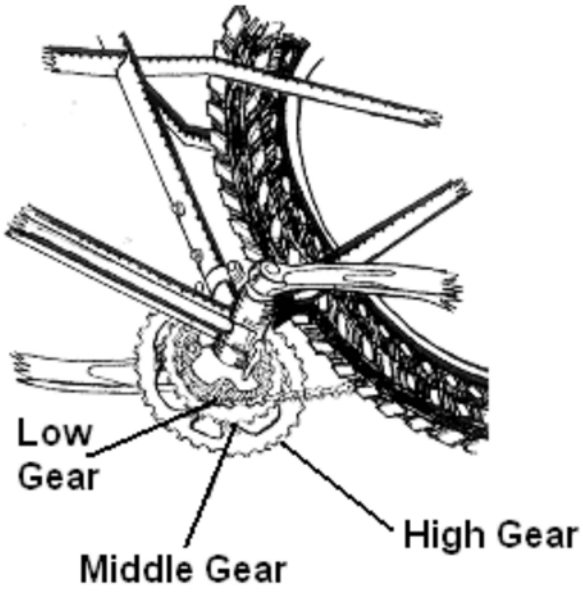

Figure 12 Front Chainset

Note. From *Your First Mountain Bike Moves: Shifting Gears* by Gorp, 2007, Copyright 2007 by Orbitz Away LLC. Retrieved November 7, 2007, from http://www.gorp.away.com/gorp/publishers/menasha/how_ride5.htm

Cassette

The cassette is numbered one through nine from the inside, closest to the frame, to the outside. The inside cogs, the larger sprockets, equal the low and easiest gears which are primarily used to climb hills and when traversing uneven terrain. The outside, smaller sprockets, equal the highest and hardest gears which are used to gain speed on flat terrain.

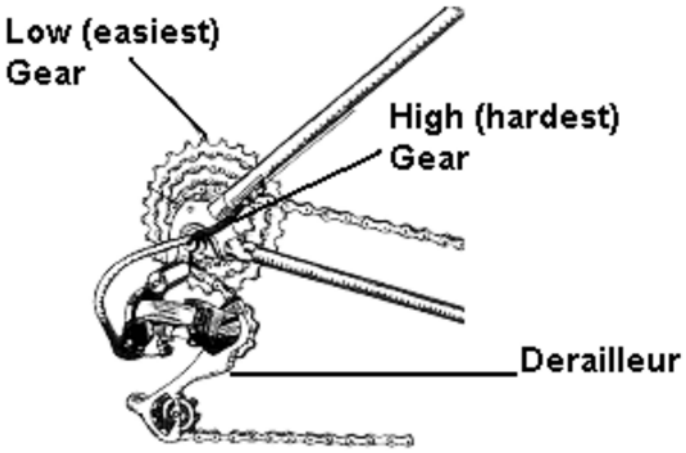

Figure 13 Rear Cassette

Note. From *Your First Mountain Bike Moves: Shifting Gears* by Gorp, 2007, Copyright 2007 by Orbitz Away LLC. Retrieved November 7, 2007, from http://www.gorp.away.com/gorp/publishers/menasha/how_ride5.htm

The mountain bike chain should never be in the big rings on the front and rear at the same time. It places an enormous amount of tension on the chain as it moves the chain from a straight to a diagonal line.

Shifting Gears

As with braking, the left gear shifter controls the chainrings on the front chainset, while the right gear shifter controls the cogs on the rear cassette. When the gear shifter is pushed, the derailleur, front or rear, will move the chain from one sprocket to another.

Figure 14 Right Gear Shifter

Note. From *Suspension Mountain Bikes* by 2 Wheel Bikes. Retrieved November 7, 2007, from http://www.2wheelbikes.com/suspension-mountainbikes/sm3000-mountain-bike.html

All mountain bike gears are indexed, which means they are pre-set and will click into place when the gear lever is activated. Most mountain bikes have a visual indicator on both sides, which shows what gear the mountain bike is in.

Pushing the gear shifter moves the chain onto a bigger chainring or cog, because the movement is against the spring tension in the derailleur. The mountain biker will have to push the lever further than the resting point so that the chain can make it onto the bigger chainring or cog. This is done with the mountain biker's thumb, because it is stronger than the index finger.

Changing to the smaller chainrings or cogs is an easier motion because the lever is releasing the spring tension, letting the derailleur fall naturally into position. These gear changes are completed using the mountain biker’s index finger to pull the lever forward.

It is possible to change more than one gear at a time. This is done through either a series of several clicks or one movement depending on the type of gear shifting mechanism the mountain bike uses.

There are several important points to remember when gearing:

- Gears cannot be changed if the pedals are not moving.
- Cogs are used for small changes in speed, like when the mountain biker is climbing a long steady hill.
- Chainrings are for bigger changes in speed, such as descending the summit of a hill.
- The ideal gear to begin biking is somewhere in the middle of the cassette, four or five, and the middle chainring.

Ascending Hills

Climbing hills is a challenge when mountain biking and the mountain bike has been specifically designed to meet this challenge. Its broad, knobby tires, the position of the mountain biker over the back wheel and the increased number of gears give the mountain bike the technical ability to ascend hills.

A mountain bike can handle inclines close to 45 degrees on badly broken ground.

Being able to ascend a hill is influenced by two factors—balance and power. Balance is gained through awareness and practice, while power is gained through repetition of the skill and muscular and cardiovascular strength.

The following are factors that affect the mountain biker's technique while attempting to ascend a hill.

Position. The centre of gravity of a mountain bike and the mountain biker is located at the mountain biker's abdomen. When climbing a hill, the centre of gravity must move forward on the mountain bike to enable the mountain biker to keep their balance. The mountain biker should pull their body weight forward on the mountain bike as the climb gets steeper, otherwise the front tire will not have enough weight on it and will lift up, resulting in a fall.

Centre of gravity is the point where all the weight of an object is concentrated.

Figure 15 Proper Ascent Position

Note. From *The Complete Mountain Bike Book* (p. 51), by T. Brink, 2007, Camden, ME: Ragged Mountain Press. Copyright 2007 by New Holland Publishers Ltd.

While it may seem easier to stand up from the saddle when climbing hills, it in fact requires more power and expends more of the mountain biker's energy. Keeping the body low and forward on the saddle is a much more effective climbing position.

Gearing and Shifting. Depending on the steepness of the hill, it is acceptable to have the front chainset on the middle chainring, index two. The rear cassette is more dependent on the grade of the hill. It is advisable, when approaching a hill to begin shifting down into a medium-intensity gear, perhaps four or five. Once the mountain biker has begun the ascent they will have to continue to lower the cogs in relation to their ability to maintain pedal power. Remember that in order to change gears, the pedals have to be moving and the more steep the incline, the harder it will be to pedal.

Descending Hills

Descending is about letting gravity do the work, while the mountain biker concentrates on braking and distributing weight. It becomes a combination of balance and applying the brakes at the correct time. Riders must always think ahead and be aware of rough terrain, corners, obstacles and other mountain bikers that may be on the trail. It is critical to apply the brakes enough to move around or by disturbances but not too much to avoid completely losing the momentum from the hill.

Position. When descending a hill it is critical that the centre of gravity of the mountain biker does not fall more than halfway down the top tube of the mountain bike. If it does, the mountain biker may go over the handlebars. The mountain biker should move their body weight toward the back of the mountain bike, be as low as possible and extend their arms so they are almost straight in front of them. Depending on the steepness of the hill, the mountain biker may want to slide their bottom off and behind the saddle for further stability.

Figure 16 Proper Descent Position

Note. From *Suspension Mountain Bikes* by 2 Wheel Bikes. Retrieved November 7, 2007, from http://www.2wheelbikes.com/suspension-mountainbikes/sm3000-mountain-bike.html

Gearing and Shifting. Gearing and shifting are not as critical when descending hills as they are in ascending hills. The key thing to remember is that descending hills provides momentum, and speed must be maintained once the hill has ended. To do this, think ahead and shift into gears that will provide the most momentum. The

front chainset should be in the biggest chainring and the rear cassette should be in the highest gear, eight. It may be necessary to shift to lower gears once the momentum from the hill begins to slow and pedalling gets harder.

Speed must be controlled when descending hills, with the mountain biker applying equal brake pressure, as required, on both the front and rear brakes. The mountain biker's hands must remain on the brake levers for the duration of the descent and should be ready to brake at all times.

DISCUSS MOUNTAIN BIKING ON INTERMEDIATE TRAILS

Mountain bike trails are classified by mountain biking organizations. The mountain biking community has been very persistent in establishing consistent criteria for the rating of all types of mountain bike trails—multi-use, single-use, double track and single track.

The International Mountain Bicycling Association (IMBA) developed a basic method to categorize the technical difficulty of recreation trails. The system was adapted from the International Trail Marking System used at ski areas throughout the world.

The IMBA Trail Difficulty Rating System has been created to:

- help trail users make informed decisions;
- encourage visitors to use trails that match their skill level;
- manage risk and minimize injuries;
- improve the outdoor experience for a wide variety of visitors; and
- aid in the planning of trails and trail systems.

Mountain bike trails, in accordance with the IMBA Trail Difficulty Rating System have been divided into three categories based on trail width, trail surface, trail grade, obstacles and technical features.

The CCM has developed its own rating system that combines similar categories of the IMBA—familiarization trails, intermediate trails and advanced trails.

Intermediate trails. Intermediate trails are defined as having some loose surface with minor obstacles such as roots and rocks with a variety of moderate hills that require skills to ascend and descend. Intermediate trails conform to the IMBA category of "More Difficult".

Part of the attraction of mountain biking on intermediate mountain bike trails is the unpredictability of terrain and the obstacles that may be encountered. The following riding considerations should be considered and implemented by the mountain biker when riding on intermediate trails:

- body position,
- speed, and
- control.

Adopt the Appropriate Body Position

A mountain biker's body position is a key factor to successfully mountain bike on intermediate trails. In most cases, body position is dependent on the successful manipulation of the mountain biker's centre of gravity in relation to the type of terrain being ridden on and the obstacles that are being crossed.

Centre of gravity. The point where all the weight of an object is concentrated. The centre of gravity of a bike and the rider is located at the rider's abdomen.

Have the cadets stand with their feet shoulder width apart, locate their navel (belly button) and lean over like they are riding a mountain bike. Have them move from side to side and front to back in the riding position to see how their balance changes as their centre of gravity shifts locations. They may need a partner for this activity.

Adopting the correct position when mountain biking can mean the difference between getting over an obstacle and falling off the mountain bike. Mountain bikers use a standard 'attack' or 'ready' position when mountain biking and adjust it as required depending on the terrain / obstacle being crossed. The attack or ready position is:

- elbows bent and out,
- head up,
- chin low,
- centre of gravity low, and
- seat hovering over the saddle.

Regulate Speed

To successfully traverse the obstacles and varied terrain found on intermediate trails a mountain biker must be able to understand and effectively regulate their speed. Momentum is an ally—without it, riding over rocks / logs / roots / mud would be virtually impossible. Many new mountain bikers, who have low levels of confidence and skill, will slow down as they approach an obstacle—this is due to fear—however, if they keep their speed constant or even a bit faster, they would be able to tackle the obstacle successfully. Speed is controlled by efficient braking and gearing. These two skills are developed through practice and experience.

Braking. Understanding the finer nuances of how the brakes—front and rear—work when engaged together is an important facet of riding on intermediate mountain bike trails.

Gearing. Gearing is a skill that is driven by each individual mountain biker, depending on skill, physical ability and strength. Knowing personal gear efficiencies is critical when traversing over obstacles and varied terrain.

Maintain Control

To ensure safety when mountain biking on intermediate trails, a mountain biker must always be in complete control. Control is maintained by:

- being aware of centre of gravity and adjusting body position accordingly;
- keeping a loose but firm grip of the handle bars; and
- keeping the head up—looking ahead to where the mountain biker wants to go.

Looking up and ahead is one of the hardest skills for mountain bikers to master. At first it feels unnatural, however, looking ahead and not at the ground or object that is being ridden over will ensure success.

TERRAIN AND OBSTACLES THAT MAY BE ENCOUNTERED ON INTERMEDIATE TRAILS

Mountain bikers must be aware of the different types of terrain and obstacles they may encounter when riding on intermediate trails because this will ensure they are well prepared to execute the appropriate mountain bike skill in order to ride over / cross that section of terrain or obstacle.

Terrain

The *Canadian Oxford Dictionary* defines terrain as ground or a track of land, focusing on its physical characteristics and / or its capacity for use.

The following is a list of the different types of terrain a mountain biker may encounter and be required to travel over when mountain biking on intermediate trails:

- grass,
- mud,
- sand,

As soon as sand becomes more than a couple of centimetres (inches) deep, mountain biking feels like riding in molasses.

- water, and
- gravel.

One of the hardest surfaces to ride a mountain bike across is a grassy meadow without a marked trail. River and stream crossings can be dangerous depending on their depth and should only be crossed at the shallowest point. When crossing, push the mountain bike rather than ride it.

Obstacles

The *Canadian Oxford Dictionary* defines an obstacle as a person or thing that obstructs progress.

The following is a list of the different obstacles a mountain biker may encounter and be required to travel over when mountain biking on intermediate trails:

- rocks,
- roots,
- logs,
- ruts,
- crevices, and
- potholes.

Dry rocks present few difficulties for mountain bikers—they require skill in order to tackle them effectively without losing momentum—but moss and rain make riding a very unpredictable experience. Wet or mossy rocks remove traction and can turn a wheel in the opposite direction from where the mountain biker intended. Roots are slippery when dry and dangerous when wet.

MOUNTAIN BIKE ON DIFFERENT TYPES OF TERRAIN

Part of the attraction of mountain biking on off-road trails is the unpredictability that these types of trails offer. A good mountain bike trail will combine a variety of different types of terrain—grass, mud, sand, water and gravel—that will challenge the mountain biker from start to finish. Many mountain bikers hate to be unseated from their mountain bike and hate to walk their mountain bikes. Knowing the intricacies for mountain biking over different types of terrain will limit the occurrences of such events.

Grass

Grass is a constantly changing surface that a mountain bike will react differently to depending on if it is new, worn, dry or wet. A mountain biker will have to adapt their riding technique to suit the conditions. On short, dry grass a mountain bike's tires can grip well and the mountain biker will have little difficulty controlling their mountain bike. However, tire grip will be affected as grass becomes worn and / or wet.

Mountain biking on worn or wet grass is difficult, as the tires' ability to grip the ground is diminished. The following considerations should be taken into account:

- stay in the saddle when ascending hills;
- select a medium to low gear to prevent wheel spin;
- brake lightly; and
- be aware of ruts as they will be slippery and may contain water and holes that cannot be seen.

Mud

Mud is a type of terrain that mountain bikers look forward to and dread at the same time. Compared to dry trails, mud is harder to mountain bike on / through and requires strong mountain bike skills in order to make the ride more manageable, quicker and enjoyable. Mountain bike tires have significantly less grip / traction when going through mud than when on dry trails. Mud slows down the mountain bikers' speed and momentum and clogs up the gears and brakes.

The following considerations should be kept in mind when mountain biking in mud:

- If possible release some air from the tire; this will provide a larger surface area to grip with.
- Keep all actions as smooth as possible.
- Stay seated in the saddle.
- Move the centre of gravity towards the middle of the mountain bike (over the bottom bracket).
- Shift into a low gear (eg, 1 : 4, 1 : 6, 2 : 3, 2 : 4).

Bottom bracket. The bottom bracket is the axel bearing around which the pedals and cranks turn to move the chain.

Sand

Sand is an extremely difficult surface to mountain bike on. Sand is common in coastal areas, but can also be found on inland trails. In dry weather, sand can be found on eroded and well-used trails. Sand is a very loose substance and as such provides nothing for the tires to dig into and severely limits traction, affecting momentum. Mountain bikers must ensure they do not sink in the sand or lose speed in order to make it through the section.

The following considerations should be kept in mind when mountain biking on sand:

- When approaching a section of the trail with sand, look for and follow an already established path.
- Approach the sand with a significant amount of speed.
- Keep the weight off the front wheel by moving the centre of gravity towards the middle of the mountain bike (over the bottom bracket).
- Shift into a medium gear (eg, 1 : 6, 2 : 4, 2 : 5).
- Pedal as smoothly as possible to stop the wheels from spinning.
- Keep the handlebars as straight as possible, using the shoulders and upper body to guide the mountain bike rather than steering it.

Water

There is always a chance that a mountain biker will have to cross some type of water on the trail. Water can be anything from a large puddle to a small creek or stream to a large river. When mountain biking over large rocks covered in water, it is best to aim directly for the stream of water as this will be the cleanest, least slippery section.

The following considerations should be kept in mind when mountain biking through water:

- Approach the water at a medium to high speed to ensure momentum is maintained throughout the crossing.
- Be aware that under the water could be loose and slippery.
- Keep a loose but firm grip on the handlebars—executing smooth controlled movements.
- Move the centre of gravity toward the middle of the mountain bike (over the bottom bracket).
- If the depth of the water is unclear get off the mountain bike and push / carry the mountain bike.

Figure 17 Mountain Biking Through Water

Note. From *Sports, Games, Recreation, Mountain Biking* by DK Images, 2008, Copyright 2008 by DK Limited. Retrieved November 20, 2008, from http://www.dkimages.com/discover/Home/Sports-Games-Recreation/Outdoor-Adventure/Mountain-Biking/index.html

In some cases, tackling difficult terrain is easier on foot than on the mountain bike. A mountain biker needs to be aware that this is a possibility and make the decision based on their own skill level and the type of terrain that they are crossing.

The following process should be used to shoulder carry a mountain bike:

1. Stand beside the mountain bike.
2. Keep the mountain bike steady by putting the left (right) hand on the handlebars.
3. Bend at the knees and crouch to put the right (left) arm through the frame.
4. Stand up, with the top tube resting on the right (left) shoulder.
5. Keep the mountain bike steady by holding either the stem or the handlebars.
6. Use the opposite arm as a counterweight to balance while walking or running.

