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Royal Canadian Air Cadets

SQUADRON TRAINING



LEVEL

3



Canada



National Défence
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A-CR-CCP-268/PT-001

ROYAL CANADIAN AIR CADET MANUAL

PROFICIENCY LEVEL THREE HANDBOOK

**(Supersedes A-CR-CCP-268/PT-001
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LIST OF EFFECTIVE PAGES (Cont)

Page No.	Change No.
vii to xviii.....	0
1-1 to 1-12	0
2-1 to 2-9/2-10	0
3-1 to 3-7/3-8	0
4-1 to 4-5/4-6	0
5-1 to 5-22.....	0
6-1 to 6-15/6-16	0
7-1 to 7-25/7-26	0
8-1 to 8-26.....	0
9-1 to 9-17/9-18	0
10-1 to 10-11/10-12	0
11-1 to 11-12	0
12-1 to 12-35/12-36	0

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FOREWORD

1. A-CR-CCP-268/PT-001, Royal Canadian Air Cadet Manual, Proficiency Level Three Handbook, is issued on authority of the Chief of the Defence Staff.
2. This publication is effective on receipt and supersedes A-CR-CCP-268/PT-001 dated 1992-09-01.
3. Requests for changes to this publication are to be sent through NDHQ, Attention: D Cdts 4.

PREFACE

1. A-CR-CCP-268/PT-001 is intended to be used as a handbook for study and reference by Royal Canadian Air Cadets in training at their local squadron.
2. A-CR-CCP-268/PT-001 is based on the Course Training Standard and Course Training Plan for Level Three found in A-CR-CCP-265/PC-001 and A-CR-CCP-268/PH-001, respectively, and is intended for use by air cadets in their first training year of the Air Cadet programme.

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CONTENTS

	PAGE
CHAPTER 1 – PERFORMANCE OBJECTIVE 401	
– DRILL	1-1
Section 1 – Introduction	1-1
Section 2 – Key to Symbols	1-1
Section 3 – Flight Drill	1-2
Flight or Squad?	1-2
Ordering a Flight on Parade	1-2
Dressing a Flight	1-2
Flight Formations	1-3
Flight in Line	1-4
Flight in Column of Threes	1-4
Flight in Column of Route	1-6
Directing Flank	1-6
Section 4 – Words of Command	1-8
Move to the Right, Move to the Left, Retire or Advance?	1-11
By the Left or By the Right?	1-11
Section 5 – Inspection	1-11
Section 6 – Conclusion	1-12
CHAPTER 2 – PERFORMANCE OBJECTIVE 402 – DRILL	
INSTRUCTION	2-1
Section 1 – Introduction	2-1
The Drill Instructor	2-1

CONTENTS (Cont)

	PAGE
Section 2 – The Drill Lesson	2-2
Teaching Drill	2-2
Calling Out the Time	2-3
Type of Formation	2-4
The Hollow Square Formation	2-4
Instructional Techniques	2-5
Mechanical Aids to Drill	2-6
"As You Were"	2-7
Section 3 – Conclusion	2-7
SOMETHING TO THINK ABOUT	2-9/2-10
CHAPTER 3 – PERFORMANCE OBJECTIVE 403 – GENERAL CADET KNOWLEDGE	3-1
Section 1 – Level 3	3-1
Section 2 – Summer Camps	3-2
Prerequisites	3-3
Course Categories	3-4
Section 3 – The Chain of Command	3-5
Communication	3-6
CHAPTER 4 – PERFORMANCE OBJECTIVE 404 – CITIZENSHIP	4-1
Introduction	4-1
Air Force Association of Canada (AFAC)	4-1
AFAC Activities	4-2

CONTENTS (Cont)

	PAGE
Membership Criteria	4-3
Membership Categories	4-3
Wing Activities	4-3
Member Benefits	4-4
Airforce Magazine	4-4
AFAC and the Air Cadets	4-5/4-6
Conclusion	4-5/4-6
CHAPTER 5 – PERFORMANCE OBJECTIVE 405 – PHYSICAL FITNESS	5-1
Section 1 – General	5-1
Section 2 – Components of a Session	5-2
Warm-up	5-2
Activity	5-3
Cool-down	5-6
Section 3 – Crests.....	5-6
Section 4 – Preparation	5-7
CHAPTER 6 – PERFORMANCE OBJECTIVE 406 – SENSIBLE LIVING	6-1
General	6-1
Nutrition	6-1
Fire Prevention and Safety	6-1
CHAPTER 7 – PERFORMANCE OBJECTIVE 408 – LEADERSHIP	7-1
Section 1 – Introduction	7-1

CONTENTS (Cont)

	PAGE
Section 2 – Wants of a Follower	7-1
Section 3 – Motivation	7-3
Needs of a Follower	7-4
Incentives to Performance	7-5
Section 4 – Leadership Approaches	7-9
Flexibility	7-11
Section 5 – Qualities of a Leader	7-12
Section 6 – The Order Giving Process	7-13
Types of Orders	7-13
Written Orders – Verbal Orders	7-15
The Order Giving Process	7-16
Section 7 – Supervision	7-17
How to Supervise	7-17
When to Supervise	7-18
Who to Supervise	7-18
What to Supervise	7-19
Section 8 – Conclusion	7-19
Section 9 – Case Studies	7-21
Case Study No. 1	7-21
Case Study No. 2	7-22
Case Study No. 3	7-23
Case Study No. 4	7-23
Case Study No. 5	7-24

CONTENTS (Cont)

	PAGE
Case Study No. 6	7-24
MOMENTS OF REFLECTION	7-25/7-26
CHAPTER 8 – PERFORMANCE OBJECTIVE 409 – INSTRUCTIONAL TECHNIQUES	8-1
Section 1 – Introduction	8-1
Section 2 – The Instructor	8-2
Section 3 – Principles of Instruction	8-3
First Principle – Emphasizing Key Points	8-3
Second Principle – Participation	8-4
Third Principle – Interest	8-4
Fourth Principle – Confirmation	8-5
Fifth Principle – Comprehension	8-5
Sixth Principle – Success	8-6
Section 4 – Verbal Support	8-6
Comparisons	8-7
Reasons	8-7
Examples	8-7
Statistics	8-8
Testimony	8-8
Section 5 – Questioning Methods	8-8
Types of Questions	8-9
Characteristics of a Good Question	8-10
How to Ask Questions	8-11

CONTENTS (Cont)

	PAGE
Section 6 – Preparing a Lesson	8-11
The Course Training Plan	8-12
Performance Objective	8-13
Enabling Objective	8-13
Lesson Specifications	8-14
The Lesson Plan	8-15
Preparing the Lesson Plan	8-16
Introduction	8-16
Development	8-17
Performance Check	8-18
Conclusion	8-19
Section 7 – Instructional Aids	8-23
Guidelines for Use	8-23
Sources of Ideas	8-24
Types of Instructional Aids	8-24
A Few Suggestions	8-25
Section 8 – Conclusion	8-26
CHAPTER 9 – PERFORMANCE OBJECTIVE 416 – PROPULSION	9-1
Section 1 – Introduction	9-1
Section 2 – Propeller	9-1
Blade Angle	9-2
Pitch	9-2
Types of Propellers	9-4

CONTENTS (Cont)

	PAGE
Section 3 – Fuel System	9-6
Fuel Tanks	9-6
Fuel Systems	9-6
Problems with the Fuel System	9-7
Detonation	9-7
Pre-ignition	9-7
Vapour Lock	9-8
Section 4 – The Carburettor	9-8
Role of the Carburettor	9-8
Mixture Control	9-8
How the Carburettor Works	9-9
Section 5 – Supercharging	9-12
Section 6 – Turbocharging	9-13
Section 7 – Engine Instruments	9-13
TEST YOURSELF	9-17/9-18
CHAPTER 10 – PERFORMANCE OBJECTIVE 417 – NAVIGATION	10-1
Section 1 – Introduction	10-1
Section 2 – Types of Navigation	10-1
Section 3 – Navigation Procedures for a Flight	10-2

CONTENTS (Cont)

	PAGE
Section 4 – Earth	10-3
Shape of the Earth	10-3
Rotation of the Earth	10-3
Latitude and Longitude	10-4
Earth's Magnetism	10-5
Variation	10-6
Isogonic Lines	10-6
Agonic Lines.....	10-7
Section 5 – Geographical Co-ordinates	10-7
Determine the Direction	10-7
Direction Expressed as an Angle	10-8
True Direction	10-9
Section 6 – Conclusion	10-10
SOMETHING TO THINK ABOUT	10-11/10-12
CHAPTER 11 – PERFORMANCE OBJECTIVE 418 – RADIO COMMUNICATION	11-1
Section 1 – Speech Transmission Techniques	11-1
Time and Date	11-2
Section 2 – Procedural Words and Phrases	11-2
Section 3 – Message Handling Procedures	11-5
Radio-telephone Calling Procedure	11-6
Single Station Call	11-6
General Call	11-7
Multiple Station Call	11-7

CONTENTS (Cont)

	PAGE
Replying	11-7
Corrections	11-8
Section 4 – Distress Communications	11-9
Distress Message	11-10
Acknowledgement of Receipt of a Distress Message	11-10
Section 5 – Urgency Communications	11-11
Urgency Message	11-11
False Distress Signal	11-12
District Offices of the Department of Communications	11-12
CHAPTER 12 – PERFORMANCE OBJECTIVE 419 – AIRCREW SURVIVAL	12-1
Section 1 – Introduction	12-1
Section 2 – Types of Maps and Their Use	12-2
Section 3 – Care and Maintenance of Map Sheets	12-3
How to Fold a Map	12-4
Section 4 – Marginal Information Found on Topographical Maps.....	12-5
Conventional Signs	12-11
Section 5 – Principles of Grid References	12-17
Order of Working a Grid Reference	12-19
Four-Figure Grid References	12-19
Six-Figure Grid References	12-20

CONTENTS (Cont)

	PAGE
Section 6 – The Compass and its Parts	12-23
Section 7 – Points of the Compass	12-25
Section 8 – Take a Compass Bearing	12-26
Section 9 – Search Techniques – Land	12-30
Types of Searches	12-30
Formations	12-33
Sound Signals	12-34
Search Hints	12-35/12-36

LIST OF FIGURES

FIGURE	TITLE	PAGE
1-1	Flight in Line	1-4
1-2	Flight in Column of Threes	1-5
1-3	Flight in Column of Route	1-5
1-4	Directing Flank – Advancing in Line	1-6
1-5	Directing Flank – Retiring in Line.....	1-7
1-6	Directing Flank when Moving to the Right in Threes	1-7
1-7	Directing Flank when Moving to the Left in Threes	1-8
1-8	Words of Command	1-10
2-1	Hollow Square	2-5
3-1	Example of Hierarchical Structure (Flight)	3-5

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
5-1	Stretching Exercises (2 Sheets)	5-4
5-2	Push-ups	5-8
5-3	Shuttle Run	5-9
5-4	Partial Curl-ups	5-10
5-5	Standing Long Jump	5-11
5-6	50 m Run	5-12
5-7	Endurance Run	5-13
5-8	Personal Progress Chart	5-14
5-9	Push-up Standards	5-15
5-10	Shuttle Run Standards	5-16
5-11	Partial Curl-up Standards	5-17
5-12	Standing Long Jump Standards	5-18
5-13	50 m Run Standards	5-19
5-14	Endurance Run Standards	5-20
5-15	Fitness Badges	5-21
5-16	Air Cadet Fitness Programme Test Record Chart	5-22
6-1	Canada's Food Guide (12 Sheets)	6-2
6-2	Fire Extinguisher Use	6-14
6-3	Classes of Fires	6-15/6-16
7-1	Table of Needs	7-5
8-1	Lesson Description	8-15
8-2	Sample Lesson Plan (3 Sheets)	8-20
9-1	Blade Angle	9-3
9-2	Fixed-Pitch Propeller	9-5
9-3	Controllable-Pitch Propeller	9-5
9-4	Air Intake	9-10
9-5	Float	9-10
9-6	Main Jet	9-11
9-7	Throttle Valve	9-11
9-8	Engine Instruments (2 Sheets)	9-15

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
10-1	Rotation Axis	10-4
10-2	Equator, Meridians and Parallels of Latitude	10-5
10-3	Earth's Magnetism	10-6
10-4	Measuring the Latitude and the Longitude	10-8
10-5	Direction Expressed as an Angle	10-9
11-1	Procedural Words and Phrases (4 Sheets)	11-2
12-1	How to Fold a Map	12-4
12-2	Principle of Grid References	12-18
12-3	Grid System	12-18
12-4	Four-Figure Grid References	12-20
12-5	Six-Figure Grid References	12-21
12-6	Finding a Six-Figure Grid Reference	12-22
12-7	Parts of a Compass	12-24
12-8	Points of the Compass	12-26
12-9	Compass	12-27
12-10	Holding the Compass	12-28
12-11	Taking a Compass Bearing	12-28
12-12	Compass Bearing	12-29
12-13	Parallel Sweep	12-31
12-14	Creeping Line Ahead	12-32
12-15	Contour Search	12-33

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CHAPTER 1
PERFORMANCE OBJECTIVE 401

DRILL

SECTION 1

INTRODUCTION








1. During your third year of training, you will have the opportunity to assume different parade positions during squadron parades. It is important, therefore, to know the different flight formations and the positions you will be called upon to assume. Also, you will have to give commands and carry out specific manoeuvres as prescribed by the squadron commander.

2. The aim of flight drill is to enable the flight, when it takes its place in the squadron, to carry out any sequence of drill movements the squadron commander orders.

SECTION 2

KEY TO SYMBOLS

3. The following is a key to symbols:

- | | |
|---------------------|---|
| a. Front rank |  |
| b. Centre rank |  |
| c. Rear rank |  |
| d. Flight commander |  |
| e. Flight sergeant |  |
| f. Marker |  |
| g. Cadet |  |

SECTION 3

FLIGHT DRILL

FLIGHT OR SQUAD?

4. The difference between a flight and a squad is in function and use. The **flight** is a basic formation of approximately 30 cadets, normally formed up in three ranks having one right marker, a flight commander and a flight sergeant. The **squad** is a military formation of approximately flight size that is adopted to teach drill movements.

ORDERING A FLIGHT ON PARADE

5. A flight is ordered on parade in a similar manner to the falling in of a squad, as described in A-CR-CCP-266/PT-001, EO 401.01.

6. The flight sergeant may then call the roll, size the flight, etc.

7. The flight will be handed over to the flight commander in the following manner:

- a. the flight sergeant calls the flight to attention;
- b. the flight commander halts two paces in front of the flight sergeant, who then reports the flight;
- c. upon being ordered to fall in, the flight sergeant turns right and proceeds by a series of wheels around the right flank to take up position three paces centred and to the rear of the flight;
- d. the flight commander marches forward two paces and takes up the flight sergeant's former position.

DRESSING A FLIGHT

8. Just before giving the flight a dressing, the flight commander will face the flight and order "RIGHT – DRESS":

- a. the flight will act as detailed in A-CR-CCP-266/PT-001, EO 401.05;

- b. the flight sergeant steps off, wheels to the right, and marches six paces to the right of the right flank; wheels to the left and halts, facing the front and in line with the front rank;
 - c. the flight sergeant then turns left and dresses the front rank. When the front rank is dressed, the flight sergeant orders "FRONT RANK – STEADY";
 - d. the flight sergeant then turns left, keeping arms at the side, paces off the interval, halts, turns right, and dresses the centre rank. The flight sergeant then orders "CENTRE RANK – STEADY";
 - e. the flight sergeant then turns left, and keeping arms at the side, again paces off the interval, halts, turns right, and dresses the rear rank. The flight sergeant then orders "REAR RANK – STEADY";
 - f. the flight commander then orders "EYES – FRONT"; and
 - g. the flight will act as ordered. The flight sergeant will step off and, by a series of wheels, march to the original position in the rear of the flight.
9. When the flight sergeant orders the right dress, the previously detailed procedure is followed. The command "EYES FRONT" is ordered by the flight sergeant after returning to position in front of the flight.

FLIGHT FORMATIONS

10. Flights will adopt various formations during a parade or during movements from one place to another. The formation adopted by the squadron for the parade will determine the formation adopted by the flights. **Parade positions and flight orientation** will change when the flight formation changes. As you hold a parade position, you must know each formation and all the movements to be executed.

FLIGHT IN LINE

11. Most of the time, a flight will form up in line. Squadrons automatically use this formation when ordered on parade. Regardless of frontage, when a flight is formed up in line, the flight commander will be positioned three paces in front and centred on the flight. The flight sergeant will be three paces in the rear and centred on the flight.

FLIGHT IN COLUMN OF THREES

12. A flight in column of three adopts the same formation as when in line, but facing a flank. Parade appointments retain the same positions.

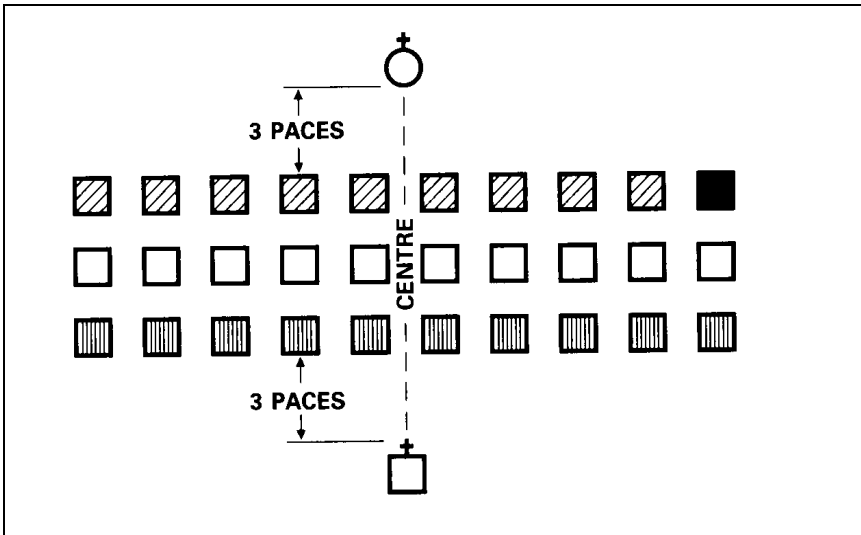


Figure 1-1 Flight in Line

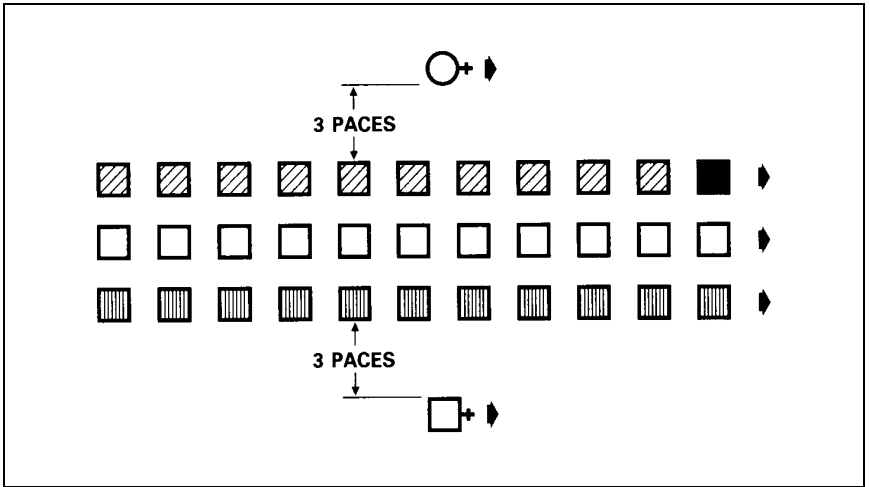


Figure 1-2 Flight in Column of Threes

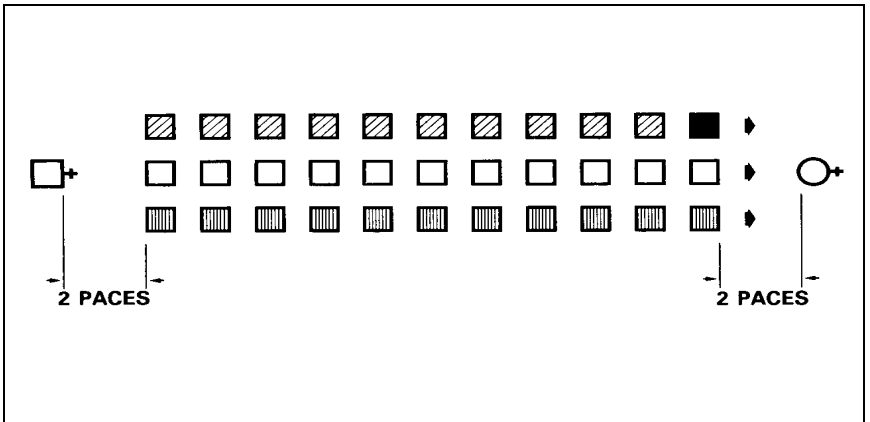


Figure 1-3 Flight in Column of Route

FLIGHT IN COLUMN OF ROUTE

13. Column of route is similar to column of threes except that the flight commander takes up a position two paces in front of the flight's centre file and the flight sergeant adopts a position two paces in the rear of the centre file. Column of route is the formation most commonly used with a flight on the march.