Gravel

Gravel is generally an unpredictable surface to mountain bike on. It usually forms in patches and it is very hard to see and / or determine its depth. The best way to tackle gravel is to avoid it—available alternatives should be taken.

On well-used trails, gravel usually gets pushed to the outside portion of the trail. This allows the mountain biker to avoid the gravel as long as they stay to the middle of the trails.

If a mountain biker must ride through gravel, it is important that they keep movements and actions smooth and controlled—sudden changes in direction and hard braking can cause the wheels to slip and the mountain biker to crash.

PERFORM ADVANCED MOUNTAIN BIKE SKILLS

Falling Off a Mountain Bike

There is a right and wrong way to fall off a mountain bike. When a person falls their natural instinct is to stick out their arm and try to break the fall. This method does not work and usually causes injury to one or more of the following: thumb, finger, hand, arm, and / or collar bone.

To fall correctly, execute a shoulder roll by:

1. pushing the mountain bike away from the body;
2. tucking the arms and head in towards the chest;
3. hitting the ground with the shoulder first; and
4. rolling over.

Log Hops

The most useful skill a mountain biker can have is getting air—being able to lift the wheels off the ground either one or both at a time. Momentum is one of the main reasons a mountain biker would want to lift their front wheel off the ground. Any time the front wheel of the mountain bike hits an obstacle while on the trail, momentum will be lost which will slow down speed.

Many beginner mountain bikers will attempt to lift the front wheel by simply yanking up with their arms. While this method does work, it is not highly effective as the front wheel will only lift marginally off the ground as there is only a small range of motion before the mountain bikers hands hit their chest.

The process to complete a log hop is as follows:

1. Adopt the attack position.
2. Shift the mountain bike into a medium gear (eg, 2 : 5 or 2 : 6).
3. Pedal toward the obstacle at a medium speed and at a right angle.

It is sometimes difficult for a mountain biker to judge when they should begin to execute a skill such as a log hop. A good rule of thumb is to begin the skill at a distance equal to the obstacles height. For example, if the obstacle is 15 cm (6 inches) high then, the mountain biker should begin to execute the skill approximately 15 cm (6 inches) from the obstacle.

4. Adjust body position, approximately one metre (one yard) away from the obstacle by:
   a. stopping pedalling;
   b. moving the pedals so they are horizontal;

Pedals are horizontal when they are in the 3 o'clock and 9 o'clock position.

c. sitting down on the saddle; and

d. shifting the body weight toward the rear of the mountain bike.

5. Lift the front wheel just before reaching the obstacle by:

a. pedalling one half turn;

b. compressing the body toward the ground by pushing down on the front fork and front tire;

c. pushing the hips backwards to shift the centre of gravity;

d. straightening up and pulling up on the handle bars in one fluid motion, while squeezing the saddle with the inner thighs; and

e. moving the weight toward the rear wheel to lift up the front wheel.

Step 5 should happen almost simultaneously. Correct timing is critical when attempting to execute a log hop.

6. Place the front wheel on the obstacle.

7. Stand up on the pedals and move the body weight over the handlebars to transfer the centre of gravity from the rear of the mountain bike to the front.

8. Push forward on the handlebars and allow momentum and pedalling action to roll the mountain bike over the obstacle.

9. Move the body weight toward the rear of the mountain bike as soon as the front wheel hits the ground.

10. Allow the back wheel to roll off the obstacle.

11. Continue mountain biking forward.

Figure 18 Log Hop

Note. From *Sports, Games, Recreation, Mountain Biking* by DK Images, 2008, Copyright 2008 by DK Limited. Retrieved November 20, 2007, from http://www.dkimages.com/discover/Home/Sports-Games-Recreation/Outdoor-Adventure/Mountain-Biking/index.html

Cornering

Cornering is a skill that all mountain bikers will be required to execute on a trail. Mountain bikers will turn corners when riding over grass, on loose gravel, in ruts, on steep downhills or during sharp ascents. Wherever the corner is, it is important to steer the bike around the corner safely and without losing their momentum.

There are three essential elements associated with cornering:

- plotting a line;
- controlling the speed; and
- looking ahead.

A corner can be divided into three main parts:

- entry,
- apex, and
- exit.

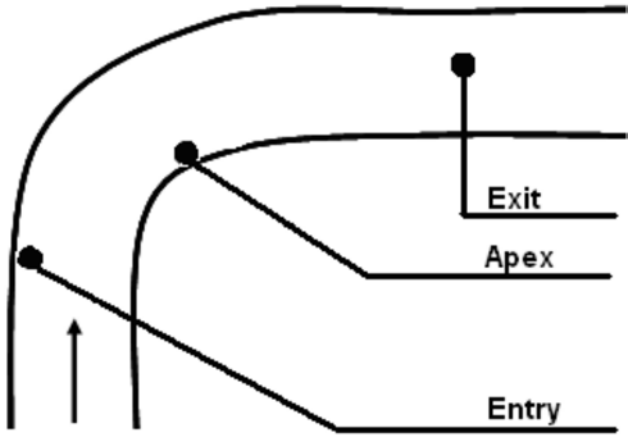

Figure 19 Parts of a Corner

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Types of corners:

Bermed corner. A bermed corner is also known as a banked corner. The outer perimeter of the corner may be raised too steeply.

Off-camber corner. An off-camber corner is the opposite of a bermed corner. The top of the slope is on the inside and slopes down to the outside of the curve.

Flat turn. A flat turn is the most common type of corner. There are no raised embankments on either side of the corner.

Decreasing radius corner. A decreasing radius corner gets narrower and tighter as it turns. Usually this type of corner is also off-camber.

Increasing radius corner. An increasing radius corner gets wider as it turns.

Plotting a Line

The standard approach to plotting a line is:

1. Approach the corner on the outside.
2. Shift to the inside at the apex of the corner.
3. Move to the outside to exit the corner.

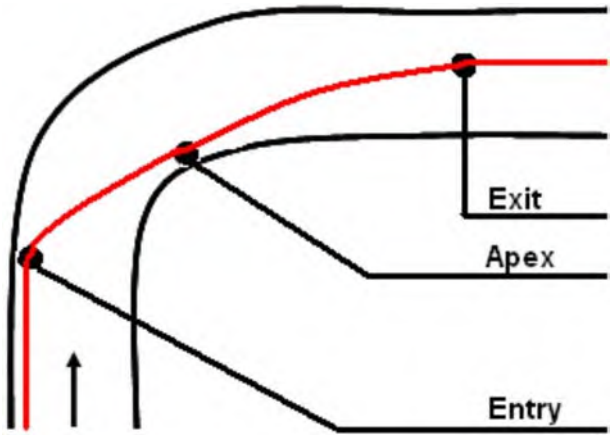

Figure 20 Plotting a Line

Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Controlling Speed

When cornering, all the braking should be completed before starting to turn. This is done because it allows the mountain biker to concentrate on exiting the corner. Braking in a straight line is far safer than braking on a corner—a locked rear brake in a corner will slide unpredictably possibly causing a crash.

It is recommended to use the front brakes as much as possible when cornering. It offers more power and control as the mountain biker's weight shifts forward during the turn.

Looking Ahead

It is in people's nature to want to look at the obstacle that they are attempting to steer around and try to avoid it. However, when cornering, the mountain biker should look ahead to where the mountain bike is going and ignore the obstacle. This will allow the mountain biker to look further into the corner and allow their mountain bike to follow the line that has already been established.

Use the following process when cornering:

1. Prepare for the corner by:
    a. plotting the line;
    b. engaging the front brakes to slow the mountain bike down; and
    c. shifting into the appropriate gear for the exit, in order to ensure speed is maintained.
2. Execute the corner by:
    a. keeping the fingers over the brake levers, applying them as necessary;
    b. balancing the body between the handlebars and the saddle;
    c. moving the inside pedal to the 12 o'clock position;
    d. pushing the weight of the body onto the outside leg;
    e. bending the inside elbow to pull the body weight forward and inward;

f. bending the inside knee; and

g. pressing down on the straight outside leg.

3. Pedal once the corner has been turned.

Figure 21 Body Position When Cornering

Note. From *Sports, Games, Recreation, Mountain Biking* by DK Images, 2008, Copyright 2008 by DK Limited. Retrieved November 20, 2008, from http://www.dkimages.com/discover/Home/Sports-Games-Recreation/Outdoor-Adventure/Mountain-Biking/index.html

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ACTIVITY

Time: 270 min

OBJECTIVE

The objective of this activity is to have the cadets, in teams of no more than six, mountain bike on familiarization / intermediate trails, for 40–50 km, during an expedition.

RESOURCES

- Fully equipped mountain bike (one per cadet),
- Personal mountain bike equipment (one per cadet), and
- Group mountain bike equipment (one per team).

ACTIVITY LAYOUT

Designate a familiarization / intermediate mountain bike trail(s), IAW A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing to include an explanation of:
    a. the objectives and importance of the activity,
    b. the resources that may be required to perform the activity, and
    c. any safety guidelines that must be followed while performing the activity.
2. Have the cadets retrieve their mountain bikes and helmets.
3. Have the cadets conduct a pre-ride bike check.
4. Explain and demonstrate the following advanced mountain bike skills, to include:
    a. log hops, and
    b. cornering.
5. Have the cadets, in teams of no more than six, ride a mountain bike on familiarization / intermediate trails, following the designated route for a distance of 40–50 km during an expedition, to practice:
    a. following road / trail safety regulations;
    b. braking;
    c. shifting gears;
    d. ascending hills;
    e. descending hills;
    f. log hops; and
    g. cornering.
6. Upon arrival at the end point, have the cadets complete a post-ride check and then store / return all equipment.
7. Conduct a debriefing by asking the cadets:
    a. how they felt about the activity;
    b. how they felt their team worked together;
    c. what portion of the activity challenged them the most;
    d. how their teammates assisted them when they were challenged;
    e. if there are any specific examples of when their team bonded;
    f. how the team made decisions;
    g. whether or not all team members ideas / suggestions were considered; and
    h. what they would do as a leader of this type of activity to ensure their subordinates enjoyed the experience.

SAFETY

- Each team will be led by the assigned team leader.
- Team Instructor(s) [TIs] must be in sight / sound of the team at all times.
- In areas of complex / technical terrain TI(s) will demonstrate requisite skills as required.
- Teams will travel separately on the same trail.
- There will be a minimum of 500 m between teams at all times.
- Each team will have a cadet positioned at the rear wearing a reflective vest.
- Cadets must travel in single file at all times.
- Cadets must ensure there are at least two mountain bike lengths between them and the person to their front and rear.
- Cadets must carry at least 1 L of water.
- Water re-supply points will be located along the route.
- Meals will be provided at a pre-determined location(s) and detailed in the route instructions.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in riding a mountain bike will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 426 PC.

CLOSING STATEMENT

Mountain biking is a fun and challenging mode of transport that can be used during expeditions. It is critical to understand the importance of maintaining a mountain bike and riding it safely. Being able to perform mountain bike skills will allow for an enjoyable and safe experience when mountain biking.

INSTRUCTOR NOTES / REMARKS

Expedition centres are required to select two dynamic modes of travel from EO M426.02a (Paddle a Canoe), EO M426.02b (Ride a Mountain Bike), EO M426.02c (Hike Along a Route), EO M426.02d (Snowshoe Along a Route) and EO M426.02e (Ski Along a Route) to incorporate into the expedition training.

This EO has been allocated nine periods in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources at the expedition centre.

Upon arrival at the expedition centre, cadets will be divided into teams. Cadets will be given an opportunity to navigate and lead peers. These teams will remain the same for the duration of the weekend.

IAW A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*:

1. a fully equipped mountain bike is described as having the following:
    a. bell or horn,
    b. lights, and
    c. reflectors;
2. the following personal mountain bike equipment is required when riding a mountain bike:
    a. helmet,
    b. water carrier,
    c. day pack, and
    d. whistle; and
3. the following group mountain bike equipment is required when riding a mountain bike:
    a. reflective vest (worn by person in rear of group),
    b. topographical / trail map of area as required,
    c. compass,
    d. first aid kit,
    e. communication device (eg, cellular phone or hand-held radio),
    f. GPS receiver, and
    g. mountain bike repair kit, to include:
        (1) spare tube,
        (2) tube patch kit,
        (3) tire levers,
        (4) bike multi-tool, to include:
            (a) 2-, 2.5-, 3-, 4-, 5-, 6- and 8-mm hex keys,
            (b) chain tool,
            (c) flat screwdriver,
            (d) Phillips screwdriver,

(e) T-25 Torx spoke key,

(f) spoke wrenches, and

(g) 8- and 10-mm open wrenches; and

h. mini pump with gauge.

Ensure each cadet has a day pack and an ample supply of water when mountain biking.

A mountain bike cleaning kit is comprised of the following items:

1. bucket,
2. hand brush,
3. cleaning cloth,
4. sponge,
5. small brush,
6. stiff brush,
7. dish soap, and
8. lubricant.

REFERENCES

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 4

EO M426.02c – HIKE ALONG A ROUTE

Total Time: 270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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.

Every cadet must have a water carrier prior to the start of this lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

The experiential approach was chosen for this activity as it allows the cadet to acquire new knowledge and skills through a direct experience. The cadet experiences hiking on Class 3 terrain during an expedition and defines that experience on a personal level. The cadet will be given the opportunity to reflect on and examine what they saw, felt and thought while hiking and consider how it relates to what they already learned and experienced as well as how it will relate to future experiences.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have hiked 10–15 km along a route with some Class 3 terrain , during an expedition.

IMPORTANCE

It is important for cadets to be able to hike along a route that contains Class 3 terrain so they will be prepared for the technical challenges if / when given the opportunity to participate in more advanced level expeditions. Hiking is not just about walking along a trail or predetermined route; it requires the individual to be aware of their surroundings, their limitations and the limitations of the group they are travelling with. Knowing what to do when an obstacle is on the route is critical for everyone's safety. As well, having a basic knowledge and understanding of techniques such as the "rest step" will make the hike more enjoyable for all members.

Teaching Point 1 **Participate in hiking familiarization.**

Time: 270 min Method: Experiential Learning

BACKGROUND KNOWLEDGE

The TP for this lesson will be presented during hiking familiarization training. Some material may be presented prior to departure, with the remainder being incorporated into teachable moments and breaks throughout the route. Cadets will have been introduced to many of the theoretical concepts; this activity will provide them the opportunity to put into practice what they have already learned.

THE DIFFERENCE BETWEEN HIKING, TREKKING AND BACKPACKING

Hiking is an activity of vigorous walking in the outdoors / wilderness on an unpaved trail, either on a path or navigating along an unmarked route. Usually day hikes consist of travelling cross-country over different terrains, sometimes with inclines and declines. It provides individuals the opportunity to travel to destinations that could not, in many cases, be seen any other way.

The aim of hiking is to learn skills beneficial to physical health. It offers an alternative learning environment and allows participants to explore the outdoor surroundings. For individuals who have never participated in hiking activities, it can be quite challenging. However, it can also offer a challenge to experienced hikers by varying the location / terrain of the hikes.

Trekking is a journey over long distances over several challenging days. Usually trekking involves terrain that requires crossing obstacles.

Hiking becomes backpacking when equipment is carried for an overnight stay.

PERSONAL CLOTHING AND EQUIPMENT FOR HIKING

Clothing

Clothing for the outdoors is slightly different than everyday clothing, yet everyone has clothing at home they can wear outside. When choosing clothing for outdoors, consider clothing that:

- is in good repair,
- breathes: perspiration must be able to escape the body and evaporate (depending on exertion, the body will warm up and become damp, even sweaty),
- is appropriate for the weather conditions and the activity,
- is made of materials that dry easily,
- offers wind and rain protection resistance,
- insulated and padded,
- flexible without drag,
- can be layered as necessary, and
- is comfortable.

Footwear

The most important factor to consider when selecting hiking footwear is fit. The footwear should be sufficiently sturdy to hold together throughout a trip. It should provide protection for the feet, and a firm foundation for walking and scrambling. Today, boots are derived from athletic shoe technology. They are light, comfortable and functional. Common characteristics to look for when selecting a hiking boot are:

Sturdy. The boot should support feet and ankles from twisting on uneven surfaces. Higher boots with stiff ankle support provide lateral rigidity. The boot should also support the foot from overextending when placing too much weight on the toe or heel.

Lightweight. The lighter the boots the easier walking will be. Every extra pound of footwear weight can be compared to five pounds of added backpack weight.

Comfortable fit. When worn, boots shall fit snugly with the heel snug against the wall of the shoe and a small amount of space for the toes to move.

Correct size. Proper fitting boots ensure comfort during hiking. A boot fits correctly when:

- it is wide enough so the boot matches the width of the foot with little extra room,
- the tongue rests comfortably along the top of the toe, and
- the toes have room to wiggle.

Socks

The boot is only part of the footwear system; socks are the first line of defence for the feet. A two-sock system is common in many activities. Unless hiking regularly in hot, damp conditions, consider wearing one pair of heavy socks and one pair of light, inner socks. Always ensure socks are properly sized for the foot.

Inner socks. This is a thin layer that helps wick, or pull moisture away, from the foot. They are usually made of a polypropylene material.

Outer socks. This layer is most often made of wool or a wool blend, which can absorb moisture. This layer cushions the foot and provides insulation.

Pack

There are many devices made to assist in carrying loads on a hike. For day trips, use a small pack which can comfortably hold all required items. In the winter, there may be a requirement for extra capacity.