DIRECTING FLANK

14. The directing flank is the flank by which the cadets take up their alignment when on the march. Unless the directing flank is modified for a special movement, it is always:

- a. when advancing in line (Figure 1-4) – the right flank;
- b. when retiring in line (Figure 1-5) – the left flank; and

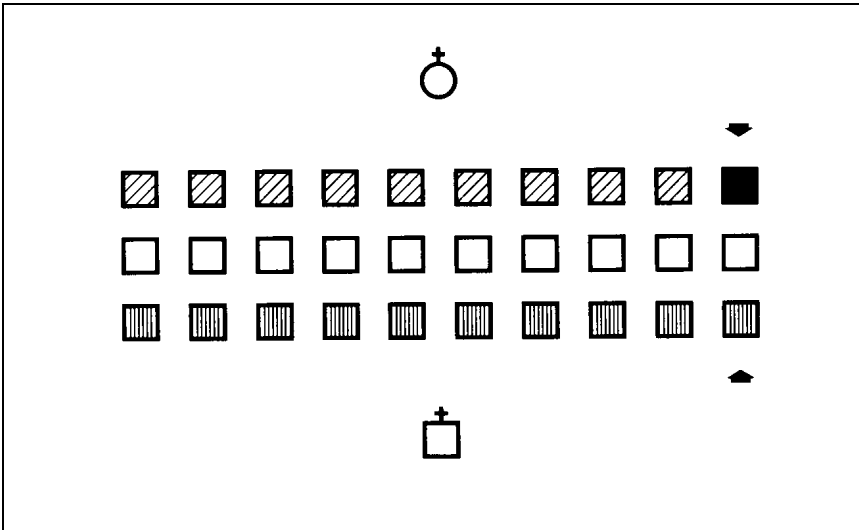


Figure 1-4 Directing Flank – Advancing in Line

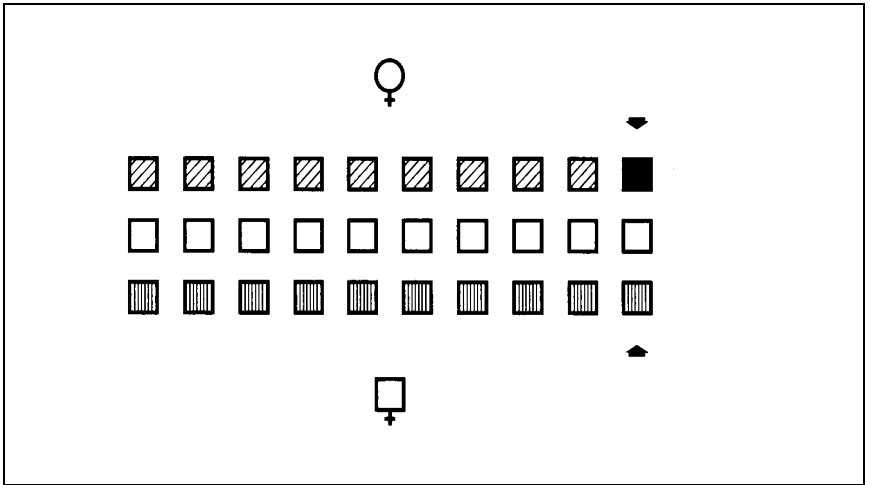


Figure 1-5 Directing Flank – Retiring in Line

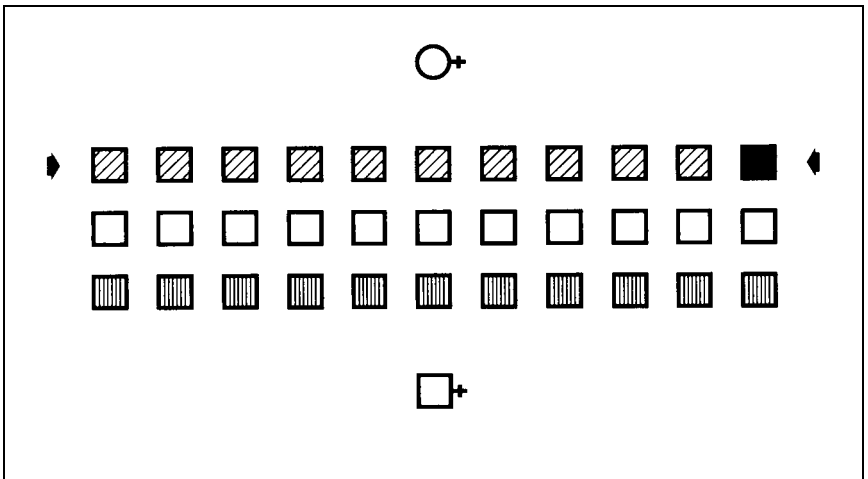


Figure 1-6 Directing Flank when Moving to the Right in Threes

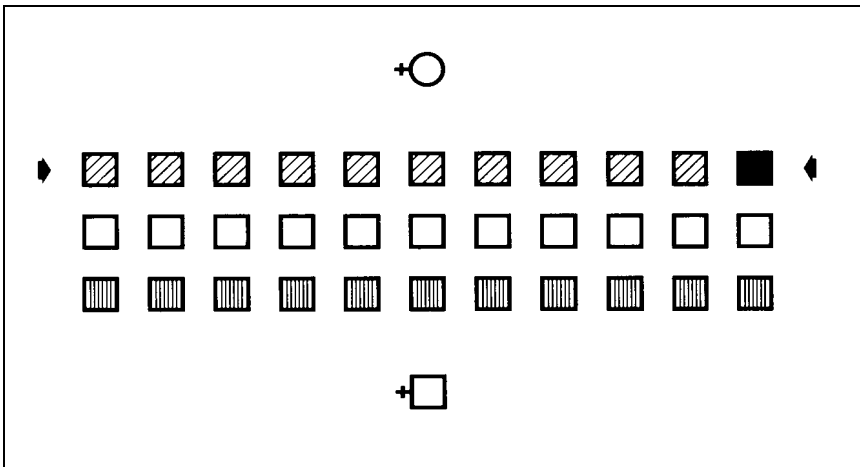


Figure 1-7 Directing Flank when Moving to the Left in Threes

- c. when in threes – the original front rank (eg, when moving to the right flank (Figure 1-6), the dressing is by the left; when moving to the left flank (Figure 1-7), the dressing is by the right).

SECTION 4

WORDS OF COMMAND

15. Good drill depends on properly delivered words of command. Commands must be pronounced clearly, distinctly, and with confidence and determination. They express an order that is to be promptly obeyed.

16. Practice and some technique are necessary to deliver good commands. You have to make sure every cadet can clearly hear your orders. The power with which your commands are delivered depend on the way you breathe... or don't! Breathing control and air circulation from the lungs to your mouth are, in this case, very important.

17. You probably know some people who "turn red" during and after each command. This is a sign that they use their vocal cords to deliver a command. You can bet that after a couple of minutes, their throats will be irritated to the point where they will lose their voice!



18. Words of command are divided into two parts:

- a. the first part is used as a warning and is called a **CAUTIONARY COMMAND**;
- b. the second part precedes the execution of the movement and is called an **EXECUTIVE COMMAND**.

19. The **cautionary command** serves as a warning for the movement to be performed and will be given preceding the executive command. It is like saying "Hey guys, pay attention! You are about to execute the following movement!" The cautionary command may include words like **ADVANCE**, **RETIRE**, etc. The **executive command** serves as a signal for the movement to be carried out. It is like saying "NOW". In this book, a hyphen separates the cautionary from the executive, as in the example.

– **EXAMPLE** –

"ADVANCE RIGHT – TURN"

20. It may be taken as a rule of thumb that the cautionary command be drawn out over two paces and the interval between the cautionary and the executive commands should also be two paces. Although it is not always possible to give exactly the same pause between the cautionary and the executive commands, the pause should be as consistent as possible.

21. Unless otherwise specified, the executive command is given as the foot specified in the following list is forward and on the ground:

Words of Command	Foot
HALT	LEFT
STEP OUT AND STEP SHORT	LEFT
CHANGE TO QUICK, SLOW OR DOUBLE TIME	RIGHT
MARK TIME (when marching)	RIGHT
FORWARD	LEFT
ABOUT TURN	RIGHT
RIGHT TURN, RIGHT INCLINE, RIGHT FORM or ON THE RIGHT FORM SQUAD	LEFT
LEFT TURN, LEFT INCLINE, LEFT FORM or ON THE LEFT FORM SQUAD	RIGHT
CHANGE STEP	RIGHT
SALUTE (when marching)	LEFT
EYES RIGHT (FRONT)	LEFT
FORM SINGLE FILE (ON THE MARCH)	RIGHT
REFORM SINGLE FILE (ON THE MARCH)	RIGHT

Figure 1-8 Words of Command

MOVE TO THE RIGHT, MOVE TO THE LEFT, RETIRE OR ADVANCE?

22. Before ordering the flight to turn, you must indicate the direction in which it will turn relative to the **original** orientation of the flight.

– EXAMPLE –

"MOVE TO THE RIGHT, LEFT – TURN."

BY THE LEFT OR BY THE RIGHT?

23. When the flight is turned in the desired direction, you must indicate the directing flank (flank by which cadets will align themselves while marching) by using the command "BY THE LEFT (RIGHT)".

– EXAMPLE –

"BY THE LEFT, QUICK – MARCH"

SECTION 5

INSPECTION

24. You inspect cadets to ensure that their uniforms are up to the standard expected of them. The inspection should be a good indication of the continual and gradual improvement shown by each individual and by the group as a whole.

25. When a flight is inspected, it will be at the open order. On the completion of the inspection, it may be returned to the close order.

26. A unit will be given a right dress after the open order and may be given a right dress after the close order.

27. Under normal circumstances, the person inspecting will start with the front and rear of each rank, commencing at the right flank of the front rank and proceeding in a counter-clockwise direction around each rank in turn.

28. Each rank is inspected at the position of attention. Ranks not under inspection may be ordered to stand at ease.

29. The inspection of a cadet is to commence at the head and work down to the feet in order to ensure that the uniform is up to the standards detailed in the A-CR-CCP-990/PT-001, Regulations for Royal Canadian Sea, Army and Air Cadets. The inspection must be performed using the evaluation sheet found in the A-CR-CCP-266/FT-001, Annex B of Chapter 3.

30. If you ask cadets to adjust their clothing or equipment, they will do so immediately. You must help the cadets improve their standard of uniform. To do so, it is important to perform a weekly follow-up.

31. It is appropriate to congratulate those cadets who are above standard. As well, you must take action to make sure that every cadet not meeting the standard receives some kind of help.

SECTION 6

CONCLUSION

32. Well-executed flight drill can be really spectacular. To achieve that high standard, drill must be performed with precision and concentration. Your cadets will react to your commands with the same energy you show them. Make sure your behaviour is always worthy of them. Demonstrate confidence and your cadets will react with assurance!

33. Whether it is with your voice while giving commands, by your high standard of deportment on and off the parade square, or during an inspection, you must show excellence. Remember: excellence is contagious!

CHAPTER 2

PERFORMANCE OBJECTIVE 402

DRILL INSTRUCTION

SECTION 1

INTRODUCTION

1. You know this person is there, right next to you watching and waiting for you to make a mistake... This person moves with energy and cadence and is sharp and agile... This person's powerful voice calls out a series of commands to which you have no other choice but to obey quickly. This person attracts everybody's attention by demonstrating superior deportment. Who is this person?

THE DRILL INSTRUCTOR

2. The important task of teaching drill and making sure every member of the squadron knows and respects the standards of drill rests on the drill instructor's shoulders. This task must be performed during all periods of instruction, during a parade or during routine training off the parade square.

3. Often viewed as a person of uncompromising standards, the drill instructor must ensure that all individual and group drill movements are carried out to the high standards in the military tradition. The instructor must also make sure that younger cadets find learning drill interesting and enjoyable.

4. The most visible sign of squadron pride will often be the precision and enthusiasm shown by cadets while executing drill movements, either as individuals or as members of a group. This kind of pride can only be developed through the satisfaction gained through good team effort. Good drill demands teamwork and a no compromise attitude when it comes time for a parade.

SECTION 2

THE DRILL LESSON

5. This year you will learn instructional techniques that will allow you to teach in a classroom. Most of these techniques – PO 409. Chapter 8 – will also be applicable while teaching drill. As with the classroom lesson, there are four major headings that must be considered. They are the **introduction**, the **body**, the **test** and the **conclusion**. The contents of each of these four headings is similar to that of a classroom lesson although there are some small differences.

TEACHING DRILL

6. **Preliminaries.** The following duties should be performed before starting the lesson:

- a. review the appropriate lesson;
- b. order the squad into a suitable formation, eg, hollow square;
- c. state the movement to be taught and the reason for its teaching;
and
- d. state the requirement for the performance check.

7. **The Lesson.** The lesson should be taught in the following two stages.

- a. **Stage 1.** The following are applicable:
 - (1) demonstrate the complete movement calling out the time;
 - (2) demonstrate the first part of the movement;
 - (3) explain how the first part of the movement is done;
 - (4) give the squad the opportunity to ask questions;

- (5) let the squad practise the first movement (collectively, individually, collectively); and
 - (6) teach the second and each subsequent movement following the sequence described in subparagraphs (2), (3), (4) and (5).
- b. **Stage 2.** The following are applicable:
- (1) practise the complete movement, with the instructor calling the time;
 - (2) practise the complete movement with the squad calling the time; and
 - (3) practise the complete movement, with the squad judging the time.
8. **Performance Check/Test.** Conduct the test.
9. **Conclusion.** The lesson should be summarized in the following manner:
- a. a restate the movement taught and the reason for teaching;
 - b. state the level of achievement; and
 - c. state the next lesson.

CALLING OUT THE TIME

10. In the early stages of training, the squad will call out the time when executing drill movements. After completing a movement on the march, the cadence will be called for three paces, eg, on the command "QUICK MARCH" the squad calls "LEFT-RIGHT-LEFT".

11. To warn the cadets that the time is to be called out, precede the command for the movement by the cautionary command "CALLING OUT THE TIME".

12. As an example on the command. "CALLING OUT THE TIME, RIGHT – TURN" the squad:

- a. executes the first movement of the turn on the executive order and simultaneously calls "ONE";
- b. on completing the first movement calls "TWO" "THREE" while observing the standard pause; and
- c. when executing the final movement calls out "ONE".

TYPE OF FORMATION

13. As you prepare for the lesson you must decide what type of formation to use while teaching. The three formations most commonly used are the **single file** for small groups of five cadets or less, the **semi-circle** (executed without any word of command) for groups of six to nine cadets and finally, the **hollow square** formation used for groups of ten cadets or more. Note that these numbers correspond to the number of cadets required to form one two or three ranks of a squad.

14. Do not hesitate to split the squad in two or three groups and ask other instructors to help you if the group is too large.

THE HOLLOW SQUARE FORMATION

15. The hollow square formation (Figure 2-1) is ideal for drill instruction as it will allow each cadet to see your demonstrations and hear your comments. It will also allow you to supervise closely.

16. The squad will be in line in three ranks prior to forming a hollow square.

17. On the command "FORM HOLLOW SQUARE. CENTRE RANK RIGHT REAR RANK LEFT – TURN", the squad acts as ordered.

18. On the command "CENTRE RANK LEFT WHEEL, REAR RANK RIGHT WHEEL. QUICK – MARCH", the squad acts as ordered.

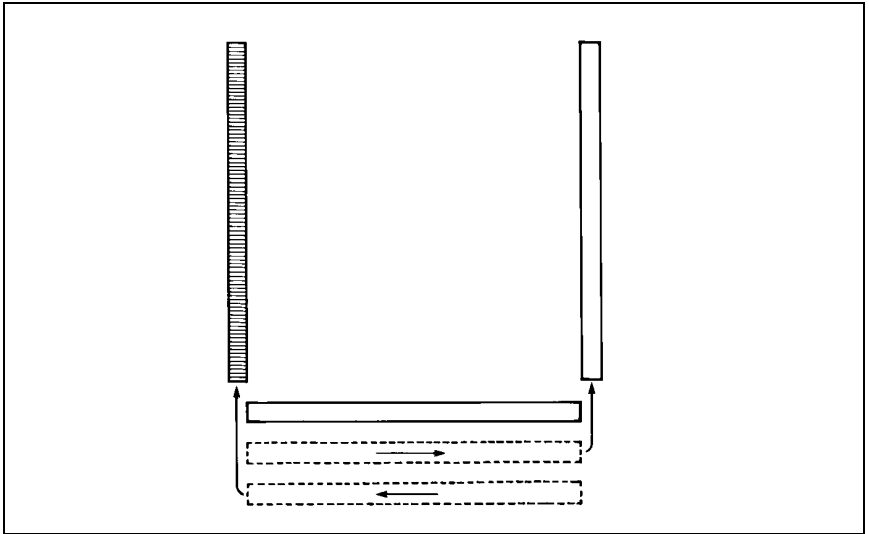


Figure 2-1 Hollow Square

19. The command "MARK – TIME" will be given when the rear cadet of the centre and rear ranks are one pace in front of the front rank.
20. On the command "SQUAD – HALT", the squad acts as ordered.
21. On the command. "CENTRE RANK LEFT, REAR RANK RIGHT – TURN" the squad acts as ordered.
22. The reverse procedure is used to reform the squad into three ranks.

INSTRUCTIONAL TECHNIQUES

23. Instructor's Appearance and Bearing. Since example is imitated your appearance and bearing must be of the highest standard. When conducting drill instruction you will stand at attention unless it is necessary to demonstrate or to correct an individual. You will also execute all movements correctly and smartly.

24. **Demonstrations.** Demonstrations must be planned so that the squad can see the position or movement. Be careful not to demonstrate too often. Excessive demonstration can bore your cadets.

25. **Checking.** Constant checking and correcting of faults is essential. Faults should be corrected immediately after they occur.

26. **Vocabulary.** Aim to develop a vocabulary of short, concise words with which you can impress on the squad that the movement must be performed smartly. For example, the words "crack", "drive", and "strike" suggest the degree of smartness required in the execution of the movement

27. **Short Rest Periods.** Cadets will always learn drill movements better if they are given short rest periods during the lesson. Command the squad to stand easy and allow members to bend their knees and stretch out their arms. During the rest period try telling a short joke or a personal anecdote or focus on the concept of working as a team.

28. **Correction of Faults.** If you want to correct a cadet's drill position **DO NOT STRIKE OR PUSH** the cadet. Indicate what has to be corrected and give the cadet the time to correct the problem. Never use your physical strength to impress others; you may frighten a cadet.

29. Well-executed drill asks of the cadet a great deal of energy and concentration, which may diminish after a while. Do not hesitate to encourage the cadets, even for small improvements. You will need a great deal of patience to get everyone to work as a team. Remember that cadets deserve to be congratulated and commended for their efforts.

MECHANICAL AIDS TO DRILL

30. It can be very difficult to keep the right cadence, especially with young cadets. To help you deal with this problem, use one of the following tools:

- a. **Drums.** Ask a musician in your band to beat the cadence on a drum. Young cadets enjoy the sound of the snare and bass drums.

- b. **Metronomes.** A metronome is a mechanical device that can be adjusted and used to give the exact cadence. There are two types of metronome. The first one is the pyramid shaped **pendulum** metronome. It has to be cranked from time to time and is the most commonly available. The **electronic** (or quartz) metronome is powered by a battery, thus ensuring a long-lasting and constant cadence. The advantage of the electronic metronome is that the beat will not slow-down when the battery and the volume weaken as is the case with the pendulum.

31. When teaching a more difficult movement use a cadet as an example. Make sure that this cadet can perform the movement well. If your squadron has a drill team, use the cadets of this specialized team; they already know the movements and this exercise will serve as a good review.

32. When your cadets have learned drill on the march but require some minor improvements, like the height of the arms, the lifting of the head the alignment during wheeling, etc, you could play a tape of military marches. This music specifically written for marching, is very dynamic and offers a constant cadence. As you will notice by doing so, your cadets will soon straighten their shoulders and chin, and they will march with more energy!