Fanny pack. The pack for short hikes or treks up to a few hours is a fanny pack. This pack is a small, unobtrusive pack that sits atop the buttocks, with a thin belt that clips around the waist. These are also known as waist, or lumbar, packs. The simplest of these packs consists of a pouch sewn to a piece of flat webbing. More elaborate fanny packs can hold upwards of 10 L, and have padded belts and suspensions. The fanny pack is lightweight, and holds the load close to the spine and a person’s centre of balance. Items carried in a fanny pack should be limited to 4.5 kg (10 lbs).

Figure 1 Fanny Pack

Note. From ABC-of-Hiking, 2007, *Shop Backpacks*, Copyright 2007 by Max Lifestyle.net "Go Hiking Like Max". Retrieved April 19, 2007, from http://www.abc-of-hiking/shopitems/backpacks/prowler5-backpacks.asp

Day pack. Day packs are produced in numerous model types; however, all have shoulder straps and a waist belt. Most day packs have pockets for organizing equipment and basic exterior features (eg, axe loops and daisy chains).

Important qualities of a good day pack include:

- back padding to protect shoulder blades,
- firmly padded shoulder straps,
- adjustment straps for placing weight between shoulders and hips,
- an internal frame (more durable and comfortable to wear),
- padded hip belt; four inches wide around hips and two inches at the buckle, and
- 35–40 L in volume (roughly 9–13 kg [20–30 lbs]).

Figure 2 Day Pack

Note. From ABC-of-Hiking, 2007, *Shop Backpacks*, Copyright 2007 by Max Lifestyle.net "Go Hiking like Max". Retrieved April 17, 2007, from http://www.abc-of-hiking/shopitems/backpacks/team-backpacks.asp

Ten Essential Items

Water carrier. One indispensable item in any wilderness traveller's kit is a water carrier. Carrying water during a hike requires a lightweight water bottle with a tight lid that is easily refillable. Versatile equipment benefits the user. When choosing a bottle it is advisable to choose one that can withstand the temperatures of frozen or hot liquids.

Wide mouth bottles are a practical choice as many water filters are built to twist directly onto the opening of the bottle. This simplifies the water filtering process.

Hydration bags are an excellent water carrying device which allows the user to easily carry between 1 L and 4 L of water at a time. They are built into a pack and consist of a lightweight plastic bladder and a drinking tube that passes over the shoulder of the user and allows for easy hydration while hiking.

Figure 3 Wide Mouth Water Bottle

Note. From "Mountain Equipment Coop", Copyright 2007 by Mountain Equipment Coop. Retrieved March 28, 2007, from http://www.mec.ca/Products/product_detail.jsp?PRODUCT%3C%3Eprd_id=845524442500177&FOLDER%3C%3Efolder_id=2534374302696609&bmUID=1177425692300

Figure 4 Hydration Bag

Note. From "Bionic Sports", Copyright 2007 by Bionic Sports. Retrieved November 16, 2007, from http://www.bionicsports.com/acatalog/Hydration.html

Pocket knife. A knife or multi-purpose tool is essential for repairing equipment and cutting rope, cord or bandages. The key is to find a knife or tool that is small but has all the attachments—blade, scissors, screwdriver—that may be required while out on a hike.

Extra food. It is always advisable to bring extra food on a hike. Snacks such as granola bars, GORP (good old raisins and peanuts), chocolate bars, and dried fruit will provide the hiker with an energy boost. In an emergency situation they may increase chances of survival.

Extra clothing. Extra clothing includes an additional layer of warm clothing and a rain coat. A light down vest, sweater, or fleece jacket will provide insulation should the weather be cooler than expected, and during breaks

when sweat evaporates and the body cools. Just because the sun is shining at the start of a hike does not mean it will be shining at the end. Rain coats may also be used in building a shelter in an emergency situation.

Sunscreen. Sunscreen blocks or prevents the skin's exposure to the sun or ultraviolet light. The skin will burn when the amount of exposure to the sun, or ultraviolet light source, exceeds the ability of the body's protective pigment to protect the skin. According to the *Canadian Dermatology Association* a minimum of SPF 15 with UV-A and UV-B protection should be worn.

Sunglasses. Hikers should always wear sunglasses to protect their eyes against damage from the sun's light (eg, ultraviolet, bright or intense light, and blue light). This is especially important in the winter, as snow blindness is a prevalent injury.

Hat. A wide brimmed hat will protect the back of the neck, ears, and face from burning. A toque in the winter will keep the hiker's ears warm and stop the escape of heat from the head.

Insect repellent. Annoying mosquitoes and black flies can have a negative impact on a hike. Wear loose fitting clothing with closed cuffs and apply insect repellent to ward off unwanted insects. The repellent should be applied to the exposed areas of the body. Many insect repellents rely on chemicals such as DEET to repel insects and have long durations per application.

Headlamp. A headlamp is simply a flashlight that has been attached to an adjustable strap that fits around the user's head. It is beneficial on a hike as it frees up the user's hands to complete tasks when light is low or it is dark.

Figure 5 Headlamp

Note. From "Mountain Equipment Coop", Copyright 2007 by Mountain Equipment Coop. Retrieved November 16, 2007, from http://www.mec.ca/Products/product_detail.jsp?PRODUCT%3C%3Eprd_id=845524442621000&FOLDER%3C%3Efolder_id=2534374302697057&bmUID=1195238790425

Survival kit. Having a survival kit is a must during any wilderness hiking trip. It should include water purification tablets, a light source, waterproof matches, a signalling device and first aid materials.

Notebook and pencil. Having a notebook and pencil will allow hikers to keep a log throughout the hike. Collecting information such as route details, trail condition, trail difficulty, and general observations will provide the individual with beneficial material when planning other hikes. It will also provide a record of the experience.

TERRAIN

Terrain is the physical characteristics of the ground, whether it is a flat, straight trail or an ice-peaked mountain. There are different types of terrain that one can expect to encounter on a route.

IAW with A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*, the CCM uses the Yosemite Decimal System (YDS) to rate trail difficulty levels. YDS has a scale from 1–5 and it rates the hardest / most technical section on a terrain / route. It also provides ratings for travel over flat terrain.

Class 1. Hiking, usually on a trail.

Class 2. Simple scrambling, crossing obstacles with the occasional use of hands, requires route-finding skills, may be backcountry dense bush.

Class 3. Angle is steep enough that hands are required for balance; scrambling on rocks using hands and feet, a rope might be carried.

Class 4. Simple climbing, often with exposure requiring a rope belay. A fall could be serious or fatal. Natural protection can usually be easily found.

Class 5. Technical rock climbing begins. Climbing involves the use of ropes, belays, and the placement of natural or artificial protection for the leader in case of a fall. An open-ended decimal extension to Class 5 exists for rating climbs within this category.

Types of Terrain

Easy terrain. Terrain is flat and footing is secure. Forest roads, trails following streams and rolling hills are generally easy walking.

Moderate terrain. Terrain with a trail that is mostly solid under foot with either one fairly steep hill or a series of small hills or forest floors with light underbrush.

Difficult terrain. Any terrain in which a person ascends or descends over 150 m in 1 km. It can also consist of patches of dense forests, thick vegetation and rocky trails / root covered trails.

Rates of travel will differ, depending on the group, equipment, terrain, elevation above ground, etc. Generally:

- On easy terrain with a pack, a group can be expected to travel 3–5 km / h.
- On difficult terrain with a pack, a group can be expected to travel 1.5–3 km / h.
- In difficult terrain, the rate of travel can drop to a third or even a quarter of what it would be on easy terrain.
- When above 3000 m, the rate of travel will greatly decrease. On average, a person will travel 1 km / h less for every 1000 m gained in elevation.
- When descending on easy terrain, the rate can be up to twice the speed of the ascent.

USING TREKKING POLES WHILE HIKING

Types of Poles and Sticks

There are three types of trekking poles—ski poles, wooden walking sticks and telescoping trekking poles. Depending on the activity, the choice of pole will be different.

Trekking poles provide better balance and reduce the amount of stress on the knees, shoulders and back. They absorb some of the impact the body would otherwise absorb. The poles, rather than the body, absorb shock, reduce arm and leg fatigue and improve endurance.

Ski poles and walking sticks may be used for long walks and easy treks on fairly level surfaces. The walking stick may be an acceptable choice for moderate treks. Telescoping trekking poles are the most versatile choice. They work well for hiking and trekking on rough terrain.

Figure 6 Ski Pole

Note. From Black Diamond, 2005, *Gear*, Copyright 2006 by Black Diamond Equipment Ltd. Retrieved April 12, 2007, from http://www.bdel.com/gear/fixed_length_ski.php

Figure 7 Telescoping Trekking Pole

Note. From Wintergoodies.com, 2007, *Hiking, Trekking & Walking Pole Adjustable*, Copyright 2007 by Wintergoodies.com. Retrieved April 12, 2007, from http://www.winterbrookgoodies.com/pd_swissgear_hiking_trekking_walking_pole.cfm

Figure 8 Wooden Walking Stick

Note. From The Walking Stick, 2005, *Hiking Poles & Walking Sticks & Staffs*, Copyright 2005 by The Walking Stick. Retrieved April 12, 2007, from http://www.backpacking.net/walkstik.html

Criteria for Choosing Trekking Poles

To find the right trekking poles or walking stick, one needs to consider the type of activities for which they will be used, the type of terrain and the weight one will carry.

Aluminum telescoping poles are the best option. They are affordable and will last longer.

Telescopic adjustment. Poles with telescopic adjustment may be adjusted to be longer or shorter depending on the type of terrain. Multiple people can use the same set of poles by adjusting the length. The poles are easy to store when not in use.

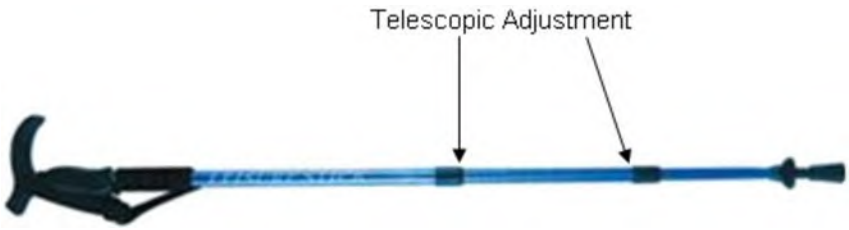

Figure 9 Telescoping Pole

Note. From Alibaba.com, 2007, *Trekking Poles*, Copyright 2007 by Alibaba.com Corporation and Licensors. Retrieved April 17, 2007, from http://aoqida.en.alibaba.com/product/50252655/51316862/Trekking_Poles/Trekking_Pole.html

Grips. Grips that have been shaped to fit the hand are more comfortable to grasp and easier to use over a long period of time. Grips that are hard can get wet with sweat and be uncomfortable to hold. One should try multiple models to find the one that fits the hand the best. An adjustable strap should be attached to the grip to prevent dropping the pole.

Figure 10 Grip With Strap

Note. From Moontrail, Backcountry Equipment Ltd, 2006, *MSR Denali II, Telescoping Trekking Poles*, Copyright 2006 by Backcountry Equipment, Ltd. Retrieved April 17, 2007, from http://moontrail.com/msr-denali2.php

Anti-shock system (shock absorption). The anti-shock system is built into the pole. Some systems are very complex and offer a range of settings depending on the user's preferences and the conditions of the trek. The anti-shock system helps absorb the impact of the pole striking the ground as one walks, easing the strain on the shoulders and arms. A lock system is a must as it allows the user to ensure the settings are locked and will not change during the hike.

Baskets. Baskets are the round rings at the bottom of trekking poles. The basket stops the poles from sinking into the surface (snow, mud or waterlogged ground). There are a variety of baskets. Baskets that are cut out like snowflakes are best used in the snow. Large, solid baskets are best used on soft muddy ground as they prevent sinking. If one is planning to buy trekking poles with baskets, ensure the baskets can easily be changed.

Figure 11 Snowflake Baskets

Note. From Backcountry Edge, 2004, *LEKI Snowflake Baskets*, Copyright 2004 by Backcountry Edge, Inc. Retrieved April 17, 2007, from http://www.backcountryedge.com/products/leki/snowflake_baskets.aspx

Figure 12 Solid Baskets

Note. From Backcountrygear.com, 2007, *Black Diamond Trekking Pole Spare Baskets*. Retrieved April 17, 2007, from http://www.backcountrygear.com/catalog/accessdetail.cfm/BD320

Tips. There are three types of tips—single point, chiselled and rubber tipped. Each of these tips will work well in a certain environment. The best overall tip is the chiselled. It looks like notches have been cut out of the very tip of the pole, leaving several points sticking out. This type of tip offers traction in almost any condition and is durable.

Figure 13 Replaceable Tips

Note. From GoSki-Real Resort Info, 2005, *Poles and Trekking Poles*, Copyright 2005 by RSN. Retrieved April 17, 2007, from http://www.goski.com/gear/product/LifeLink_Replaceable_Flex_Tip_Pair.html

Methods of Use

Using trekking poles may help prevent aches and pains. Poles are useful to help stabilize heavy loads and to negotiate trails. Besides providing better balance, trekking poles reduce the amount of stress on the back, legs and especially the knees. The poles absorb some of the impact the body would have to endure.

As the explanation is given, demonstrate the different techniques for holding trekking poles.

Trekking uphill. When walking on even terrain, arms should be parallel to the ground when holding the grip. When trekking uphill, shorten the trekking poles for comfort and stability. This allows one to gain more power.

Figure 14 Trekking Uphill

Note. From TrekkingPoles.com, 2006, *How to Use Trekking Poles*, Copyright 2006 by NicheRetail, LLC Company. Retrieved April 26, 2007, from http://www.trekkingpoles.com/custserv/custserv.jsp?pageName=How_To_Use

Trekking downhill. Trekking poles will help reduce the shock of each footfall on the joints when going downhill. For comfort and stability it is recommended that the poles be lengthened.

Figure 15 Trekking Downhill

Note. From TrekkingPoles.com, 2006, *How to Use Trekking Poles*, Copyright 2006 by NicheRetail, LLC Company. Retrieved April 26, 2007, from http://www.trekkingpoles.com/custserv/custserv.jsp?pageName=How_To_Use

The following may help while descending on rocky terrain:

- Walk slowly and test each rock before placing body weight on it.
- Lean forward to place body weight on the trekking poles.
- Grip the trekking pole securely.
- Keep the arms bent at 90 degrees.
- When possible, move one pole forward and step through with the opposite leg.

Trekking poles can also be used to:

- probe the depth of puddles or the strength of snow bridges;
- ward off aggressive animals; and
- provide support for a camera.

Some people like to have one hand free and only use one pole. For a greater level of support, two is better.

A solid wooden walking stick can be picked up in nature at any time during an expedition.

PERSONAL HIKING RHYTHM

An average day of hiking will consist of periods of hiking and periods of rest. The combination of a good hiking rhythm, a good hiking speed, and fixed rest intervals separate beginners from experienced hikers. Enthusiasm often tends to cause one to start too fast, get tired quickly, take an early rest, and start off too fast again.

Stride Rhythm and Speed

A steady hiking rhythm is generally more enjoyable as one over exerts themselves less and generally keep the physical strain at comfortable levels. Having a steady rhythm will enable a hiker to stick to a fixed schedule and lessen the strain put on the body. This allows a hiker to travel less fatigued.

Developing a hiking rhythm. A hiking rhythm is very personal and is developed over the course of many hikes. To develop a rhythm there are some guidelines to follow:

- Choose a specific stride rhythm and speed and keep to it. A good rhythm is one that allows a hiker to hike at the same intensity level for at least one hour without having to take a break.
- Adjust rhythm to terrain, weather and weight. The point where a person can no longer carry on a conversation indicates the hiker has gone beyond a comfortable tempo.
- Make the rhythm a full body movement where breathing and swinging of the arms happen in harmony.
- Uneven surfaces like uphill and downhill slopes of varying incline can make it difficult to maintain a steady hiking rhythm.

Controlling Fatigue

The purpose of resting is to slow down the heart rate and breathing, thereby allowing the heart and lungs to rest. Resting gives the body time to get rid of the lactic acids built up in muscles, and to recover from hot spots or sores.

Resting guidelines:

- Rest in regular intervals; try 10 minutes for every hour hiked (make them part of the rhythm).
- Stick to 10-minute rest breaks. Use only lunch and dinner (supper) breaks as extended rest periods.
- 10 minutes is the most effective rest duration for body recovery.
- Ensure to take off backpacks, rest in the shade, and sit down during rests.
- During the extended rest breaks, allow feet to rest and dry by removing shoes, and airing out footwear.

Adjusting Rhythm

Generally, hiking rhythm on a flat surface can be maintained easily; however, when weather and additional weight are included, hiking becomes more difficult. How fast one travels depends on the fitness level of the entire group, the terrain, the altitude and pack weight. One of the best ways to measure and regulate pace is to pay close attention to the tempo of breathing.

If breathing determines pace then, for example, on level ground one takes three steps per inhalation, and three steps per exhalation. Climbing a hill, while maintaining the same breathing rate, the steps per inhalation fall to two. A good rule of thumb to follow is to walk at a pace where one can still carry on a conversation.

When travelling in different conditions one's pace will change, according to:

- **Weather.** Poor weather will reduce pace and force the hiker to reduce step size for safety.
- **Weight.** Weight will affect pace size as the more weight one carries, the more energy must be expelled.
- **Terrain.** Travelling uphill will reduce pace size and distance travelled.

Full Body Synchronization

Hiking rhythm is a full body affair. Just like marching, hiking requires coordinated movements where every action has a reaction. The swinging of arms provides momentum, breathing controls pace, etc. To properly control rhythm, one must first learn what body parts work in unison. To employ full body synchronization during movement, the arms should be in motion at a natural swing, opposite the forward foot.

Resting Intervals

An average day of hiking consists of periods of hiking and resting. Resting intervals should occur once every hour, for a duration of 10 minutes, in an area that is conveniently shaded and possibly near a water source. During the first five to seven minutes of resting, the body flushes out about 30 percent of the lactic acid buildup in the muscles, but only five percent in the next 15 minutes (be cautious rest does not extend beyond 10 minutes).

In addition to lactic acid buildup in the muscles, the body works in unison and other areas may become fatigued. By resting:

- the heart rate slows and beats at a reduced rate,
- the lungs supply less oxygen to the body,
- the body and mind rest, and
- feet and footwear can be aired out, reducing the chance of blisters.

The Rest Step

When trekking, sometimes a hill is so steep that it simply cannot be climbed without taking breaks. In these cases, the rest step can be used. The rest step is also good when hiking in snow and fog.

To employ the rest step:

1. Begin from an upright position. Step forward with the right leg, keeping the weight on the left (back) leg, with the knee locked. Pause before taking the next step, with the weight still on the back leg.
2. Transfer the weight to the right leg. Push up with the right leg and take a step forward with the left leg. Lock the right knee, so that the right leg is bearing all the body weight. Pause before taking the next step, with the weight still on the back leg.

3. Transfer the weight to the left leg. Push up with the left leg and take a step forward with the right leg. Pause before taking the next step, with the weight still on the back leg. Continue moving, walking at a slow and steady pace.

Figure 16 Rest Step

Note. From *Backpacking and Hiking* (p. 143), by K. Berger, 2005, New York, NY: DK Publishing Inc. Copyright 2005 by DK Publishing, Inc.

CLASS 3 TERRAIN HIKING TECHNIQUES

Scrambling

Scrambling is a term used to describe making one's way over rough, uneven terrain and rocks by climbing or crawling. Scrambling usually requires the use of both hands and feet.

The following should be considered when using the scrambling technique:

- Test handholds and footholds before committing body weight.
- Keep the lower body close to the rocks.
- Use the hands to help maintain balance.
- Use large muscles in the legs to support body weight.
- Always maintain three points of contact with the rocks.

Figure 17 Scrambling Technique

Note. From Talisman Newsletter, 2006, *Merry Christmas*, Copyright 2007 by Talisman Mountaineering Activities Scotland. Retrieved April 17, 2007, from http://www.talisman-activities.co.uk/downloads/newsletters/newsletter4/newsletter4.htm

When scrambling and facing difficulty, take a moment to catch your breath. Study your route options and always identify a way back.

Boulder Hopping

Boulder hopping is when one uses speed and momentum to lightly hop from boulder to boulder, using arms or trekking poles to for balance.

The following should be considered when boulder hopping:

- Plan your route. Larger boulders are more stable.
- Use hands for stability.
- Keep knees bent and relaxed.
- Control speed. Lightly hop.
- If one begins to lose balance, move forward, stepping lightly from foot to foot until balance is regained.

Figure 18 Boulder Hopping With Trekking Poles

Note. From Great Outdoor, 2006, *Hiking the Forgotten End of the AT*, Copyright 2006 by Greatoutdoor.com. Retrieved April 12, 2007, from http://www.greatoutdoors.com/go/photos.jsp?title=hikingtheforgottenendoftheat&imag=1

Scree Crossing

A scree is a mass of fine, small rocks that are often found above the tree line on mountain slopes. When dealing with a scree, caution is the first rule.

Figure 19 Scree

Note. From East Riding of Yorkshire Council, *E Riding Media Library-England North*, Copyright 2007 by School Improvement Service, East Riding of Yorkshire Council. Retrieved April 17, 2007,from http://www.eriding.net/media/england_north.shtml

Traversing a Scree

Traversing means walking obliquely or crossing in a sideways movement.

Walking on a scree may be very slippery. When traversing a scree, a planned zig-zag path is the best option. The route should be broken down in small sections. One should keep the pace controlled and remember that speed can only mean greater risk of injury.

Walking sideways. Walking sideways will provide more contact between the long side of the foot and the slope to give better stability.

Climbing a Scree

One should avoid climbing a scree, if possible as it can be very exhausting. If there is no other option, the following tips should be considered:

- Keep to the sides of the scree. The movement of the scree is slower and larger boulders can be found there.
- Aim to keep feet horizontal. If the scree is small enough, kick the toes into the slope (like in snow).
- Climbing with the feet spread-eagled will help put weight on the instep of each boot.
- Take small steps to reduce the strain on the legs. This also reduces the chances of slipping.
- Legs should be bent at the knee to support the body.

Descending a Scree

When descending a scree, one should keep the weight on the heels and take short steps. One's back should be straight and the knees should be slightly bent to absorb stress and improve balance.

The following should be considered when descending a scree:

- Dig the heels into the slope.
- Use the hands to stay steady.
- Relax the knees and keep moving.

CROSSING WATER OBSTACLES

Rivers

Crossing rivers can be very challenging depending on the time of the year (eg, spring when snow melts into streams and rivers). A plan should be established before crossing a river.

Choose a place to cross. The safest place to cross is where the water is calm and no deeper than the height of one's hips. Such conditions can be found around rivers bends, where the stream widens and slows to make the turn. The darker (and greener) the water, the deeper it is.

The following should be avoided:

- turbulence that causes white water;
- dark water; and
- a powerful current.

If conditions appear dangerous, walk upstream in search of a safer option. Always cross with caution.

Best time to cross. Early in the morning is the best time to cross. Rivers run slower in the morning because the water is colder at night.

Wading across a river. Wading across a river is the safest option. When crossing, always face upstream, diagonal to the current.

If crossing in a group, link arms, with the strongest people at the end. The group should move slowly in a line, diagonal to the current.

Trekking poles can be used to wade across a river. They will help with the balance.

When crossing a river, to keep boots dry, take them off and wear sport sandals. If one does not have sport sandals, remove socks and boot liners, put boots back on and cross the river.

Hopping. Hopping is a technique used with rocks and will help one cross a river and stay dry. The following should be considered when hopping:

- Plan the route. Evaluate the steps to take.
- Decide which rocks are stable.
- Test steps before committing.
- If a step is unstable, move quickly to the next one.

Stepping in the water is an option. It is better to step into the water and get wet feet than to fall into it.

Crossing rivers using a wooden bridge or ropes. Wooden bridges range from constructed bridges to logs placed across a stream. Always test a bridge first to see if it is fixed and stable. Crossing a log should be done one person at a time since weight can dislodge the log. If a bridge or a log is too narrow, unstable or high, shuffle across in a sitting position.

Unless trained in river rescue, hand-held rope should not be used. If a rope is fixed in place, it can be used to hold on to. Avoid getting tangled in the rope. Carabiners shall not be used to attach a person to the rope.

Waterlogged Ground

Avoid crossing waterlogged ground if possible. If there is no other way around, one should plan a route through it. Footsteps of previous trekkers can tell how deep and hard the soil is.

Natural hard spots. When planning a route, aiming for hard spots in the ground can save time. Trees and shrubs might indicate a solid piece of ground. Large rocks and clumps of hard grass are also good indicators.

Trails. Sometimes, trails go across waterlogged ground. Frequently used trails will often have small wooden pathways (looking like short bridges) built to help facilitate the crossing. Bridges made of fallen logs may also be used.

When crossing waterlogged grounds, boots should be tightly laced. Suction of mud may pull at the boots.

Crossing Snow and Ice

Reading the snow for a safe route. When planning a route, it is best to avoid rocky places. Rocks absorb heat causing the snow near them to melt faster. The soft snow may not be firm enough to hold someone's weight. Before using a path, test the snow with trekking poles to prevent injuries. It is best to cross a large snowfield early in the morning when the snow is harder. As the sun rises and becomes more powerful, snow melts unevenly and creates soft spots.

Ascending on snow. When walking on snow, the conditions will govern the route. A new route may be created to ascend safely. Zig-zags may also be an option. If it is easier to go straight up, one should kick the snow several times to make solid steps to stand on. Before standing on these steps, one should always test body weight.

Trekking uphill through snow can be very exhausting. It is recommended to plan twice as much time to complete this kind of trek. Take breaks as required.

Crossing ice. Crossing ice requires caution. When crossing ice, one should use trekking poles to probe for holes or test the snow. On ice, do not rely on old footsteps. The route may not be safe if they are a few days old. Always test before advancing.

Ice is thinner in early winter and spring. During these seasons, one should try to go around.

ACTIVITY

Time: 270 min

OBJECTIVE

The objective of this activity is to have the cadets, in teams of no more than six, hike along a route with some Class 3 terrain, for a distance of 10–15 km.

RESOURCES

- Expedition field pack,
- Personal equipment,
- Hiking equipment, to include:
  - hiking boots (one pair per cadet),
  - day pack (one per cadet),
  - water carrier (one per cadet), and
  - trekking poles (two poles per cadet);
- Topographical / trail map of the area (two per team),
- Compass (one per team),
- Whistle (one per cadet),
- Communication device (two per team),

- GPS Receiver (one per team),
- Batteries (spares for hand-held radio and GPS), and
- First aid kit (one per team).

ACTIVITY LAYOUT

Designate a hiking route with some Class 3 terrain.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing, to include an explanation of:
    a. the objectives and importance of the activity;
    b. the resources that may be required to perform the activity; and
    c. any safety guidelines that must be followed while performing the activity.
2. Have the cadets, in teams of no more than six, hike along a route with some Class 3 terrain, for a distance of 10–15 km during an expedition to practice:
    a. executing the "rest step"; and
    b. employing proper techniques to:
        (1) hop boulders (as applicable),
        (2) cross scree (as applicable), and
        (3) cross a water obstacle (as applicable).
3. Conduct a debriefing by asking the cadets:
    a. how they felt about the activity,
    b. how they felt their team worked together;
    c. what portion of the activity challenged them the most;
    d. how their teammates assisted them when they were challenged;
    e. if there are any specific examples of when their team bonded;
    f. how the team made decisions;
    g. whether or not all team members ideas / suggestions were considered; and
    h. what they would do as a leader of this type of activity to ensure their subordinates enjoyed the experience.

SAFETY

- The cadets will respect the predetermined boundaries for this activity.
- Teams will travel in single file.
- Teams will not pass another teams / groups unless directed to do so by their team instructor.

- All the cadets must carry 1 L of water.
- A water supply will be available along the route.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in hiking along a route will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the expedition will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-704/PG-001, Gold Star *Qualification Standard and Plan*, Chapter 3, Annex B, 426 PC.

CLOSING STATEMENT

Hiking is one of three dynamic modes of transport that can be used during expedition training. It is critical that the cadets are given the opportunity to hike on routes which include some Class 3 terrain to prepare them for more advanced expedition experiences. Being aware of pacing and implementing the "rest step" while hiking will ensure a more enjoyable hiking experience for the individual and the team / group. When travelling on advanced hiking terrain, the possibility of encountering obstacles is quite great, therefore it is important that all members understand how to safely cross them.

INSTRUCTOR NOTES / REMARKS

Expedition centres are required to select two dynamic modes of travel from EO M426.02a (Paddle a Canoe), EO M426.02b (Ride a Mountain Bike), and EO M426.02c (Hike Along a Route) EO M426.02d (Snowshoe Along a Route) and EO M426.02e (Ski Along a Route) to incorporate into the expedition training.

This EO has been allocated nine periods in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources at the expedition centre.

Upon arrival at the expedition centre, cadets will be broken into teams. These teams will remain the same for the duration of the expedition.

IAW A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*:

1. hiking equipment includes:
    - hiking boots, and
    - trekking poles; and

2. the following group hiking equipment is required when hiking:
    - topographical / trail map of area as required,
    - compass,
    - GPS receiver.
    - first aid kit, and
    - communication device (eg, cellular phone or hand-held radio).

The intensity level of the activity shall follow the progression matrix outlined in A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*.

Ensure that each cadet has an ample supply of water when hiking.

REFERENCES

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ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 5

EO M426.02d – SNOWSHOE ALONG A ROUTE

Total Time: 270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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 introduce and give direction on the types of snow that may be encountered when snowshoeing.

A demonstration and performance was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate the procedure for fitting snowshoes and executing snowshoe techniques while providing an opportunity for the cadet to practice the skills.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have practiced snowshoe techniques along a route.

IMPORTANCE

It is important for cadets to snowshoe along a route by using different snowshoe techniques so they will be prepared for the technical challenges, when given the opportunity to participate in more advanced level expeditions. Snowshoeing along a trail or predetermined route requires the individual to be aware of their surroundings, their limitations and the limitations of the group they are travelling with. Knowing different types of snow conditions provides the snowshoer with the information to make a decision as to whether the snow conditions are safe enough to continue.

Teaching Point 1 **Discuss types of snow.**

Time: 10 min Method: Interactive Lecture

Cadets will be expected to snowshoe for a distance of 8–10 km. While travelling, it is possible to travel across many different types of snow. Being aware of what type of snow one is travelling on will help to increase awareness of how their footing will react to the condition of the snow.

If cross-country skiing was chosen as a mode of travel and was instructed prior to this EO, types of snow have already been discussed. If that is the case, conduct a quick review bringing attention to how snow can affect snowshoeing.

Point out examples of different types of snow that exist in the surrounding environment.

TYPES OF SNOW

Snow and ice conditions change with heating and cooling, and are largely affected by the weather. With a change in conditions speed of travel may be affected.

New fallen snow. Very loose and light. The snowflakes still have multiple branches. If new snow is dry, it is feathery; if damp, it quickly consolidates into a stage of settled snow. When this snow is damp, it can be difficult to snowshoe on. When dry and fluffy, this snow is easy to snowshoe on.

Powder snow. New, untouched freshly fallen soft snow. It can give the feeling of floating in a weightless environment. Powder snow can be packed in thick layers that form a natural pillow. Powder snow has a low moisture content, as almost 97 percent of it is air. In coastal regions, where there is higher humidity, the snow is heavier than in a continental region. Powder snow compacts easily, supporting the weight of the snowshoer. This is a good type of snow to snowshoe on.

Wind-packed snow. Snow blown from one direction, compacted by the force of the wind. Wind-packed snow is created by the pressure exerted by wind, causing a form of cold-heat hardening. In some areas, the snow surface is strong enough to hold the weight of a person on snowshoes. This snow is good to snowshoe on.

Sun crust snow. Snow that has had the upper layer melt and then refreeze. Usually on top of powder snow, sun crust snow is stronger than the powder snow below it due to the refreezing. This snow can be dangerous to snowshoe on if on a slope; the crust may give and a person may lose their footing. Snowshoeing on a flat surface over sun crust snow can be difficult as the snowshoe breaks through the crust and can hook into the crust on the return. The constant hooking and breaking in sun crusted snow can tire the snowshoer.

Sun crust snow is not very stable on a slope and can be dangerous when weighted. The snow will give way causing a fall or a slide.

Corn snow. After thawing, corn snow occurs. The structure of the snow is very grainy at this point. Corn snow usually occurs in the spring, and can be strong enough to carry weight but it also can indicate the presence of rotten snow, which is very dangerous. Corn snow is produced during the cycle of melting and refreezing in the accumulated snow. Caution should be taken when snowshoeing on this type of snow, especially in mountainous or hilly terrain.

A layer of snow that has been sun crusted will become corn snow.

Rotten snow. Caused by repeated melting and freezing and is found mostly on the south side of hills, or in lower levels of snow. Water will seep to the lower layers and will not freeze because it is insulated from the weather by the covering snow layer. Rotten snow can resemble very small icicles, or candle ice. This snow is dangerous. Sudden drops may exists and holes develop under the surface of the snow. Falling and injury are highly possible.

Slush snow. When the air temperature becomes warmer than the freezing point, the snow begins to melt and the water content becomes high. Slush snow absorbs water from melting snow. Slush snow is recognizable by depressions in the snow with darker or bluish snow areas. These areas show holes in the ice or an accumulation of water on the surface of the ice. Snowshoeing on this type of snow can be dangerous since the chance of stepping into a large puddle or slipping by loss of traction exists.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What type of snow is loose and light?

Q2. Describe wind-packed snow.

Q3. What is rotten snow?

ANTICIPATED ANSWERS:

A1. New fallen snow is loose and light.

A2. Snow blown from one direction, compacted by the force of the wind. Wind-packed snow is created by the pressure exerted by wind, causing a form of cold-heat hardening. In some areas, the snow surface is strong enough to hold the weight of a person on snowshoes. This snow is good to snowshoe on.

A3. Rotten snow is snow found on the south side of hills, or in lower levels of snow. It is caused by repeated melting and freezing.

Teaching Point 2 **Explain, demonstrate and have the cadets fit personal snowshoe equipment.**

Time: 15 min Method: Demonstration and Performance

For this TP it is recommended that instruction take the following format:

1. Explain the importance of selecting and properly fitting snowshoe equipment.
2. Explain and demonstrate the selection of snowshoe size and how size affects carrying capacity.
3. Have cadets select and size snowshoes.
4. Explain, demonstrate and have the cadets fit snowshoe bindings.
5. Explain, demonstrate and have the cadets select and properly size poles.
6. Once each cadet has selected snowshoe equipment, label all equipment with masking tape.

Note: Assistant instructors may be used to monitor the cadets' performance.

The standard snowshoe may vary between expedition centres. Check the manufacturers' specifications for sizing and holding capacity.

SNOWSHOES

Snowshoe size is dictated by a person's total weight including body, pack, boots, and clothing.