"AS YOU WERE"

33. "AS YOU WERE" will only be ordered when another word of command cannot be used to have a squad adopt a previous position or to cancel an incorrect order before it has been completed.

SECTION 3

CONCLUSION

34. Drill instructors are different from other instructors because they have to behave in such a way that cadets will have no choice but to respect them constantly, on and off the parade square. Very few instructors can say that they have such an impact on young cadets.

35. Your uncompromising attention to detail will often be mistaken by some cadets as a form of harassment. Some of them will be afraid of making mistakes while you are around. You have to ensure that all cadets understand that your insistence on excellence has as its goal to help everybody work together.

36. The tone of your voice should be firm but never haughty or aggressive. Cadets will soon come to understand the difference. **DO NOT SHOUT!** No matter how many mistakes cadets make they deserve your respect and your help. Be patient, and if needed, ask for another instructor's assistance in taking care of cadets having more difficulty.



37. Your teaching task should not be limited to the parade square. Never hesitate to stop and correct a cadet's drill, outside of a drill class. Your cadets will likely be thankful and appreciate your interest and/or concern.

SOMETHING TO THINK ABOUT...

"We are what we repeatedly do; excellence then
is not an act, but a habit..."

Aristotle

"Hold yourself responsible for a higher standard
than anybody else expects of you."

Henry Ward Beecher

"I am not discouraged because every wrong attempt
discarded is another step forward."

Thomas Edison

CHAPTER 3

PERFORMANCE OBJECTIVE 403

GENERAL CADET KNOWLEDGE

SECTION 1

LEVEL 3

1. This year you will be asked to perform senior NCO's tasks and receive training in instructional, flight drill and ground search techniques. This means you will have the opportunity to put your knowledge to work and in doing so, develop your leadership skills.

2. The subject material is getting more specialized. Here are the subjects covered in Proficiency Level Three:

Drill
General Cadet Knowledge
Physical Fitness
Leadership
Propulsion
Radio Communication

Drill Instruction
Citizenship
Sensible Living
Instructional Techniques
Navigation
Aircrew Survival

3. Successful completion of Proficiency Level Three and a summer camp other than the basic two week course qualifies you to be promoted to the rank of flight sergeant. Keep in mind this does not mean you will be automatically promoted. The further you advance up your squadron's chain of command, the fewer promotion opportunities there are. Your overall conduct and behaviour during your squadron's weekly training will be considered as an important factor that will help the officers decide who will be promoted.

4. Your involvement in the squadron's activities will also be considered by the officers when the time comes to select the candidates for summer camps. As a Proficiency Level Three cadet, you will have to show plenty of self-discipline in order to be a role model for younger cadets. The techniques you will learn this year will help you take charge of a flight within the squadron.

SECTION 2

SUMMER CAMPS

5. After successfully completing level three training you will become eligible to attend the following summer camps:

GLIDER COURSE
AIR CADET INSTRUCTORS COURSE
SURVIVAL INSTRUCTORS COURSE
ATHLETIC INSTRUCTORS COURSE
AIR TRAFFIC CONTROL
TECHNICAL TRAINING
LIFEGUARD
MUSICIAN
SERVICE BAND

6. **Survival Instructor Course.** The Survival Instructor Course provides six weeks of practical training in out-of-doors skills. In addition to learning the required skills, cadets learn how to pass on this information to the younger cadets at the squadron. Those cadets selected are given the opportunity to learn about how to live in the great outdoors and to enjoy it as well.

7. **Air Cadet Instructors Course.** This three-week course gives the cadet the opportunity to develop the required knowledge and experience to teach at the squadron level. The successful course cadets have the knowledge and the required experience to serve as assistant instructors or as instructors at their home squadron.

8. **Athletic Instructors Course.** The Athletic Instructors Course is a six-week national course that is designed to familiarize individuals with the theory of physical education and to provide a knowledge about it. Individuals returning to the squadron after the course should be after to organize a sports programme.

9. **Air Traffic Control.** The Air Traffic Control Course is a six-week course. It is designed to introduce senior cadets to the highly skilled profession of air traffic control in both civil and military career fields. This objective is accomplished by training in the very basic skills required for

the safe orderly and expeditious flow of air traffic under Visual Flight Rules through the use of rules and procedures applied by tower controllers and their assistants.

10. **Lifeguard.** The Air Cadet Lifeguard Course is designed to provide candidates with knowledge and training so that they may be employed as lifeguards at future summer camps. In order to be selected, candidates must have displayed an interest in swimming and be in good physical condition.

11. **Technical Training Course.** The Technical Training Course is a six-week national air cadet course designed to expose the candidate to advanced aspects of air cadet training in one of four trade disciplines. The **electronics** course concentrates on all aspects of basic electronic theory coupled with a practical AM radio project. The **airframe** course concentrates on aspects of aircraft airframe structure/maintenance with some practical work within the talents and safety limitations of the cadets. The **aeroengine** course explores the theory and practical aspects of jet engines. The **photography** course takes the candidates through all phases of picture taking and processing of black and white film.

PREREQUISITES

12. Each of these courses has a different set of goals and therefore requires the cadets to hold specific qualifications. It is very important to make sure that you satisfy **EVERY** prerequisite **BEFORE** applying for a course. These criteria exist to make sure that only the best qualified cadets can participate in summer training.

13. Here are the most common criteria:

- a. **Physical Condition.** Each of the participating cadets must be physically fit to undergo training. A medical examination is required for each cadet. Specialized courses (Survival, Lifeguard and Athletic Instructor) have specific fitness standards that are higher than others.
- b. **Previous Training.** Before being considered for any of these courses, you must successfully complete your Level Three training.

- c. **Preference.** Selection preference will be given to cadets who intend to continue their service with the squadron, either as senior cadets or in some other supervisory capacity.
- d. **Narrative.** For some courses you will be required to explain, in a one-page handwritten narrative, why you would like to participate in the course.
- e. **Recommendation.** For six-week courses, a recommendation by your squadron commander and by the Chair of the Civilian Committee is important.

14. If you decide to apply you will be asked to fill out a series of forms. The omission of a simple detail, such as your age or the medical exam, may cause your application to be rejected. The same thing can be said of false information. It is **YOUR** responsibility to make sure that the information on your application form is correct.

15. The selection for summer camps is done by an officer working at the regional cadet office and/or by representatives of the Air Cadet League. Most of these people know little or nothing about you. The omission of one simple detail may be the only difference between being awarded a summer course or being passed over! Be careful.

COURSE CATEGORIES

16. There are two summer course categories:
- a. **Courses Awarded According to the Squadron Quota.** These courses are awarded according to the number of cadets in your squadron. The number of cadets participating in summer training is determined by the space available at each camp. It is your squadron's responsibility to select the cadets to participate. But first be sure to apply!
 - b. **Courses Awarded by Selection.** In addition to being limited by the space available at each camp the selection for these courses is done by a selection committee. The committee examines each application form closely and retains only those of the most deserving cadets. These courses are usually offered to a limited

number of cadets. You may have to undergo an interview as a part of the selection process. Under consideration will be your experience as a cadet as well as your marks in school. Only the most deserving will be considered for these selection courses.

SECTION 3

THE CHAIN OF COMMAND

17. You probably know the names of all the NCOs and officers of your squadron by now. You also know how important the NCOs are in squadron activities. By taking a look in the Standing Orders you may find a task definition for each rank and a hierarchical structure similar to the one in Figure 3-1.

18. Do you know why your squadron needs such a structure? Do you know who will answer your questions on administration, supply, training, discipline, flying courses, etc? Who is responsible for the special activities, the training levels, the flight, etc? Do you know where to go to obtain information?

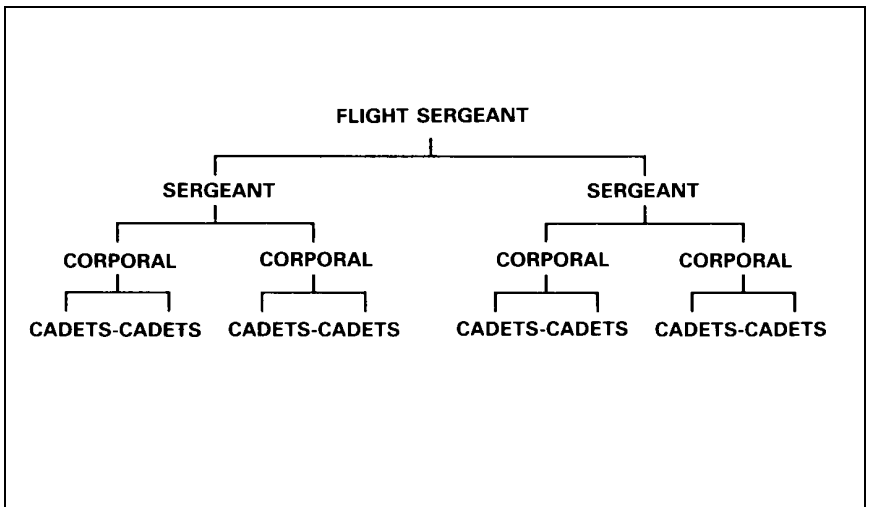


Figure 3-1 Example of Hierarchical Structure (Flight)

COMMUNICATION

19. A hierarchical structure is used to facilitate communication between the different members of an organization. It allows information to be transmitted from one person to another. Every important company or social group, including police officers and fire-fighters, communicate through a hierarchy.

20. Cadets are no different. Your understanding of the use of your position in the hierarchy or chain of command will facilitate smoother administration.

21. An air cadet squadron can function effectively only when every one of its members respects the established rank and position hierarchy. Cadets use the military hierarchy.

22. The hierarchical structure will often be similar or identical to the rank structure of your squadron. It is then easy to identify those in charge of the flights, the levels of training and the special courses. But what happens if you are a member of a flight, a level, the band, the flying course and the Duke of Edinburgh Award programme, ALL AT THE SAME TIME! Who is your superior? To whom will you report?

23. Each cadet must be able to identify who is in charge in any given situation so that there will be no contradictions or repetitions in the orders or directions given. Young cadets require precise and clear directions.

24. Communication can be done **upwards** (eg, corporal to sergeant), **downwards** (eg, flight sergeant to sergeant) or **horizontally** (eg, corporal to corporal). Everything is based on the level of responsibility an individual holds within the squadron hierarchy. To be efficient, the communication must be done **one level at a time**. For example, the flight sergeant should communicate with the corporal using the sergeant as an intermediary. Thus, the corporal is the sergeant's immediate responsibility and the cadet will obtain information from the sergeant by asking the corporal first.