Parts of a Snowshoe

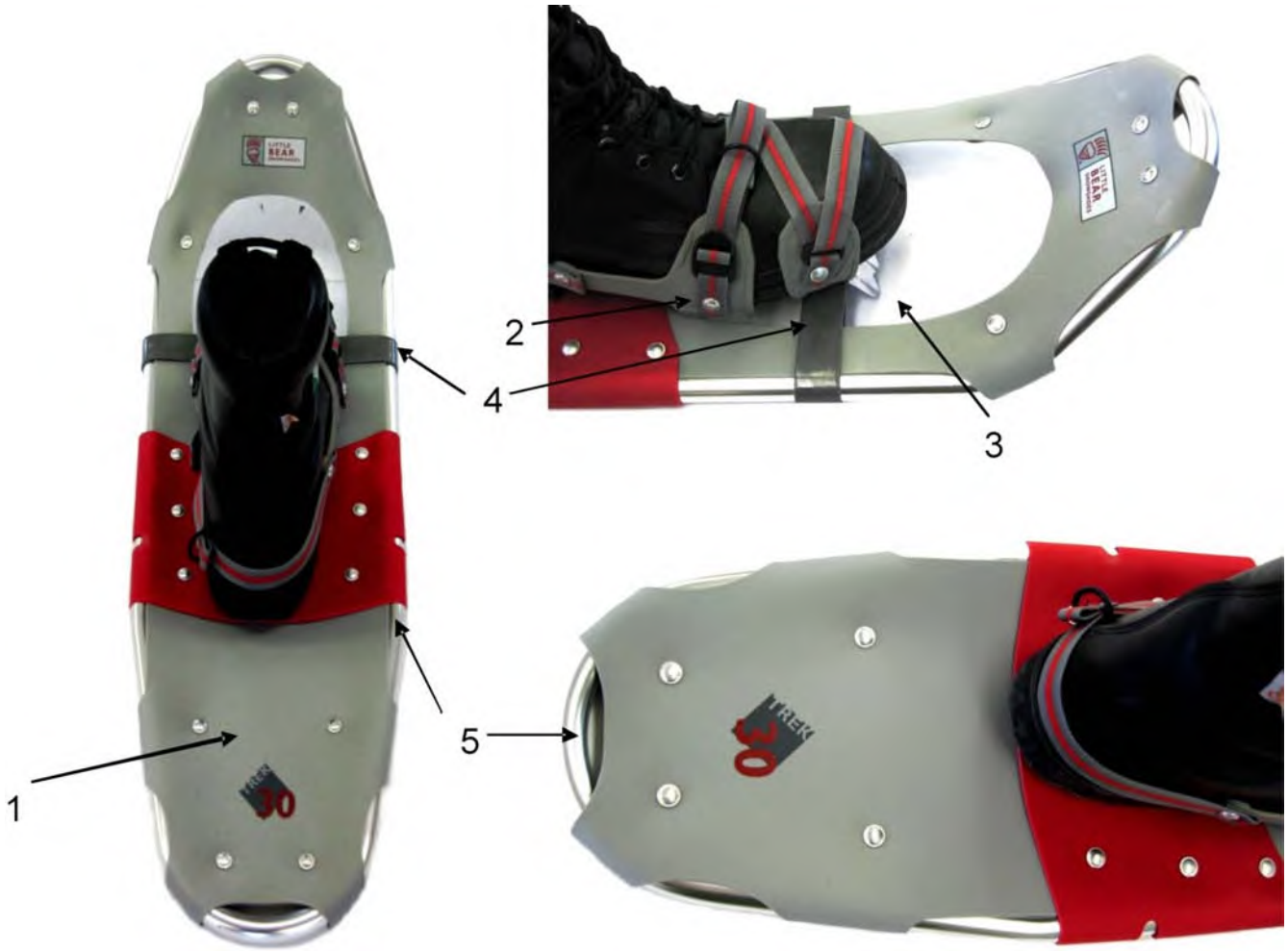


Figure 1 Parts of a Snowshoe

Note. Created by Director Cadets 3, 2009, Ottawa, ON: Department of National Defence.

1. **Deck.** The part of the snowshoe that supports a person's weight on the snow. It can be webbed or solid and is made from a variety of materials depending on the manufacture.

2. **Binding.** Connects the boot to the snowshoe. When worn, the bindings should be secure but comfortable.

3. **Crampon.** Attached below the pivot point. When weighted, the crampon digs into the surface below it and provides traction to the snowshoer.

4. **Pivot point.** Allows the foot to rotate with a natural arc when walking. To engage the crampon, rotate the pivot point forward with pressure from the ball of the foot—this provides more traction when digging into the surface below.

5. **Frame.** This is the part of the snowshoe that makes up the skeletal shape. It can be made of metal or wood and functions as the seat for the bindings and crampons. A snowshoe with a strong frame will last a long time.

Selecting Snowshoes

The chart below is a rough guide to follow when in a standard condition of wet powder snow.

If in between weight categories:

- Select the smaller snowshoe if expecting to encounter heavy snow.
- Select the larger snowshoe if travelling through deep backcountry powder.

Snowshoe Size	Carrying Capacity
20 cm by 56 cm (8 inch by 22 inch)	68 kg (150 lbs)
20 cm by 63 cm (8 inch by 25 inch)	90 kg (200 lbs)
22 cm by 43 cm (9 inch by 34 inch)	113 kg (250 lbs)
24 cm by 86 cm (9.5 inch by 36 inch)	136 kg (300 lbs)

The smaller the snowshoe, the better it will be for climbing over blow downs (fallen trees and bushes) and through brush. The larger the snowshoe, the better flotation on top of snow.

BINDINGS

The binding attaches the foot to the snowshoe securely, preventing the heel from sliding from side to side, even when travelling across a slope. Bindings most often fit a wide range of boots sizes. In any category of snowshoe, the binding should be made of hardy, flexible rubberized nylon straps, with buckles that do not loosen or freeze and are easily manipulated even when wearing mittens. The bindings must not be fastened too tightly where circulation may be cut off, as the chances of frostbite will increase.

During rest breaks, bindings should be checked for fit and possible readjustment.

Types of bindings include:

Fixed rotation. Lifts the snowshoe tail up with the foot. These tend to throw snow onto the snowshoer's back, but are better when climbing over forest obstacles.

Free rotation. Will not lift the snowshoe tail up with the foot. The extended tails may get hung up in vegetation or downed trees. Military issue snowshoes have free rotation bindings.

The binding on most snowshoes connects to the pivot point.

Snowshoe bindings may be different at each expedition centre. The following guide to fit bindings is a description on how military issued bindings are fitted. When using civilian bindings, check the manufacturers' specifications and present those instructions to the cadets.

It is much easier to make binding adjustments when not wearing the snowshoes.

Adjusting the Binding (Harness)

Snowshoe bindings (harnesses) need to be adjusted to fit the boot / mukluks. Improper fit can result in a snowshoe falling off on the trail and poor foot placement on the snowshoes. Bindings (harnesses) should hinge freely up and down, with the toe of the boot / mukluk fitting through the toe hole in the snowshoe and the ball of the foot directly over the toe cord.

Adjust the Bindings (Harnesses) to the Boot / Mukluk

1. Resize the toe strap by undoing the tie down strap from the tie down buckle.
2. Reweave the tie down strap through the webbing on the snowshoe to either loosen or tighten the toe strap to the size of the mukluk.
3. Fasten the tie down strap through the tie down buckle.

To prevent the toe strap from slipping up over the toe of the mukluk, the toe strap should be tied down to the front mesh of the snowshoe using a 20-cm piece of heavy duty twine.

Attaching the Snowshoe to the Boot / Mukluk

1. Position the boot / mukluk in the toe strap, with the cross strap under the instep.
2. Bring the inside part of the side strap back diagonally up over the heel and around the outside of the boot / mukluk (as illustrated in Figure 2).

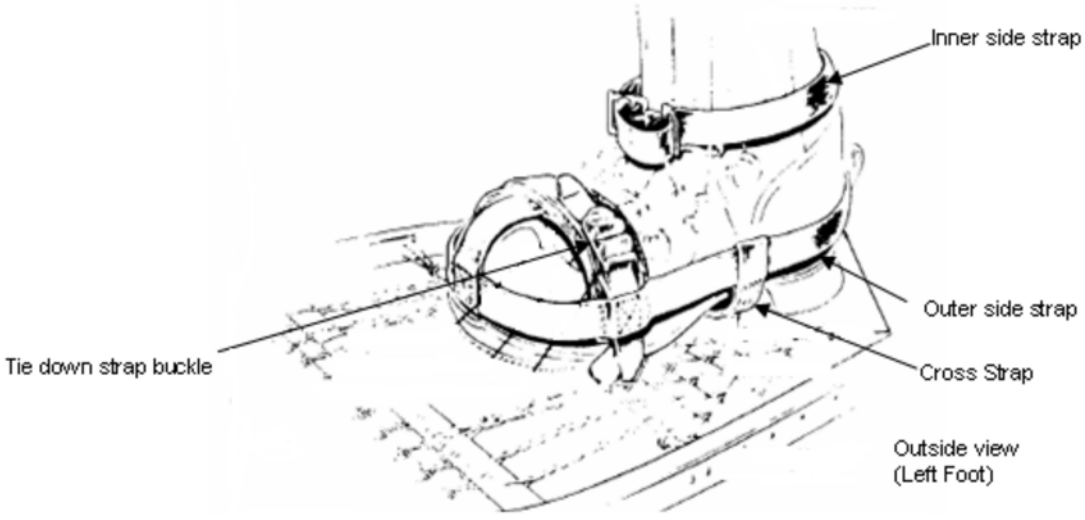


Figure 2 Attaching Harness to the Boot / Muckluk

Note. From *Artic and Sub Artic Operations Volume 2 Basic Cold Weather Training* (p. 5-44), by Chief of the Defence Staff, 1974, Ottawa, ON: Department of National Defence. Copyright 1975 by Department of National Defence.

3. Bring the outside part of the side strap back and around the lower part of the heel, around the inside of the boot / mukluk, crossing over the inner side strap, with the buckle located over the boot / mukluk laces, as illustrated in Figure 3.

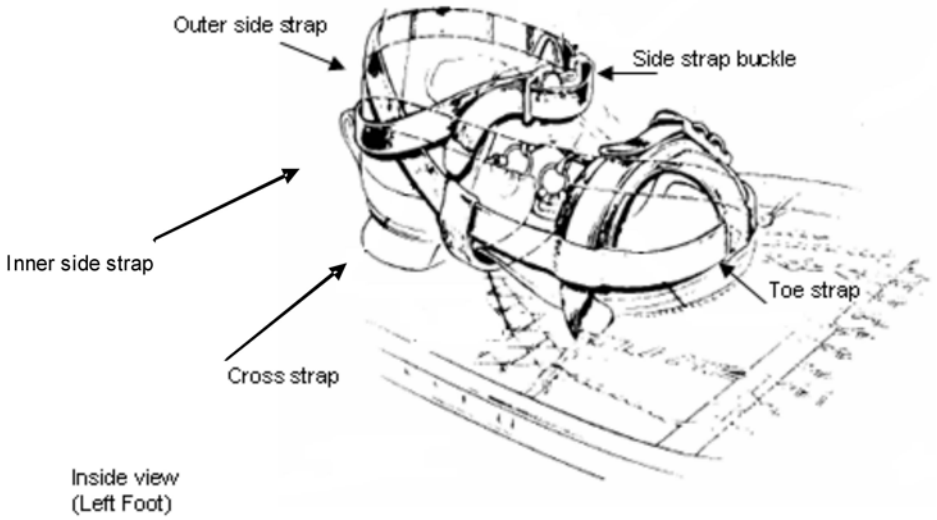


Figure 3 Attaching Harness to a Boot

Note. From *Artic and Sub Artic Operations Volume 2 Basic Cold Weather Training* (p. 5-45), by Chief of the Defence Staff, 1974, Ottawa, ON: Department of National Defence. Copyright 1975 by Department of National Defence.

POLES

Telescoping trekking poles are the most versatile choice for snowshoeing. These poles provide better balance and reduce the amount of stress on the knees, shoulders and back. They absorb some of the impact the body would otherwise absorb. The poles, rather than the body, absorb shock, reduce arm and leg fatigue and improve endurance. While snowshoeing, they help a person keep balance while climbing inclines or when backing out of an area in deep snow. Although trekking poles are generally not required when snowshoeing, they are a helpful accessory.

Figure 4 Telescoping Trekking Pole

Note. From Wintergoodies.com, 2007, *Hiking, Trekking & Walking Pole Adjustable*, Copyright 2007 by Wintergoodies.com. Retrieved April 12, 2007, from http://www.winterbrookgoodies.com/pd_swissgear_hiking_trekking_walking_pole.cfm

Sizing a Pole

Sizing poles to fit a snowshoer requires the user to stand up straight and hold the pole close to the body. The pole when held upright should come to a height in-between the middle of the chest and slightly below the armpit. Adjust the trekking pole accordingly until it is sized to the snowshoer.

CONFIRMATION OF TEACHING POINT 2

The cadets' fitting of personal snowshoe equipment will serve as the confirmation of this TP.

Teaching Point 3 **Explain, demonstrate and have the cadets practice snowshoe techniques along a route.**

Time: 235 min Method: Demonstration and Performance

Cadets shall be given detailed instruction on how to complete each snowshoe technique.

For each technique explain, demonstrate and have the cadets practice the movement.

Cadets shall perform each technique at a level of proficiency that will allow successful completion of the route to be travelled prior to departing.

SNOWSHOE TECHNIQUES

Snowshoeing is a very easy skill to learn. People can immediately walk on snowshoes even if they have never worn them before. However, there are techniques that will greatly improve these abilities while snowshoeing over snow-covered terrain.

Striding

To conserve energy when snowshoeing on soft snow, lift the snowshoe to clear the snow and thrust forward to complete each pace.

The rest step allows for momentary pauses between steps. With practice, one can adjust the length of the pause to the state of fatigue. As one steps forward, thrust the front snowshoe out and let it plop down, or stamp it firmly into place. Straighten and lock the rear knee joint so the tendons and cartilage are holding weight and pause and relax the thigh muscles, using the poles to maintain balance. Bring the rear leg ahead, thrust the snowshoe out, place it, lock what is now the rear leg, relax momentarily and repeat.

The effect is to rest the legs during the time they are actually working hard. A couple of seconds of work with a couple of seconds of rest make it possible to keep going steadily without long stops.

Novice snowshoers have a tendency to look down at the snowshoes when they walk. They will adapt more quickly to snowshoeing if they keep their head and eyes up, and look forward, down the trail.

Executing Kick Turns

Kick turns are performed when conditions exist where there is not enough room to perform a normal 180-degree stepping turn. Remind cadets to always assess the area and perform a normal 180-degree steeping turn when they can; it is safer and less accidental falls and twists will occur.

Kick turns are performed when a change in direction is required. It is commonly used in an enclosed area along the trail. The steps in performing a kick turn are:

1. Lift one leg and swing it back, and then kick it forward and upward.
2. At the top of the kick, just as the tail of the snowshoe clears the snow, turn the foot 180 degrees.
3. Lower and plant the foot in the snow, with the front of the foot facing to the rear.
4. Shift the body weight to the foot facing 180 degrees to the rear and then lift the other foot.
5. Bring the foot over the trailing edge of the planted snowshoe and face the new direction.

Crossing Obstacles

Obstacles such as fallen trees, logs, tree stumps, ditches and small streams can be stepped over. Care must be taken not to place too much strain on the snowshoe ends by bridging a gap, since the frame may break. In shallow snow, there is a danger of catching and tearing the webbing on tree stumps or snags that are only slightly covered.

Never bridge two obstacles together with the snowshoes. When jumping over obstacles do not let the tails of the snowshoes fall downward. If the tail of the snowshoe is vertical upon landing, it will strike the snow first and may result in a fall. When possible, find an alternate route around the obstacle.

Bridging. When the toe and tail of the snowshoe are placed on two elevated objects and the entire weight of the snowshoer is fitted on the webbing of the snowshoe.

Figure 5 Bridging

Note. From *Snowshoeing: From Novice to Master* (p. 46), by G. Prater, 2002, Seattle, WA: The Mountaineers Books. Copyright 2002 by The Mountaineers Books.

Ascending Hills

The method chosen to walk uphill will depend on the angle of the incline and the condition of the snow. The following techniques can be used when navigating uphill.

Step kick. When going straight up a hill, this is the most efficient method on firm or hard packed snow where traction is not a concern. Kick the toe of the snowshoe in the snow ensuring that it is firmly planted before shifting weight to the snowshoe.

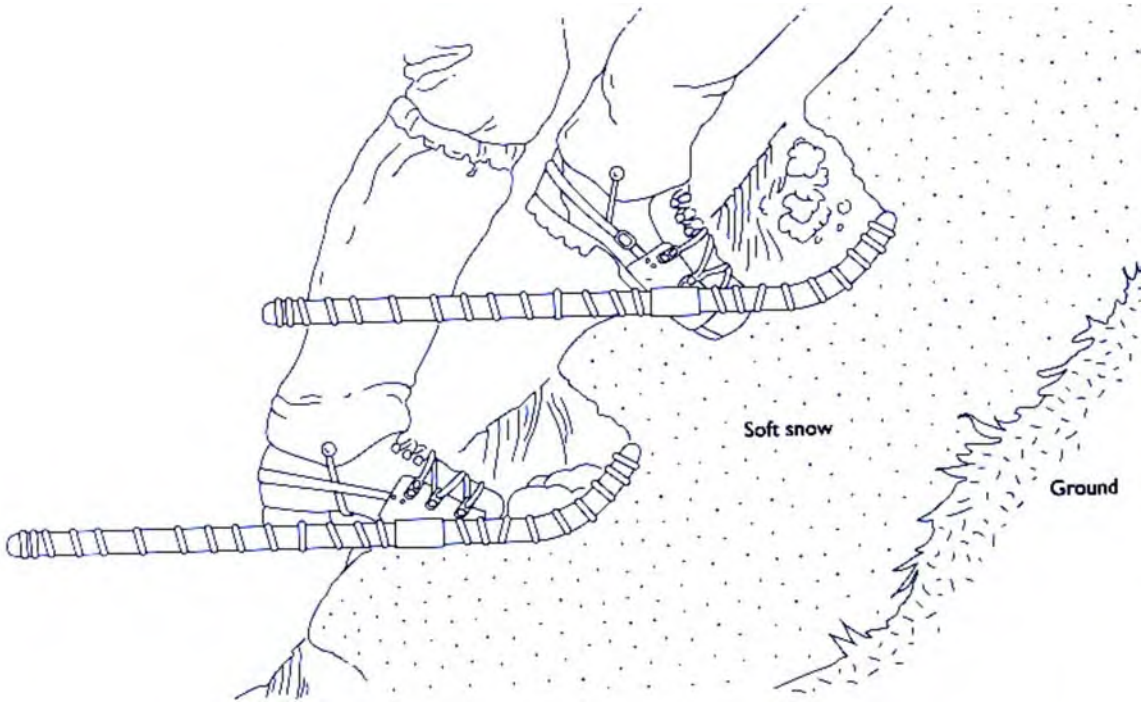


Figure 6 Step Kick

Note. From *Snowshoeing: From Novice to Master* (p. 114), by G. Prater, 2002, Seattle, WA: The Mountaineers Books. Copyright 2002 by The Mountaineers Books.

Edging. Performed by simply kicking the snowshoe sideways into the slope, or moving the boot heel as far toward the uphill side of the slope as possible. Stamp the snowshoe down, forcing the outside edge of the snowshoe into the slope. When edging, the body will be perpendicular to the slope. It is used when walking up a steep slope.

Figure 7 Edging

Note. From *Snowshoeing: From Novice to Master* (p. 113), by G. Prater, 2002, Seattle, WA: The Mountaineers Books. Copyright 2002 by The Mountaineers Books.

Switchbacking. Used to travel a slope that is fairly steep and is covered in deep powder snow. Ascend the hill by walking across the slope at an angle that is comfortable and not steep enough to allow the snowshoes to slip. To turn back (switchback) to the right, firmly stamp the left snowshoe in the snow and make sure it will hold. Shift the weight to the left foot, face the slope, and then swing the right snowshoe around to point it in the direction of the next switchback and firmly stamp it into the snow. Ensure that the tail of the right snowshoe is not placed on the left snowshoe. Stamp the right web into the snow and gently shift the body weight and step on it. To make a left turn, reverse the procedure.

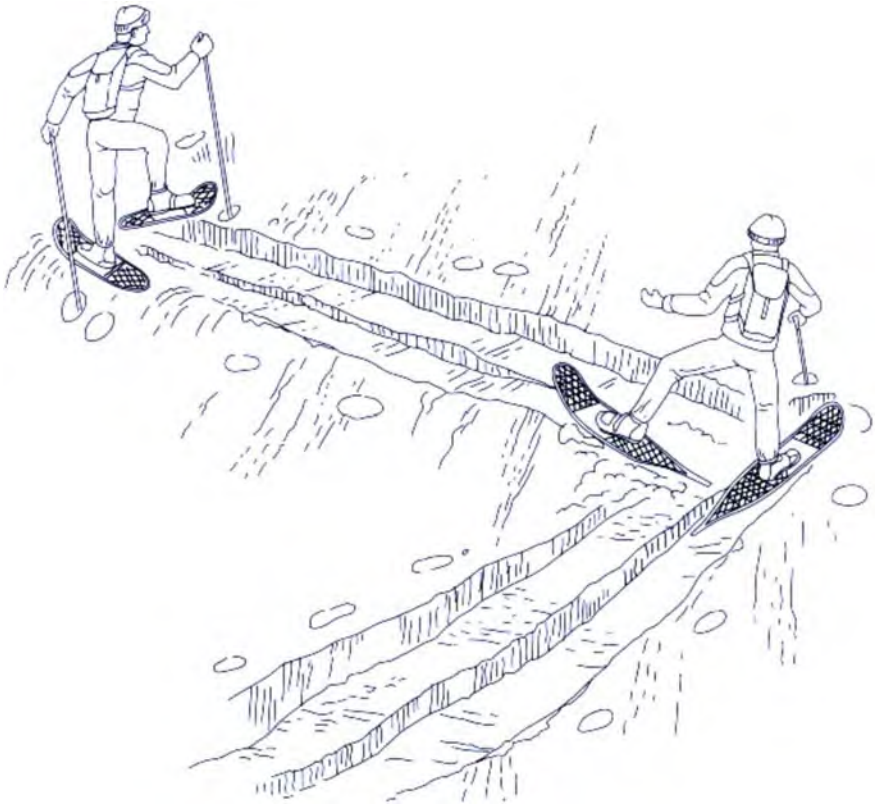


Figure 8 Switchbacking

Note. From *Snowshoeing: From Novice to Master* (p. 110), by G. Prater, 2002, Seattle, WA: The Mountaineers Books. Copyright 2002 by The Mountaineers Books.

Descending Hills

The method that is chosen to walk downhill will depend on the angle of the incline and the condition of the snow. The same techniques for ascending hills are used to descend. When descending a hill a person should follow the following guidelines:

- Do not lean forward by bending at the waist. This is a normal tendency for beginners and will increase the chance of falling forward.
- Avoid leaning back on the snowshoes, as if digging in the heels. This will increase the chance of the snowshoes sliding out from under the snowshoer.
- To assume a safe posture, stand straight up; balance the body straight over the foot; and slightly bend the knees to compensate for changes, and then relax.

Breaking Snow

In loose snow, the trailbreaker may have several extra pounds of snow on the snowshoes. The snow falls on top of the webbing when walking and sinking in deep snow. This extra weight will exhaust the trailbreaker at a faster rate than the followers. When the trailbreaker feels they can no longer move forward at a progressive pace, they should step to the side and drop to the rear as the rest of the party moves past.

Trailbreakers, depending on the depth of the snow and the terrain being covered should only break trail for 2–5 minutes.

ACTIVITY

Time: 200 min

OBJECTIVE

The objective of this activity is to have the cadets, in teams of no more than six, snowshoe along a route for 8–10 km with an expedition field pack, to include:

- adjusting stride;
- performing a kick-turn;
- crossing obstacles applicable to the terrain;
- ascending a hill;
- descending a hill; and
- breaking snow.

RESOURCES

- Personal expedition equipment,
- Personal snowshoe equipment,
- Group snowshoe equipment, and
- Water carrier (one per cadet).

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing to include an explanation of:
   a. the objectives and importance of the activity,
   b. the resources that may be required to perform the activity, and
   c. any safety guidelines that must be followed while performing the activity.
2. Have the cadets retrieve their snowshoes and packs.
3. Have the cadets put on their snowshoes and packs.

4. Have the cadets, in teams of no more than six, snowshoe with an expedition field pack, following the designated route for a distance of 8–10 km during an expedition to practice:
   a. adjusting stride;
   b. performing a kick-turn;
   c. crossing obstacles applicable to the terrain;
   d. ascending a hill;
   e. descending a hill; and
   f. breaking snow.
5. Upon arrival at the end point, have the cadets remove, clean and inspect snowshoes for damage and then properly store / return all equipment.
6. Conduct a debriefing by asking the cadets:
   a. how they felt about the activity;
   b. how they felt their team worked together;
   c. what portion of the activity challenged them the most;
   d. how their teammates assisted them when they were challenged;
   e. if there are any specific examples of when their team bonded;
   f. how the team made decisions;
   g. whether or not all team members ideas / suggestions were considered; and
   h. what they would do as a leader of this type of activity to ensure their subordinates enjoyed the experience.

SAFETY

- Each team will be led by the assigned team leader.
- The Team Instructor(s) (TI) must be in sight or sound of the team at all times.
- In areas of complex / technical terrain TI(s) will demonstrate requisite skills as required.
- Teams will travel separately on the same trail.
- There will be a minimum of 500 m between teams at all times.
- Cadets must travel in single file at all times.
- Cadets must have at least 1 L of water.
- Water resupply points will be located along the route.
- Meals will be provided at a predetermined location(s) and detailed in the route instructions.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in snowshoeing along a route will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 426 PC.

CLOSING STATEMENT

Snowshoeing is one of the dynamic modes of transport that can be used during expedition training. It is critical that the cadets are given the opportunity to practice snowshoe techniques along designated routes to prepare them for more advanced snowshoeing experiences. Being aware of sharing the trailbreaking task and implementing the rest step while snowshoeing will ensure a more enjoyable snowshoeing experience for the individual and the team / group. When travelling the possibility of encountering obstacles is quite great, so it is important that all members understand how to safely cross them.

INSTRUCTOR NOTES / REMARKS

Expedition centres are required to select two dynamic modes of travel from EO M426.02a (Paddle a Canoe), EO M426.02b (Ride a Mountain Bike), EO M426.02c (Hike Along a Route), EO M426.02d (Snowshoe Along a Route) and EO M426.02e (Ski Along a Route) to incorporate into the expedition training.

This EO has been allocated nine periods in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources at the expedition centre.

Upon arrival at the expedition centre, cadets will be divided into teams. Cadets will be given an opportunity to navigate and lead peers. These teams will remain the same for the duration of the weekend.

Total distance for the snowshoe route can be adjusted depending on terrain and level of skill of participants.

The following equipment is required when snowshoeing:

1. personal snowshoe equipment, to include:
    a. snowshoes,
    b. bindings,
    c. poles,
    d. whistle, and
    e. appropriate cold-weather clothing; and
2. group snowshoe equipment, to include:
    a. topographical / trail map of area as required,
    b. compass,

c. first aid kit,

d. communication device (eg, cellular phone or hand-held radio),

e. GPS receiver, and

f. cold weather emergency kit appropriate to the activity.

IAW A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards* weather must be continuously assessed. Training should cease and cadets must be brought inside if the temperature gets too low (consider wind chill).

REFERENCES

C2-004 ISBN 1-896713-00-9 Tawrell, P. (1996). *Camping and wilderness survival: The ultimate outdoors book*. Green Valley, ON: Author.

C2-248 ISBN 978-0-89886-891-3 Prater, G. (2002). *Snowshoeing: From novice to master*. Seattle, WA: The Mountaineers Books.

ROYAL CANADIAN ARMY CADETS

GOLD STAR

INSTRUCTIONAL GUIDE

SECTION 6

EO M426.02e – SKI ALONG A ROUTE

Total Time: 270 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-704/PG-001, *Gold 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.

Organize all cross-country ski equipment into three groups—skis, boots, and poles. Within each group organize the equipment by size / height.

Photocopy one Cross-Country Ski Equipment Sizing Information Form located at Attachment A and cut it into four separate forms.

Assistant instructors will be required for this lesson.

PRE-LESSON ASSIGNMENT

Distribute to the cadet the Cross-Country Ski Equipment Sizing Information Form located at Attachment A to cadets when they arrive at the expedition centre on the Friday evening. Cadets must complete the form prior to the commencement of this EO.

Cadets must arrive wearing appropriate cold weather clothing. They must have the socks on that they will be wearing during the expedition, to ensure proper fit of ski boots.

APPROACH

An interactive lecture was chosen for TP 1 to introduce and give the cadet direction on types of snow and how they can affect a cross-country skier.

A demonstration and performance was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate the procedures for fitting personal cross-country ski equipment and executing classic cross-country ski techniques while providing an opportunity for the cadet to practice the skill.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have classic cross-country skied along a route for 6–10 km, during an expedition.

IMPORTANCE

It is important for cadets to classic cross-country ski along a route, as it is a mode of travel used during winter expedition training. Cadets are required to work as a member of a team to travel a significant distance during the expedition. Performing classic cross-country ski techniques assists them in keeping up with their team.

Teaching Point 1 **Discuss types of snow.**

Time: 10 min Method: Interactive Lecture

The purpose of this TP is to introduce the cadets to the different types of snow they may encounter when cross-country skiing.

If snowshoeing was chosen as a mode of travel and was instructed prior to this EO, types of snow have already been discussed. If that is the case, conduct a quick review bringing attention to how the different types of snow can affect the slide and grip of skis.

Point out examples of different types of snow that exist in the surrounding environment.

Being aware of what type of snow or ice one is travelling on increases awareness of how skis perform in different conditions.

TYPES OF SNOW

Skis do not slide on the snow; they slide on a thin layer of moisture (2) that is between the snow (3) and the ski surface (1). The thin layer of moisture is created by the pressure of the ski upon the snow and by the friction caused by the motion of the skis across the snow. Heat created by the pressure and the friction melts some of the snow.

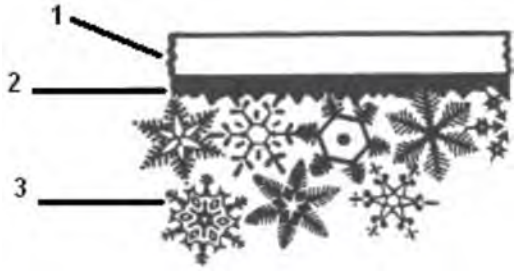


Figure 1 Relationship Between Snow, Moisture and the Cross-Country Ski

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (p. 164), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Skis also have to grip the snow to allow the skier to push and move forward while going uphill or on flat terrain. This grip is influenced by the type of snow crystals (flakes).

New snow crystals (flakes), with their numerous points and arms, dig into the uneven surface of the waxed ski when there is weight pushing down on them.

Figure 2 New Snow Crystals (Flakes)

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.) (p. 164), by W.J. Lederer & J.P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Old snow crystals (flakes), 24–36 hours old, begin to wear away, making them smoother and less able to grip into the ski. Once snow crystals (flakes) begin to melt, or melt and then re-freeze, the points and arms become virtually non-existent, severely affecting how the skis slide on and grip the snow.

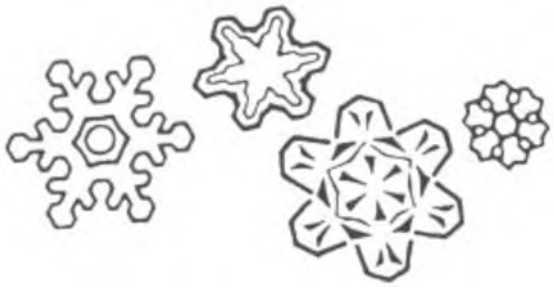


Figure 3 Old Snow Crystals (Flakes)

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.) (p. 166), by W.J. Lederer & J.P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

The action of skis both sliding and gripping the snow is made possible by wax. Wax selection is influenced by:

- the moisture content in the snow,
- the temperature of the air,
- the shape of the snow crystals (flakes), and
- the age / type of snow.

In new snow, the layer of wax should be smooth and thin. In older snow, the layer of wax should be sticky and thick.

Being able to identify different types of snow is very important for cross-country skiers. The type of snow dictates the type / level of wax required for optimum skiing.

Cadets are not required to wax their own skis. This will be completed by an experienced staff member. They should, however, be able to tell the staff member what type of snow they will be skiing on.

New fallen snow. Very loose and light. The snowflakes still have multiple points / arms. If new snow is dry, it is feathery; if damp, it quickly consolidates into a stage of settled snow.

Powder snow. New, untouched freshly fallen soft snow. It can give the feeling of floating in a weightless environment. Powder snow can be packed in thick layers that form a natural pillow. Powder snow has a low moisture content, as almost 97 percent of it is air. Powder snow compacts easily.

Wind-packed snow. Snow blown from one direction, compacted by the force of the wind. Wind-packed snow is created by the pressure exerted by wind, causing a form of cold-heat hardening. In some areas the snow surface is strong enough to hold the weight of a person on skis.

Sun crust snow. Snow that has had the upper layer melt and then refreeze. Usually on top of powder snow, sun crust snow is stronger than the powder snow below it due to the refreezing. This snow can be dangerous as the crust may give away causing the skier to lose their grip.

Sun crust snow is not very stable on a slope and can be dangerous when weighted. The snow will give way causing a fall or a slide.

Corn snow. After thawing, corn snow occurs. The structure of the snow is very grainy at this point. Corn snow usually occurs in the spring, and can be strong enough to carry weight but it also can indicate the presence of rotten snow, which is very dangerous. Corn snow is produced during the cycle of melting and refreezing in the accumulated snow.

A layer of snow that has been sun crusted will become corn snow.

Rotten snow. Caused by repeated melting and freezing and is found mostly on the south side of hills, or in lower levels of snow. Water will seep to the lower layers and will not freeze because it is insulated from the weather by the covering snow layer. Rotten snow can resemble very small icicles, or candle ice. This snow is dangerous. Sudden drops may exists and holes develop under the surface of the snow. Falling and injury are highly possible.

Slush snow. When the air temperature becomes warmer than the freezing point, the snow begins to melt and the water content becomes high. Slush snow absorbs water from melting snow. Slush snow is recognizable by depressions in the snow with darker or bluish snow areas. These areas show holes in the ice or an accumulation of water on the surface of the ice. Skiing on this type of snow is not advisable.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What do skis slide on?

Q2. What do new snow crystals (flakes) look like?

Q3. What type of snow has the lowest moisture content?

ANTICIPATED ANSWERS:

A1. Skis slide on the thin layer of moisture that is between the snow and the ski surface.

A2. New snow crystals (flakes) have many points and arms.

A3. Powder snow has the lowest moisture content.

Teaching Point 2 **Explain, demonstrate and have the cadets select and fit cross-country ski equipment.**

Time: 30 min Method: Demonstration and Performance

For this TP it is recommended that instruction take the following format:

1. Introduce the parts and characteristics of cross-country skis.
2. Demonstrate selection and sizing of cross country ski equipment.
3. Have assistant instructors issue the cadets cross-country ski equipment, using the sizing information recorded on the cadet's Cross-Country Ski Equipment Sizing Information Form. Have the cadets form a line to receive the items in the following order:
   a. cross-country skis,
   b. ski boots, and
   c. ski poles.
4. Monitor the cadets and check sizing as they practice the steps to fitting cross-country ski equipment.
5. Conduct equipment exchanges as required.
6. Label each cadet's cross-country ski equipment with gear or masking tape.

Note: Assistant instructors will be required to distribute cross-country ski equipment and monitor the cadets' performance.

Cadets have no option in the type of skis / bindings / boots that are used. Type will depend on expedition centre stores.