25. The rank hierarchy is the same for every air cadet squadron. It is possible, however, that your squadron's hierarchical structure will have some variations compared to the squadron next door, given the number of cadets, the number of officers available and a variety of other factors. In this case, the sum of responsibility awarded to each person may also vary. But no matter how your squadron is structured, the communication system through the hierarchy remains the same.

26. It is important to respect the hierarchy because orders often change quite rapidly in an air cadet squadron. If each link of the communication chain does not do its job, cadets suffer from a lack of information and direction.

CHAPTER 4

PERFORMANCE OBJECTIVE 404

CITIZENSHIP

INTRODUCTION

1. This year, you will be asked to do research on a community group in your area. Take a couple of hours and visit the local chapter of the group you have chosen. Take the time to learn more about its goals, its traditions and its involvement in the community. You will have to present a 15-minute lecture to your friends at the squadron. You may be surprised to discover what is going on in your own town!

AIR FORCE ASSOCIATION OF CANADA (AFAC)

2. While playing the "trivia game" last year, you learned that between the 1920 and 1968 (when it was dismantled as a military organization) the Royal Canadian Air Force (RCAF) had played an important role, both military and civilian, in Canadian aviation history.

3. The Air Force Association of Canada (AFAC) was founded in 1948 as an organization to look after the welfare of veteran airmen. In the mid-fifties it began to serve active members of the Canadian Air Force and ex-air cadets.

4. Even though the RCAF does not exist any more, it having been replaced by Air Command, the AFAC is still alive and more than ever involved in a wide range of activities.

5. The AFAC as we know it today is a national, non-profit aerospace and community service organization composed of aviation – minded citizens. Its goals are to preserve the country's rich aeronautical tradition and history, to support Canada's Air Force in meeting its military obligations, and to support and encourage the civil aviation component within Canada.

AFAC ACTIVITIES

6. The AFAC is also involved in many activities across the country. Among these activities it:

- a. supports Canada's Air Force by promoting Air Command activities nationally and locally, and encourages our Government to maintain a viable, well-equipped peace-time Air Force;
- b. is committed to the support of a strong national aerospace industry and it is committed to the maintenance of high standards in civil aviation;
- c. contributes, through its members, thousands of hours to community programmes. For example, in co-operation with local school and police officials, several wings have conducted IDENT-A-KID campaigns to safeguard identity information on thousands of school children. Locally, many wings sponsor a national organ donor programme;
- d. contributes, through its members, to aviation-oriented national causes that include the RCAF Benevolent Fund, the RCAF Memorial Museum and the RCAF Heritage Trust through the AFAC Trust;
- e. has responded to specific hometown community needs and actively raised funds for hospital equipment, senior housing, health and fitness programmes, the handicapped and various youth programmes, through its wings;
- f. directly, and through the association's active membership in the National Council of Veteran Associations, deals with Veterans Affairs Canada on behalf of groundcrew and aircrew veterans;
- g. is a driving force in the Alliance of Air Force Associations (AAFA) in pursuit of its goal to further the role of the Air Force, and its representation as a member of the Conference of Defence Associations (CDA).

MEMBERSHIP CRITERIA

7. As is the case with similar organizations, there are criteria to meet in order to be considered as a member. They include the following:
 - a. all who serve or have served in the RCAF and/or Canadian Forces, including all branches of airborne, naval and military air;
 - b. serving and former members of Commonwealth Air Forces; and former air cadets and persons employed in Canada's aerospace industry and civilian aviation.

MEMBERSHIP CATEGORIES

8. Wing members belong to one of the 83 wings located in communities in Canada, the United States and overseas. There are three membership categories:
 - a. wing members;
 - b. members-at-large who have no wing affiliation; and
 - c. if an individual lacks the qualifications for regular membership, associate membership is available. Approval as an associate member can be granted either by a wing or by National Headquarters membership staff.
9. By joining the AFAC, an individual does not automatically become a member of a local wing. However, as a general rule, any AFAC member is eligible to join any AFAC wing.

WING ACTIVITIES

10. Although affiliated with and chartered by National Headquarters, wings of the AFAC are self-supporting. Consequently, there is some variation in what they offer to their members. Most wings operate a club-house facility in the community.

11. Customarily, however, each wing:
 - a. works to protect the rights and interests of retired service members, and provides support for the achievement of national objectives;
 - b. sponsors one or more programmes to benefit the community or the nation;
 - c. keeps members informed through publication of a periodic newsletter; and
 - d. holds periodic business meetings and social gatherings.

MEMBER BENEFITS

12. The AFAC, in co-operation with leading national providers, offers a variety of benefits for members in good standing, such as:
 - a. a group term life insurance plan;
 - b. a group registered savings plan;
 - c. a home and property insurance plan; and
 - d. a subscription to the AFAC magazine "AIRFORCE", Canada's leading aerospace magazine.

AIRFORCE MAGAZINE

13. The AFAC publishes a magazine covering different topics closely or distantly related to aviation. For instance, you could read about the Canadian aerospace industry (the CANADARM, space shuttle flights, astronauts, satellites, etc), historical texts depicting the glorious times of the AFAC, and other topics likely to generate interest among aviation fanatics. Each issue of this colourful magazine also devotes a number of pages to air cadet exploits!

AFAC AND THE AIR CADETS

14. The AFAC provides support for thousands of air cadets across Canada and its wings directly sponsor 46 air cadet squadrons.

15. In recognition of the 50th anniversary, in 1991, of the Air Cadet League of Canada, the AFAC raised \$67000 and created an air cadet trust fund. The fund provides 28 annual flying awards for deserving air cadets across Canada who have already successfully completed a flying scholarship and are seeking a career in military or civil aviation. If you are interested in this award, ask your officer for more information.

CONCLUSION

16. As you can see, the AFAC is more than a social organization for aviation veterans! Its social involvement in the Canadian community goes beyond that of other recreational groups as it actively and dynamically perpetuates great Canadian aviation traditions. The AFAC is only one of many associations actively involved in the community. Look around you, maybe your parents or friends are involved in one of them.

CHAPTER 5

PERFORMANCE OBJECTIVE 405

PHYSICAL FITNESS

SECTION 1

GENERAL

1. The promotion of physical fitness is one of the primary aims of the cadet movement. Team sports, as organized by your squadron, also create and develop teamwork between young cadets and NCOs.
2. Physical fitness is important to your health and should be an enjoyable use of your time. Many people enjoy team sports on a competitive level while some people do not enjoy this type of activity. For those who do not wish to take part in team/competitive sports, there are many other activities that may be of interest. Some of these activities include skiing, skating, walking, canoeing, bicycling, and so on.
3. Once again this year you will participate in the Canada Fitness Award Programme (CFAP). This programme was adopted by D Cdts as the Air Cadet Fitness Programme (ACFP). If you already have reached the highest step of the podium, you should do your best to encourage younger cadets. Take advantage of this activity and bring all your cadets out to participate. The six tests, each having a specific purpose, include the following:
 - a. push-ups, for arm and shoulder girdle strength;
 - b. shuttle run, for speed, power and agility;
 - c. partial curl-ups, for abdominal muscles;
 - d. standing long jump, for power and agility;
 - e. 50 m run, for speed, power and agility; and
 - f. endurance run, for stamina.

SECTION 2

COMPONENTS OF A SESSION

4. Each activity session should consist of three parts:
 - a. warm-up,
 - b. activity, and
 - c. cool-down.

WARM-UP

5. The warm-up is an essential part of every session. A warm-up routine has a number of benefits:
 - a. **It Prepares the Body for Action.** It increases heart rate, warms up the muscles, stretches tight connective tissue at the ends of the muscles, and helps lubricate the joints. All this helps the muscles function more efficiently.
 - b. **It Helps Develop Sports Skills.** Done on a regular basis, stretching and strengthening exercises allow the muscles to work through a wider range so you can play sports comfortably with greater skill.
 - c. **It Helps Prevent Injury.** Muscles that are supple and strong are less prone to overstretch and strain.
 - d. **Guidelines.** To get these benefits, you must warm up properly. Here are some guidelines that your instructor can use for a group warm-up session:
 - (1) Start with three minutes of brisk walking or easy jogging.
 - (2) Do your stretching exercises slowly and smoothly, with no bouncing or jerking. Quick, bouncing movements can cause injury.

- (3) Stretch only until you feel tightness. If you feel pain, you are stretching too far.
- (4) Do strengthening exercises at a controlled speed. If they are done too quickly, poor technique may result and the risk of injury is increased.
- (5) Breathe naturally, inhaling and exhaling fully on each repetition. Holding your breath should be avoided. It can cause dizziness or faintness, and it puts greater demands on the heart.
- (6) Don't rush. A good warm-up takes 10 to 15 minutes.

ACTIVITY

6. The activity part of your session could be a run, an obstacle course, circuit training, physical training (PT), a game or some combination of these. The following guidelines can help you accomplish effective, safe and enjoyable activities:
 - a. **Progression.** Follow the principles of progressive overload – increase the demands of an activity (duration and intensity) gradually over a period of time.
 - b. **Specificity.** The effects of activity are specific to the types of training done: running improves aerobic fitness; medicine ball exercises improve co-ordination, agility, and strength; and so on. Do a variety of activities to ensure a balanced programme.
 - c. **Consistency.** It is important to exercise regularly. Studies show that for fitness improvement, three times a week is twice as good as two times a week.
 - d. **Flexibility.** Inclement weather (heat and humidity or extreme cold), facility conflicts, or other factors may cause you to miss or modify sessions. Try to stick to a routine, but be flexible and improvise whenever necessary.

Figure 5-1 (Sheet 1 of 2) Stretching Exercises

1. Arm Circles

Full, slow sweeping circles with both arms, frontwards, then backwards.

**2. Side Stretch**

Reach one arm overhead and the other down the side of the leg. Repeat alternately to other side.

**3. Sit-Reach**

One leg straight, one bent with the sole of the foot near the knee of the straight leg. Reach out along the straight leg.

**4. Cat Back**

On all fours, arch, tucking chin to chest and exhaling. Return to flat-back position. Don't sag.

**5. Pelvic Tilt**

On your back, knees bent, feet flat on the floor. Tighten abdominals and buttocks and press your lower back firmly against the floor.