Cross-country skiing is a fun and challenging sport with origins dating back hundreds of years. Norwegian and Scandinavian immigrants brought the sport of cross-country skiing to North America in the late 1800s. While it was initially used as a mode of transportation for hunters, miners, and mail carriers, it has progressed into a winter sport that can be enjoyed by all ages and all fitness levels.

Cross-country skiing can be grouped into three categories:

- ski touring,
- track skiing, and
- backcountry skiing.

Ski touring. The broadest and most versatile category of cross-country skiing. Ski touring does not require groomed trails—skiers can walk out their 'backdoor' and enjoy nature in a park, through a forest, or along a country road.

SELECT CLASSIC CROSS-COUNTRY SKIS

Cross-country skiing is a sport that can be conducted with little or no training, which is what makes it so popular. It is critical that skiers have properly fitted equipment. Properly fitted equipment increases overall skiing efficiency, staves off injuries and increases personal enjoyment.

Parts of a Ski

1. **Tip.** The front of the ski.
2. **Tail.** The back of the ski.
3. **Waist.** The middle of the ski.
4. **Ski base.** The underside of the ski.
5. **Topsheet.** The upper surface of the ski.
6. **Sidewalls.** The sides of the ski.
7. **Edge.** Where the sidewall meets the ski base.

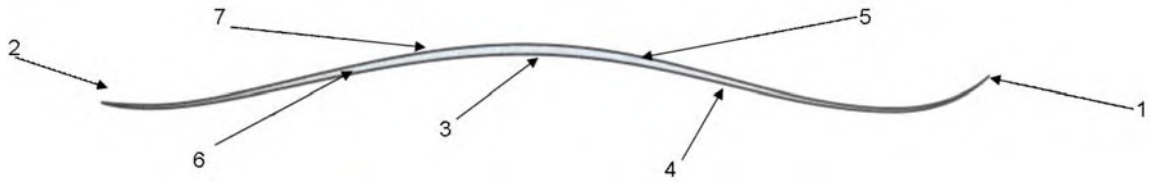


Figure 4 Parts of a Ski

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (p. 59), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Characteristics of Cross-Country Skis

1. **Camber.** The arch of a ski from tip to tail as it lies ski base down on a flat surface. Camber allows a ski to be thin and light but still support the skier's weight. Camber of a ski can be manipulated to control where and how much pressure is applied to the snow along the length of the ski.

Camber can be explained by thinking about an arched bridge versus a flat bridge. The weight and pressure of an arched bridge is transferred from the middle of each span to the support piers—allowing for lighter materials to be used and the space below the arch not requiring much support. To carry the same amount of weight, a flat bridge needs to be constructed from stronger materials and supported by piers along its entire length.

2. **Width.** The width of a ski depends on the type of snow the individual is skiing on. The softer the snow, the wider the ski should be. Likewise, if skiing on machine-groomed, hard-packed trails, a narrower ski is recommended.

3. **Length.** Classic cross-country skis are typically longer than skating skis. This is because skating skis are usually used on machine-groomed, hard-packed trails and do not require the ski to float to the surface of deep snow.

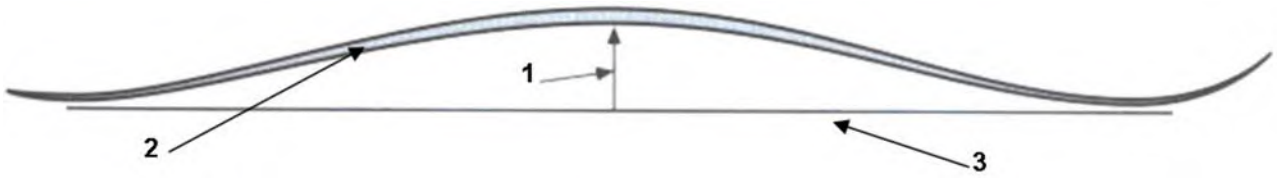


Figure 5 Characteristics of Skis

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (p. 59), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Selecting Skis

The chart below is a rough guide to follow when selecting a ski length. When selecting a ski length, it is always recommended that the manufacturer's sizing chart be consulted.

Ski Length	Carrying Capacity
168 cm	90–130 lbs
168, 178 cm	130–150 lbs
178, 188 cm	150–180 lbs
188 cm	180–220 lbs

The most common types of bindings used when cross-country skiing are:

- three-pin (75 mm), and
- system.

Three-pin bindings. Three-pin bindings work with boot soles and are shaped like a duckbill at the toe. The three pins at the front of the binding fit into three holes in the toe of the boot. A bar called a bail levers down from the upturned sides of the binding to clamp the toe of the boot sole to the ski and is held in place by a catch at the front. The duckbill that mates with the binding is 75 mm wide.

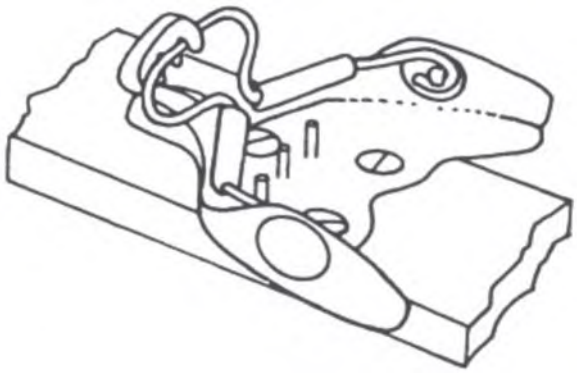


Figure 6 Three-Pin Binding

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (p. 20), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

System bindings. There are two types of system bindings—Salomon Nordic System (SNS) and New Nordic Norm (NNN). They are not interchangeable. In both models, the ski boots have a deep channel in the sole and a bar beneath the toe that clips into the binding. A wide ridge mounted on the ski extends to the rear from the point where the bar mates with the binding. This ridge fits into the channel in the boot to provide side-to-side control.

Figure 7 NNN System Binding

Note. From *Back Country Ski Bindings* by In My View…Things as I see Them, 2009. Retrieved May 1, 2009, from http://1.bp.blogspot.com/_UFDhrGObeFc/SWWjkvg_8KI/AAAAAAAAArM/qmVXzDiE1ek/s400/nnnBCbindings.jpg

SELECT SKI BOOTS

Skis are guided and controlled through the boots, so it is important that they fit well. Boots are made from a variety of materials from all leather, to modelled plastic to a combination of materials. Lighter boots provide more freedom but offer less support. Heavier boots provide more support but usually restrict movement and are harder to fit. Boots that are too tight / loose may cause the skier incredible discomfort—resulting in blisters, frost bite, a twisted ankle, etc.

Figure 8 Three-Pin Binding Boots

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.) (p. 23), by W.J. Lederer & J.P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 9 NNN Binding Boots

Note. From *Back Country Ski Bindings* by In My View… Things as I see Them, 2009. Retrieved May 1, 2009, from http://1.bp.blogspot.com/_UFDhrGObeFc/SWWjkvg_8KI/AAAAAAAAArM/qmVXzDiE1ek/s400/nnnBCbindings.jpg

To check the fit of boots, slide the foot as far forward as it will go when standing up. With the toes just touching the front of the boot, there should be just enough room to slide the forefinger behind the heel.

SELECT SKI POLES

Ski poles are an integral part of cross-country skiing. Most techniques in cross-country skiing require the skier to not only use their skis, but their arms (poles) as well. Ski poles help the skier maintain balance while climbing inclines, when going downhill and when going forward.

Telescopic poles allow for adjustments for all sizes of skiers.

Parts of a Ski Pole

Ski poles have a variety of parts, they are:

1. **Basket.** Keeps the shaft of the ski pole from becoming fully submersed in the snow.
2. **Tip.** Allows the pole to dig into snow, ice and dirt so the skier gets a strong push.
3. **Shaft.** Is the main part of the pole—should be made from a strong material so it does not bend under pressure.
4. **Handle.** The handle is ergonomically designed for the comfort the skier.
5. **Strap.** Ensures that the pole moves with the skier.

Figure 10 Parts of a Ski Pole

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (p. 73), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Characteristics of Ski Poles

A good ski pole should have the following characteristics:

- a medium-sized basket (the deeper the snow, the larger the basket should be),
- an adjustable strap,
- a weight distribution that concentrates the weight near the handle, and
- minimal bend when pressure is placed on it.

Sizing Ski Poles

Sizing ski poles to fit a cross-country skier requires the skier to stand up straight and hold the pole close to the body. The pole, when held upright, should come to a height in-between the top of the chest and the armpit.

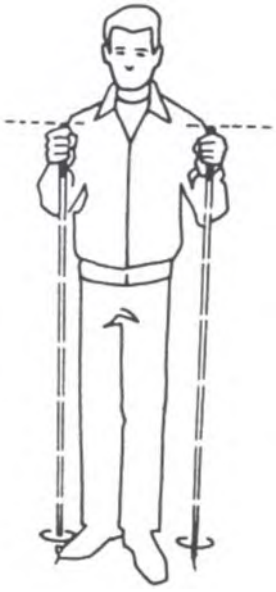


Figure 11 Sizing Ski Poles

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (p. 26), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

FIT CROSS-COUNTRY SKI EQUIPMENT

The following process should be used to fit cross-country ski equipment:

1. Put on ski boots.
2. Adjust poles to proper size.
3. Find a flat spot where the snow is firm.
4. Place the skis on the snow side by side (about 30 cm [1 foot] apart).
5. Place poles into the snow, within reach, one on each side of the skis.
6. Identify the type of binding being used (three-pin or system).

Tell cadets what bindings are being used.

7. Attach the ski boot to the ski with:
    a. a three-pin binding by:
        (1) opening the bail (the bar that levers down from the upturned sides of the binding to clamp the toe of the boot sole to the ski);
        (2) brushing the snow off the bottom of the right (left) ski boot and the right (left) ski binding;
        (3) sliding the square toe of the boot into the toe piece of the binding beneath the open bail;
        (4) pressing down with the ball of the foot to push the three pins of the binding into the ski boot (ensure that the pins are aligned before pressing down);
        (5) closing the bail by pushing down and clamping it to the plate; and
        (6) completing the process again for the other ski; and

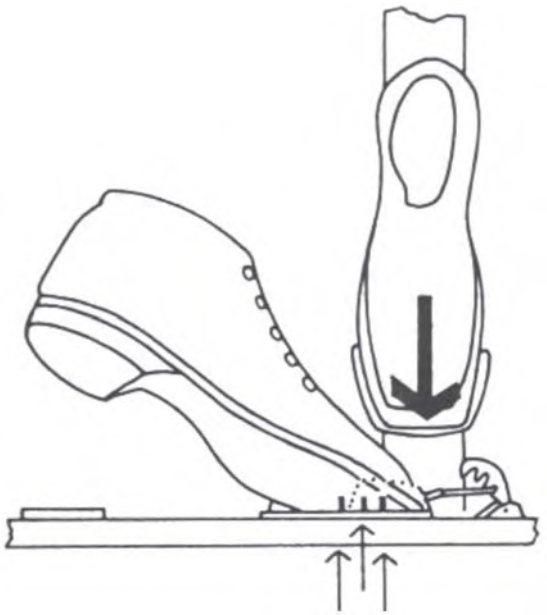


Figure 12 Attaching a Ski Boot to a Three-Pin Binding

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.) (p. 36), by W.J. Lederer & J.P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

There is a left and a right ski when using three-pin bindings. The part of the binding which flares out is always on the outside.

b. a system binding by:

(1) pulling up on the toe piece to open the binding;

Some system bindings are automatic and do not require the binding to be opened. If the toe piece does not pull up, then it is automatic.

(2) brushing the snow off the bottom of the right (left) ski boot and the right (left) ski binding;

(3) placing the bar located on the bottom of the toe piece of the ski boot into the slot on the binding;

(4) pushing down with the ball of the foot to force the bar into the slot;

(5) closing the toe piece if manual bindings are being used or listening for the click of the binding locking if automatic bindings are being used; and

(6) completing the process again for the other ski.

8. Grasp the ski poles by moving each hand up the shaft of the pole and into the strap from the bottom so that the thumb rests over the strap.

Figure 13 Grasping the Ski Pole

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (p. 41), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

CONFIRMATION OF TEACHING POINT 2

The cadets' fitting of cross-country ski equipment will serve as the confirmation of this TP.

Teaching Point 3 **Explain, demonstrate and have the cadets practice classic cross-country ski techniques along a route.**

Time: 220 min Method: Demonstration and Performance

The purpose of this TP is to provide cadets instruction on cross-country ski techniques and once a level of proficiency has been established in each skill, for the cadets to travel a designated route for 6–10 km.

For this skill TP it is recommended that instruction take the following format:

1. Explain and demonstrate each skill while the cadets observe.
2. Explain and demonstrate the steps to complete each skill while the cadets observe. Monitor the cadets as they practice each step.
3. Monitor the cadets' performance as they practice each skill.

Assistant instructors will be required to monitor the cadets' performance.

The ideal area for learning cross-country ski techniques is relatively flat, with a gentle hill in close proximity. It is better to have packed snow, rather than deep snow or ice.

CROSS-COUNTRY SKI TECHNIQUES

Cross-country skiing is a sport that requires very little skill. Anybody can put on a pair of skis and play in the snow. Understanding stroke mechanics and techniques will, however, make skiing more efficient and enjoyable.

Having the correct body position when cross-country skiing is very important. When in the proper cross-country ski position, the skier is in a relaxed half-sitting position. The feet are flat, knees slightly bent, the head should be up, and the poles lightly grasped.

Falling Down

No matter how good a cross-country skier a person is, there is always a chance that they will fall down. It is not the falling that is difficult when cross-country skiing. Getting up after the fall is what most people struggle with.

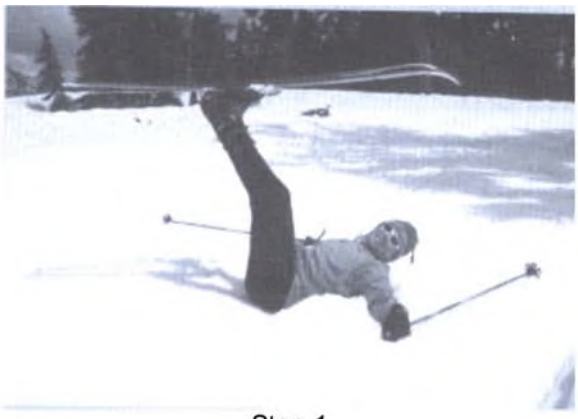
If a skier feels like they have lost their balance / they are going to fall:

1. Check the area for rocks or tree stumps to avoid, if possible.
2. Sit down to one side or the other of the skis.
3. Keep legs below the rest of the body.
4. Dig the skis into the snow to stop any forward momentum.

It is dangerous for a skier to fall forward onto their knees. This could injure the skier's knees / ankles. As well, when falling forward, a person generally sticks their arms out to break the fall—this could result in an injury.

To get up after a fall:

1. Roll onto their back and stick their limbs, skis and poles into the air to untangle them.
2. Place skis below the body.
3. Keep legs extended.
4. Slide hips towards the tips of the skis (if on a hill stop just beside the skis, if on flat ground place chest on skis).
5. Come to one knee (plant poles to assist with coming to one knee).
6. Stand up.



Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Figure 14 Steps to Getting Up After Falling Down

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (pp. 36–37), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Stopping

For their own safety and for the safety of those around them, it is extremely important that cross-country skiers are able to slow down and stop themselves on flat ground and on hills. The principles for both are the same and require the skier have constant control of their body and their skis. A cross-country ski glides most effectively when it is flat on the ski base. A ski begins to loose forward momentum as soon as it is tipped to either edge. Therefore to stop, the skier must tip the ski to the edge—this is called edging.

Edging can be done when the skis are parallel or when they are in a wedge position—tips together, tails spread apart to form an 'A'.

The wedge position is also sometimes referred to as the snowplow position. Some may be more familiar with this term as it is also used in downhill skiing.

There are two types of wedging:

- the half wedge, and
- the full wedge.

To slow down / stop using the half wedge:

1. Decide which ski they are going to move into the half wedge position.
2. Keep one ski parallel.
3. Move into the half wedge position by:
    a. bringing the knees together;
    b. keeping the tips of the skis together; and
    c. moving the tail of the desired ski outward by pushing the heel out and the toes inward.
4. Angle the inside edge of the wedged ski into the snow by rolling the ankle inward (the more the edge is angled into the snow, the faster the skier will slow down / stop).

Figure 15 Half Wedge

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (p. 50), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

To slow down / stop using the full wedge:

1. Sink into a crouch.
2. Bring the knees together and point them toward the tips of the skis.
3. Keep the tips of the skis together (but not touching).
4. Move the tails of the skis outward by pushing the heels outward and the toes inward.
5. Angle the inside edges of the wedged skis into the snow by rolling the ankles inwards (the more the edge is angled into the snow, the faster the skier will slow down / stop).

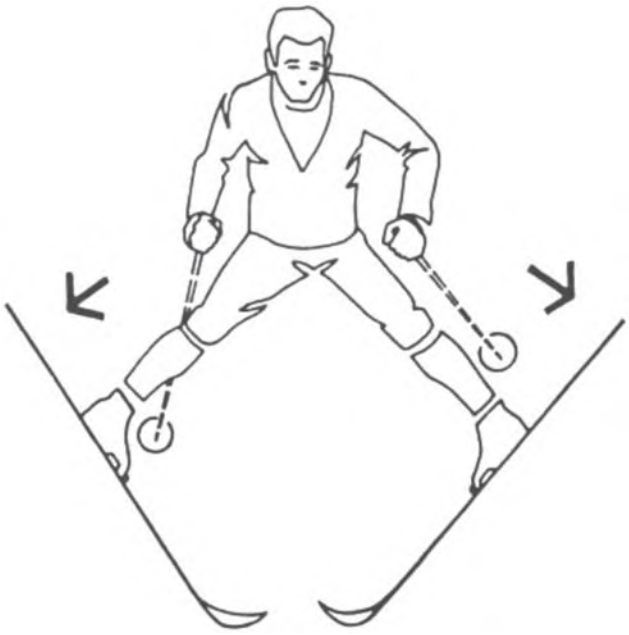


Figure 16 Full Wedge

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (p. 52), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Changing Direction

Whenever on cross-country skis there is always a requirement for the skier to change direction of travel. It is a fairly simple process that requires practice in order to perfect it.

For new cross-country skiers, it is recommended that they stop before attempting to change direction. Once they become more proficient, they may employ these skills while moving.

Changing direction can be carried out by picking up the tip, the tail or the entire ski, one at a time, and moving it toward the new direction of travel—then repeating the process with the other ski. Depending on the degree of the turn, the skier may need to complete this process a number of times before reaching the desired direction.

To change direction:

1. Assume the half-sitting position.

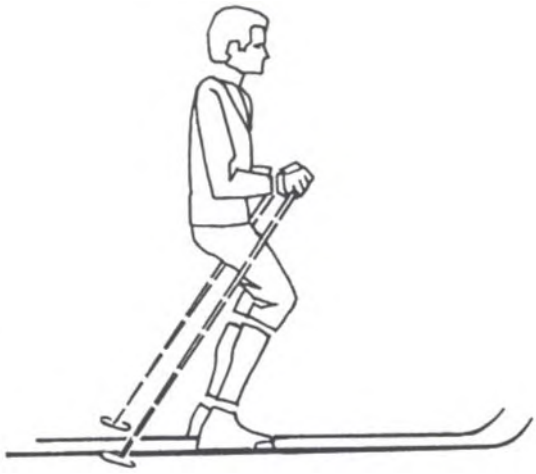


Figure 17 Half Sitting Position

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (p. 40), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

2. Move the left (right) ski forward until left (right) boot toe is just ahead of the right (left) boot toe.
3. Lift the tip of the left (right) ski about 30 cm (1 foot) off the ground.
4. Move the lifted ski slightly to the left (right), about an arc of 30 degrees.
5. Place the left (right) ski on the ground and transfer the weight to it.
6. Bring the right ski around, in the same manner, to meet the left ski.
7. Repeat Steps 2–6 until facing the desired direction.

Figure 18 Changing Direction

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (pp. 42–43), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

Figure 19 Ski Tracks When Changing Direction

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (pp. 42–43), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

To pick up the tip of the ski, the skier has to:

1. lift their toes so they come up to the top of the ski boot;
2. flex their foot up to their shin; and
3. lift their knee toward their chest.

To pick up the tail of the ski, the skier has to:

1. curl their toes down against the sole of their ski boot;
2. bring their heel to their butt; and
3. keep their knees close together.

Moving forward when cross-country skiing requires the skier to incorporate balance, glide, grip, rhythm, and poling.

Balance. To maintain balance, skiers have to constantly adjust their centre of gravity with their hips and upper body centred over their skis as they glide.

Glide. Moving the body forward from the ankles puts the body in motion and allows the skier to 'keep up' with their feet and glide more with each stride.

Grip. Glide can not occur without good grip. Cross-country skis have a grip zone centred beneath the ball of the foot in the middle of the ski. This grip zone makes the ski stick to the snow when pressure is applied by the skiers foot during the push of each stride.

Rhythm. Skiers must develop a slow and steady rhythm to their stride, moving effortlessly from one ski to the next. For some, this is a difficult concept, but can be developed with practice.

Poling

There are two different poling techniques that a cross-country skier can use, to include:

- **Diagonal poling.** Uses the pole opposite of the gliding ski to create additional forward motion of the skier. The skier plants and pushes with only one pole at a time; and
- **Double poling.** Simultaneously uses both poles to propel the skis and skier forward. Used to go down gentle slopes in order to gain speed and on flats when the skier is not using the diagonal stride.

The following poling principles should be considered:

- Poles can not push forward unless they are angled to the rear.
- The skier gets a stronger push when their arms are bent rather than straight.
- Pushing the pole back rather than down converts more of the skiers energy into forward motion at the end of a stroke.
- The skier should use their body weight, not just their arms—pull with their core, to move forward.
- The skier should concentrate on pushing with their poles rather than bringing them forward.

To diagonal pole:

1. Assume the half-sitting position.
2. Move the left ski so that it is forward of the right ski.
3. Lean forward.
4. Transfer the weight to the left ski.
5. Plant the right pole just ahead of the left ski boot (to the right of the path that the right ski will take) with the handle ahead of the basket.
6. Simultaneously push off with the left ski and push the right pole back (ensure that core strength is used, not just the arms).
7. Recover by lifting the left pole.
8. Repeat the process with the other pole.

Figure 20 Diagonal Poling / Diagonal Stride

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (p. 146), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

To double pole:

1. Assume the half-sitting position.
2. Keep the elbows close into the body.
3. Round the back;
4. Lean forward.
5. Plant the poles just ahead of the ski boots (handles should be ahead of the baskets).

6. Contract the stomach muscles.
7. Push forward and extend the arms back.
8. Stand up.
9. Allow the arms and poles to swing forward.
10. Prepare for the next pole plant.

Figure 21 Double Poling

Note. From *Cross-Country Skiing: Building Skills for Fun and Fitness* (p. 43), by S. Hindman, 2006, Seattle, WA: The Mountaineers Books. Copyright 2005 by The Mountaineers Books.

Executing the Diagonal Stride

When cross-country skiing, the most frequently used way to move forward is by executing the diagonal stride. It is called the diagonal stride because the right leg and the left pole (and vice versa) work together to move the skier forward. The diagonal stride technique makes for greater forward thrust and easy balance.

The body movement when executing the diagonal stride is the same as marching.

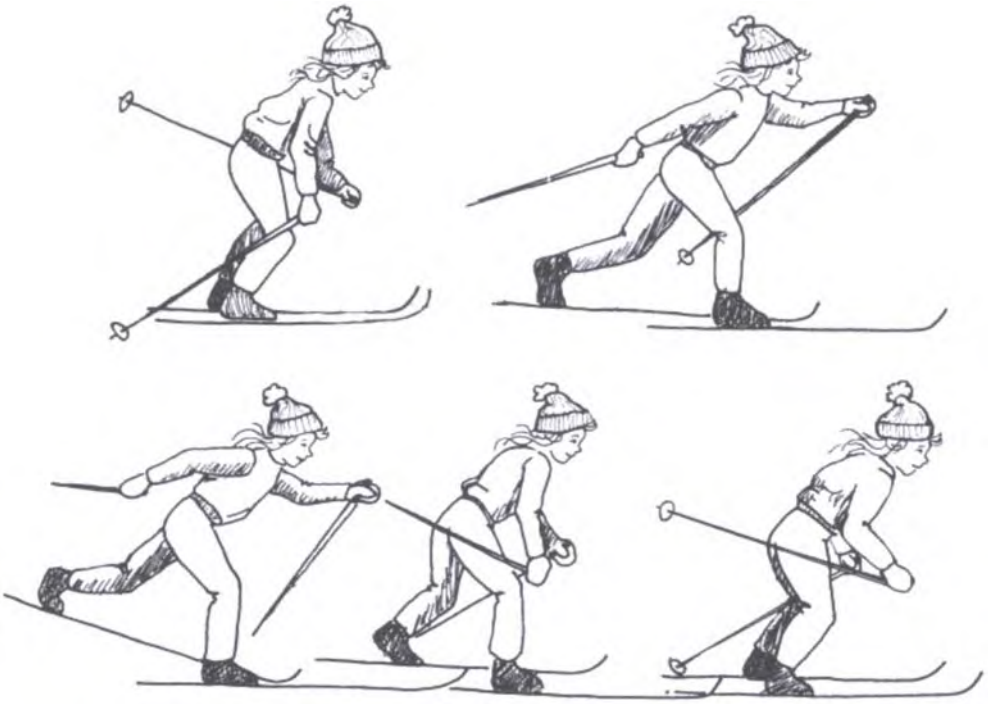


Figure 22 Diagonal Stride Technique

Note. From *Ski Games: A Fun-Filled Approach to Teaching Nordic and Alpine Skiing* (p. 92), by L. Gullion, 1990, Champaign, IL: Leisure Press. Copyright 1990 by Laurie Gullion.

The steps to execute the diagonal stride are the same as those to diagonal pole.

Ascending Hills

The biggest factor that affects a skier's ability to traverse up a hill is grip. Grip comes from the skier staying over their feet and pushing their skies straight down into the snow. There are two different techniques that can be used to ascend hills:

Herringbone. A technique used to climb straight up a hill on the inside edges of the skis with the tips farther apart than the tails. A skier using the herringbone technique to ascend a hill leaves an imprint that resembles the skeleton of a fish.

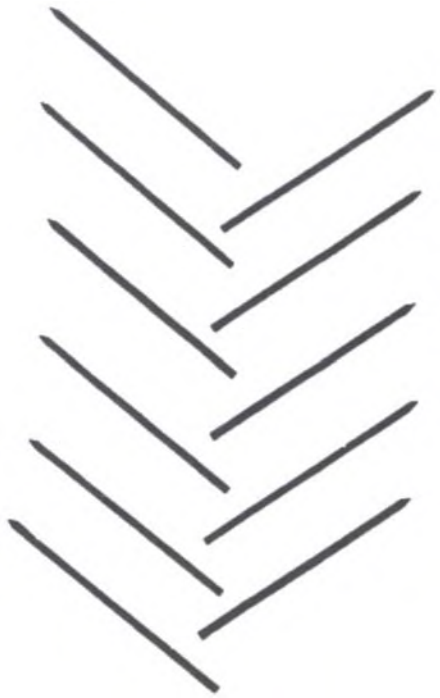


Figure 23 Herringbone Tracks

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (p. 90), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

To use the herringbone technique to ascend a hill:

1. Place skis into a 'V' formation (the tails should be close together).
2. Turn the legs out.
3. Transfer the weight onto the left (right) foot.
4. Lift up the right (left) ski and move it forward.
5. Plant the left (right) pole behind the left (right) ski.
6. Repeat until reaching the top of the hill.

Figure 24 Herringbone Technique

Note. From *Complete Cross-Country Skiing and Ski Touring* (2nd ed.), (p. 91), by W. J. Lederer & J. P. Wilson, 1970, Toronto, ON: George J. McLeod Ltd. Copyright 1970 by William J. Lederer and Joe Pete Wilson.

On steep hills, the skier has to dig in the edges of their skis to maintain grip and position.

Side step. Is a technique where the skier places their skis horizontal to the hill and moves upward using short side steps. A skier uses the side step when a hill gets too steep, the snow becomes too deep, or the herringbone becomes too tiring.

To use the side step technique to ascend a hill:

1. Place the skis horizontal to the hill to be ascended.
2. Keep the body upright and centred over the skis.
3. Move the torso sideways and up the hill.
4. Plant the pole ahead of them.
5. Lift and move the ski up.
6. Dig the edge of the ski into the snow.
7. Repeat until the top of the hill is reached.

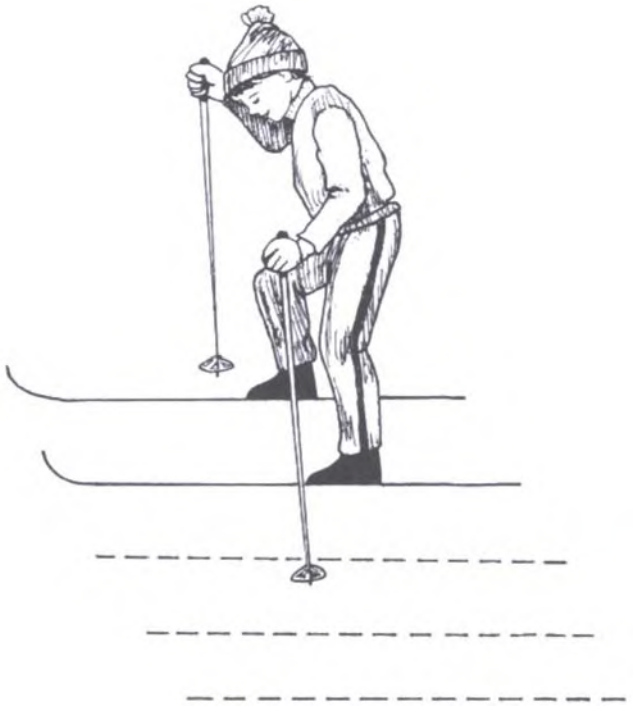


Figure 25 Side Step Technique

Note. From *Ski Games: A Fun-Filled Approach to Teaching Nordic and Alpine Skiing* (p. 100), by L. Gullion, 1990, Champaign, IL: Leisure Press. Copyright 1990 by Laurie Gullion.

Descend a Hill

The most important factors to descending a hill safely are balance and control. A skier should never just turn their skis downhill and go—the descent must always be controlled. In other words, the skier must always be ready to slow down or stop.

When descending a hill:

1. Adopt the half-sitting position.
2. Keep the head up and look forward.
3. Move the skis so that they are just under shoulder width apart.
4. Ensure the feet are flat on the skis.
5. Look down the slope to make sure there are no obstacles.
6. Drop the hands to thigh level.
7. Hold the pole shafts toward the back, keeping the baskets off the snow.
8. Glide down the hill.
9. Slow down / stop by executing a full wedge.

ACTIVITY

Time: 120 min

OBJECTIVE

The objective of this activity is to have the cadets, in teams of no more than six, ski along a route for 6–10 km with an expedition field pack to practice cross-country ski techniques.

RESOURCES

- Personal expedition equipment,
- Personal cross-country ski equipment,
- Group cross-country ski equipment, and
- Water carrier (one per cadet).

ACTIVITY LAYOUT

Nil.

ACTIVITY INSTRUCTIONS

1. Conduct a briefing to include an explanation of:
    a. the objectives and importance of the activity,
    b. the resources that may be required to perform the activity, and
    c. any safety guidelines that must be followed while performing the activity.
2. Have the cadets retrieve their cross-country ski equipment and expedition field packs.
3. Have the cadets, in teams of no more than six, cross-country ski with an expedition field pack, following the designated route for a distance of 6–10 km during an expedition to practice:
    a. falling;
    b. stopping using:
        (1) the half wedge, and
        (2) the full wedge;
    c. changing direction;
    d. poling by:
        (1) diagonal poling, and
        (2) double poling;
    e. executing the diagonal stride;

f. ascending hills by:

(1) employing the herringbone technique; and

(2) employing the side stepping technique; and

g. descending hills.

4. Upon arrival at the end point, have the cadets remove, clean and inspect their cross-country ski equipment for damage and then store / return all equipment.

5. Conduct a debriefing by asking the cadets:

a. how they felt about the activity;

b. how they felt their team worked together;

c. what portion of the activity challenged them the most;

d. how their teammates assisted them when they were challenged;

e. if there are any specific examples of when their team bonded;

f. how the team made decisions;

g. whether or not all team members ideas / suggestions were considered; and

h. what they would do as a leader of this type of activity to ensure their subordinates enjoyed the experience.

SAFETY

- The Team Instructor(s) (TI) must be in sight or sound of the team at all times.
- In areas of complex / technical terrain, TI(s) will demonstrate requisite skills as required.
- Teams will travel separately on the same trail.
- There will be a minimum of 500 m between teams at all times.
- Cadets must travel in single file at all times.
- Cadets must have at least 1 L of water.
- Water resupply points will be located along the route.
- Meals will be provided at a predetermined location(s) and detailed in the route instructions.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in cross-country skiing along a route will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This lesson is assessed IAW A-CR-CCP-704/PG-001, *Gold Star Qualification Standard and Plan*, Chapter 3, Annex B, 426 PC.

CLOSING STATEMENT

Skiing is a fun and challenging mode of travel that can be used during winter expeditions. Being aware of the different types and characteristics of snow and ice helps ensure the safety of all expedition participants. Possessing the ability to execute classic cross-country ski techniques makes the experience more enjoyable and the expedition more efficient.

INSTRUCTOR NOTES / REMARKS

Expedition centres are required to select two dynamic modes of travel from EO M426.02a (Paddle a Canoe), EO M426.02b (Ride a Mountain Bike), EO M426.02c (Hike Along a Route), EO M426.02d (Snowshoe Along a Route) and EO M426.02e (Ski Along a Route) to incorporate into the expedition training.

This EO has been allocated nine periods in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources at the expedition centre.

Upon arrival at the expedition centre, cadets will be divided into teams. Cadets will be given an opportunity to navigate and lead peers. These teams will remain the same for the duration of the weekend.

Total distance for the cross-country ski route may be adjusted depending on trail availability and skill level of participants.

IAW A-CR-CCP-951/PT-002, *Royal Canadian Army Cadets Adventure Training Safety Standards*:

1. the following personal cross-country ski equipment is required when cross-country skiing:
    a. ski boots,
    b. skis,
    c. poles,
    d. appropriate cold-weather clothing, and
    e. a whistle;
2. the following group cross-country ski equipment is required when cross-country skiing:
    a. topographical / trail map of area as required,
    b. compass,
    c. first aid kit,
    d. communication device (eg, cellular phone or hand-held radio),

e. GPS receiver, and

f. cold weather emergency kit appropriate to the activity; and

3. weather must be continuously assessed. If the temperature falls below -20°C (with the wind-chill factor calculated in), cadets must be brought inside.

REFERENCES

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CROSS-COUNTRY SKI EQUIPMENT SIZING INFORMATION FORM

Name: _____ **Team:** _____ **Height:** _____ **Weight:** _____ **Shoe Size:** _____	**Name:** _____ **Team:** _____ **Height:** _____ **Weight:** _____ **Shoe Size:** _____
Name: _____ **Team:** _____ **Height:** _____ **Weight:** _____ **Shoe Size:** _____	**Name:** _____ **Team:** _____ **Height:** _____ **Weight:** _____ **Shoe Size:** _____

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