**6. Knee Cross-Overs**

Seated, legs in front, knees bent, feet flat on the floor. Roll legs to one side toward the floor. Look over the other shoulder.

**7. Curl-Up**

Flatten lower back to floor, then slowly curl up with straight arms reaching past the knees.

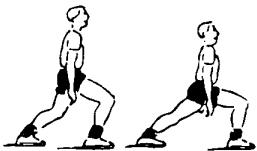
**8. Thigh Stretch**

Bend one knee, grasp ankle, pull foot gently toward the buttock. Repeat alternately with the other leg. Don't arch your back.



9. Calf Stretch

One foot in front of the other and feet pointing straight ahead, bend both legs (squatting) to stretch the soleus muscle in the rear leg. Repeat with legs further apart and back leg straight to stretch the calf muscle in the rear leg.



Before skipping, circuit training, and obstacle courses

10. Ankle Rocker

Slowly rock on outside of feet, from heels, to side, to toes, to the other side. The knees should make a circular motion.



Before swimming

10a. Chest Stretch

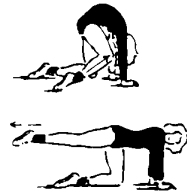
On hands and knees, slowly slide your hands forward while sitting back on your legs.



Before cycling

10b. Curl and Stretch

On all fours, reach one knee toward nose, then extend the leg behind until it's parallel with the floor.



COOL-DOWN

7. Stretching exercises play an important role in the cool-down following an activity session. A cool-down brings the heart rate and body temperature back to normal, and it helps prevent unnecessary stiffness and soreness that can result from vigorous activity. Spend at least five minutes on the cool-down. Do the exercises from the sample routine and stretch the muscles that were used most during your activity (No. 8 and No. 9 for running, No. 8 and No. 10 for games like hockey, basketball, etc).

SECTION 3

CRESTS

8. Crests are awarded on the basis of the level of achievement:

- a. **Award of Excellence.** Excellence level in all six test items.
- b. **Gold.** Gold level or higher in five test items, including the endurance run.
- c. **Silver.** Silver level or higher on four test items, including the endurance run.
- d. **Bronze.** Bronze level or higher in four test items, including the endurance run.

9. The crest has its origin in the TRISCELE, which is an ancient symbol of the sun. The triscele represents the revival of life and of prosperity. Figure 5-15 illustrates the badges awarded to you to be worn on your uniform.

10. The symbol of the triscele is on monuments that date back as far as 1300 BC. It is interesting that the earliest instances of the classical triscele's use had a clear connection with fitness. A shield bearing this symbol appears on a vase designed as a prize in Athenian competitions during the sixth century.

SECTION 4

PREPARATION

11. A basic conditioning or training programme of about three to four weeks may be conducted by your instructors. A similar programme could follow the testing to improve the results.

12. The six ACFP activities are described in Figures 5-2 to 5-7. The norm charts from which your score is calculated are shown in Figures 5-9 to 5-14. Your instructor will explain the use of these charts. A sample personal progress chart is illustrated in Figure 5-8. You should receive one of these from your instructor.

13. If you have achieved a Canada Fitness Award level from school or from another organization, you can get credit for this at cadets. You will probably have to bring in proof of this level. Check with your instructor or training officer to determine the procedure.

1 Push-Ups

Equipment: Ensolite or hard surface gymnastic mat.

Starting Position: The participant assumes a front lying position on the mat with hands placed approximately under shoulder, legs straight and together, and toes tucked under so that they are in contact with the mat.

Action: The participant then pushes with the arms until they are fully extended, keeping legs and back straight. The body is then lowered, using the arms and keeping the back in a straight line from head to toes, until the elbows reach 90 degrees and the upper arms are parallel to the floor. This movement is repeated as many times as possible.

There is no time limit to this test, but push-ups must be performed rhythmically and continuously.

The test is terminated for the following reasons:

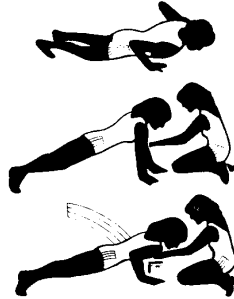
- participant appears to be experiencing severe discomfort and/or pain;
- participant is unable to maintain a rhythmic movement and must rest (stop test after participant falls behind more than three repetitions); and/or
- participant consistently displays poor techniques*, despite repeated corrections by the examiner (a maximum of three corrections may be tolerated).

The examiner should demonstrate the correct movement and most common faults and allow participants to practise the exercise several times prior to testing day.

***Examples of poor technique:**

- knees touching floor;
- upper or lower back swaying;
- failure to reach a complete arm extension;
- failure to attain an approximate 90 degree bend at elbow.

Administrative Hint: 1) Have participants work in partners. Test what a 90 degree bend at elbows feels like. Partner checks for 90 degree accuracy and places a hand under shoulder or chest at a height where 90 degrees is attained. During the execution of each push-up, the participant only has to touch the partner's hand with chest or shoulder to know that the accurate height has been reached, as well as how many push-ups have been completed. 2) Too many practice trials of this test item on testing day can fatigue the participant unnecessarily. Use your own discretion.



2 Shuttle Run

Equipment: Stop-watch, three wooden blocks (or beanbags, etc), two parallel lines 10 m apart.

Instructions: Place one block beside subject just behind starting line, two blocks just behind far line.

Starting Position: Begin face down, forehead on starting line, hands at side of chest.

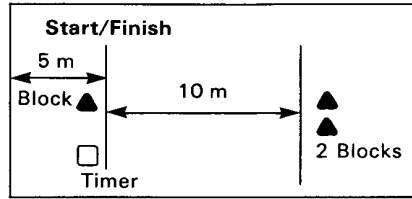
Action: On signal ("ready") GO! participant runs to far line and picks up a block; returns to the starting line; drops the block and picks up the other block (ie, **exchange**); runs to the far line; **exchanges** blocks again; and **carries block** across the finish line.

Administrative Hint: Participant should be in gym shoes (or barefeet) but not in stocking feet.

Ensure that there are no obstructions beyond the start-finish line.

Ensure an appropriate rest interval between trials.
Scoring: Start watch on 'GO'; stop when participant crosses start-finish line.

At the time of the test, record best of two trials to nearest 1/10th of a second on test record card.



3 Partial Curl-Ups

Equipment: Gymnastic mat, metronome (set to 40 beats per minute).

Starting Position: The participant lies on back, with the knees slightly bent at an angle of 140 degrees (approximately 6 to 10 cm off the floor), heels on the ground, arms extended along thighs with fingers pointing towards the knees. **Stabilization, hooking or anchoring of the feet is NOT permitted.**

Action: The initial phase of the curl-up must involve a "flattening out" of the lower back region (ie, pelvic tilting), followed by a **slow** "curling-up" of the upper spine with the hands sliding along thighs until finger tips touch knees. At this point, the trunk should be raised at an angle of no greater than 30 degrees to the floor. Heels must remain in contact with the floor at all times. Return to starting position, touching the partner's hand with back of head.

The movement is slow, and well controlled. The time to perform the lifting and lowering stages is the same. The cadence is 20 curl-ups per minute or 3 seconds per movement. Verify metronome accuracy with a stop-watch.

The participant is to perform without pausing between curl-ups to a maximum number without a time limit. Allow the participant to practise the exercise several times prior to test day.

The test is terminated if the participant:

- appears to be experiencing severe discomfort and/or pain;
- is unable to maintain correct rhythm and must rest (stop test after participant falls

- behind more than three repetitions); and/or
- consistently displays poor technique*, despite repeated corrections by the examiner (a maximum of three corrections may be tolerated).

***Examples of poor technique:**

- lifting the heels off the floor;
- failure to slide hands along thighs (ie, throwing forward is not allowed);
- failure to touch knees;
- head not touching the partner's hand; and
- failure to maintain desired angles at knees or trunk.

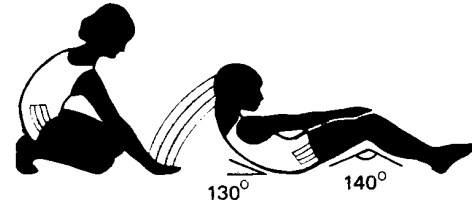
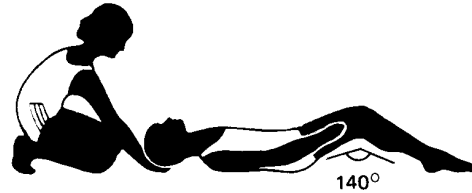


Figure 5-5 Standing Long Jump

4 Standing Long Jump

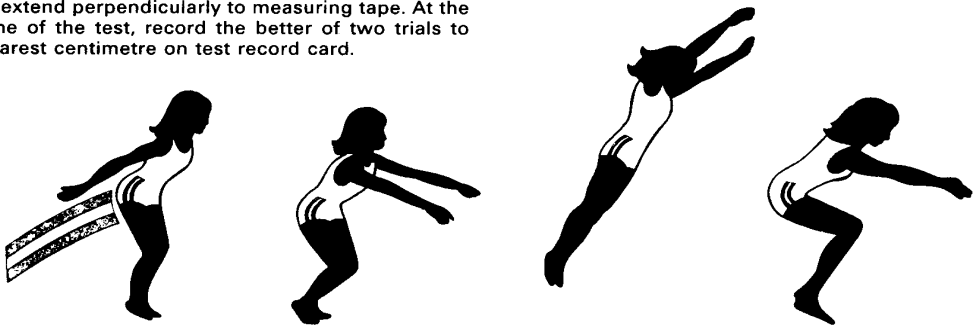
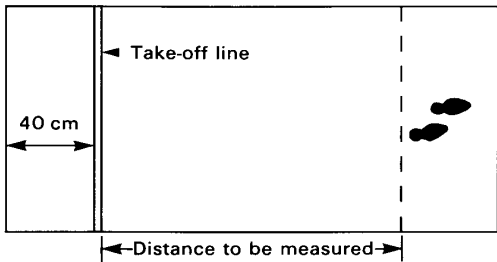
Equipment: Three-metre ensolite or hard surface gymnastic mat, tape measure, stick.

Instructions: On the mat, mark a starting line with masking tape approximately 40 cm from one end of the mat. Secure the tape measure from the starting line along the mat, close to one edge.

Starting Position: As many practice trials as time permits are allowed. Begin with feet slightly apart, toes behind starting line.

Action: Bend hips, knees and ankles, push vigorously with legs while swinging arms forward.

Scoring: Use stick behind heel nearest take-off line to extend perpendicularly to measuring tape. At the time of the test, record the better of two trials to nearest centimetre on test record card.



5 50 m Run

Equipment: Stop-watch for each timer, 50 m straight-away with run-off, four pylons or flags, starting flag.

Instructions: Mark off 50 m course. Ensure that all participants are wearing running shoes.

Starting Position: Line participants in four lanes behind starting line, timers at finish line.

Action: On signal ("ready") GO! starter drops flag and each participant runs as fast as possible past the finish line.

Scoring: From drop of flag until participant crosses finish line. Score to nearest 1/10th of a second on test record card. Ensure an appropriate rest interval between trials.

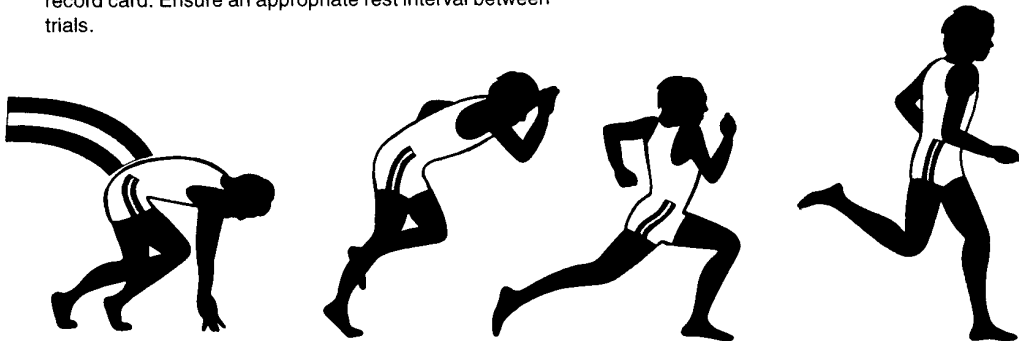
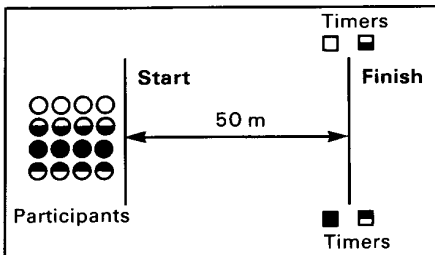


Figure 5-6 50 m Run

6 Endurance Run

Equipment: Stop-watch for each timer, four pylons or flags, starting flag.

Instructions: Mark off 50 m square (alternatives 60 m by 40 m or 70 m by 30 m). Ensure that all participants have running shoes.

Starting Position: Place one group of participants, with timer, at each corner. Timers tally laps for each runner on back of the test record card.

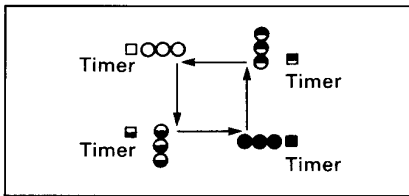
Inform participants how many laps they will run (four laps, ages 6 to 9; eight laps, ages 10 to 12; 12 laps, ages 13 to 17).

Instruct participants to maintain a steady, pace to complete the distance as quickly as possible, but to stop or **preferably** walk if they are unable to continue running.

Action: On signal ("ready") GO! flag drops and all participants begin.

Scoring: At completion of required number of laps, register elapsed time in minutes and seconds on test record card.

Note — It is important that participants be allowed a light "warming-up" before and a "cooling down" period following this event. Stretching leg muscles before and after releases strain and tightness in muscles. Encourage participants to continue walking and "deep breathing" for three to five minutes.



Your Personal Progress Chart						
TESTS	Push-ups	Shuttle Run	Partial Curl-ups	Standing Long Jump	50 m Run	Endurance Run
GOAL						
September						
October						
November						
December						
January						
February						
March						
April						
May						
June						
July						
August						

Figure 5-8 Personal Progress Chart

1 PUSH-UPS**(Total Number)**

Standard by Age	Female						
	12	13	14	15	16	17	18
Excellence	20	21	20	20	24	25	25
Gold	17	17	16	20	20	20	20
Silver	10	11	16	15	12	16	16
Bronze	2	4	3	7	4	7	7

(Total Number)

Standard by Age	Male						
	12	13	14	15	16	17	18
Excellence	31	39	40	42	44	53	53
Gold	28	35	32	37	40	46	46
Silver	18	24	24	30	30	37	37
Bronze	9	11	13	20	22	23	23

Figure 5-9 Push-up Standards

2 SHUTTLE RUN

(To nearest 1/10th of a second)

Standard by Age	Female						
	12	13	14	15	16	17	18
Excellence	12.2	11.9	11.6	11.8	11.7	11.6	11.6
Gold	12.5	12.3	12.0	12.2	12.0	11.9	11.9
Silver	13.1	19.0	12.7	12.9	12.6	12.6	12.6
Bronze	14.3	14.1	14.8	14.0	13.8	13.7	13.7

(To nearest 1/10th of a second)

Standard by Age	Male						
	12	13	14	15	16	17	18
Excellence	11.7	11.4	10.9	10.8	10.5	10.4	10.4
Gold	12.0	11.6	11.2	11.0	10.7	10.6	10.6
Silver	12.5	12.1	11.7	11.4	11.1	11.1	11.1
Bronze	13.7	13.5	12.7	12.4	12.1	11.9	11.9

Figure 5-10 Shuttle Run Standards

3 PARTIAL CURL-UPS

(Total Number)

Standard by Age	Female						
	12	13	14	15	16	17	18
Excellence	50	59	48	38	49	58	58
Gold	43	50	41	35	35	49	49
Silver	38	40	30	26	26	40	40
Bronze	19	22	20	15	16	26	26

(Total Number)

Standard by Age	Male						
	12	13	14	15	16	17	18
Excellence	64	59	62	75	73	66	66
Gold	54	51	54	87	50	58	58
Silver	32	39	40	45	37	42	42
Bronze	22	28	24	26	24	25	25

Figure 5-11 Partial Curl-up Standards

4 STANDING LONG JUMP

(Centimetres)

Standard by Age	Female						
	12	13	14	15	16	17	18
Excellence	179	184	189	188	196	198	198
Gold	171	170	181	181	187	190	190
Silver	158	163	162	185	173	174	174
Bronze	133	141	145	144	147	152	152

(Centimetres)

Standard by Age	Male						
	12	13	14	15	16	17	18
Excellence	183	200	213	223	232	238	238
Gold	176	193	206	215	224	231	231
Silver	184	177	199	202	211	220	220
Bronze	143	151	166	171	191	195	195

Figure 5-12 Standing Long Jump Standards

5 50 m RUN**(To the nearest 1/10th of a second)**

Standard by Age	Female						
	12	13	14	15	16	17	18
Excellence	8.4	8.0	7.9	8.0	7.9	7.9	7.9
Gold	8.6	6.2	8.1	8.2	8.1	8.0	8.0
Silver	9.2	9.7	8.6	8.7	8.6	8.5	8.5
Bronze	10.2	9.5	9.4	9.4	9.3	9.2	9.2

(To the nearest 1/10th of a second)

Standard by Age	Male						
	12	13	14	15	16	17	18
Excellence	8.1	7.7	7.4	7.2	7.0	6.9	6.9
Gold	8.4	7.9	7.6	7.4	7.1	7.0	7.0
Silver	8.8	8.4	8.0	7.7	7.4	7.3	7.3
Bronze	9.7	9.2	8.8	8.4	8.0	8.0	8.0

Figure 5-13 50 m Run Standards

6 ENDURANCE RUN

(Minutes and Seconds)

Standard by Age	Female						
	1600 m		2400 m				
	12	13	14	15	16	17	18
Excellence	8:41	13:54	13:28	13:31	12:38	12:45	12:45
Gold	9:18	14:33	14:18	14:01	13:22	13:31	13:31
Silver	10:26	16:12	15:51	16:02	16:44	15:19	15:19
Bronze	12:46	18:59	18:51	18:58	18:37	18:53	18:53

(Minutes and Seconds)

Standard by Age	Male						
	1600 m		2400 m				
	12	13	14	15	16	17	18
Excellence	7:41	11:31	10:43	10:23	10:08	10:08	10:08
Gold	8:04	11:49	11:09	10:50	10:42	10:32	10:32
Silver	8:46	12:51	12:16	11:51	11:22	11:10	11:10
Bronze	10:31	15:35	14:40	14:46	14:08	13:33	13:33

Figure 5-14 Endurance Run Standards

Royal Canadian Air Cadets Fitness Test

Standards of Attribution Uniform Badges



EXCELLENCE level on all six test items.



GOLD level or higher on five test items, including endurance run.



SILVER level or higher on four items, including endurance run.



BRONZE level or higher on four items, including endurance run.

In order to qualify for any badge, you must complete all six test items.

Figure 5-15 Fitness Badges



Air Cadet Fitness Programme Test Record Chart

Name of Cadet: _____ Rank: _____

LHQ Training Level: 1 2 3 4 5 Squadron: _____

Age at Time of Testing: _____ Sex: M F

Date of Test: _____ Badge Awarded: Excel - Gold - Silver - Bronze

Activity	Raw Score	Level of Achievement				
		Excellence	Gold	Silver	Bronze	Partic.
Push-Ups						
Shuttle Run (seconds)						
Partial Curl-Ups						
Standing Long Jump (cm)						
50 m Run (seconds)						
Endurance Run (min-seconds)						

Name of Evaluator: _____

Date: _____

Figure 5-16 Air Cadet Fitness Programme Test Record Chart

CHAPTER 6

PERFORMANCE OBJECTIVE 406

SENSIBLE LIVING

GENERAL


1. What is sensible living? After you have completed this performance objective, you will have a better understanding of just what it means to live sensibly.
2. This unit is on-going. Several specialists may be invited to the squadron to talk to you about fire safety, hygiene and nutrition, drugs, alcohol and smoking. Although there is no formal test for this performance objective, you will have to attend the guest lecturers' presentations to complete your second year training.

NUTRITION

3. Figure 6-1 illustrates Canada's Food Guide. If you follow the guidelines set out in Canada's Food Guide, you can set up a good nutritional basis for a healthy life.

FIRE PREVENTION AND SAFETY

4. Figures 6-2 and 6-3 illustrate and explain the use of fire extinguishers. Your local fire department can provide you or your squadron with many pamphlets that contain useful information on fire prevention and safety.


Health
Canada
Santé
Canada

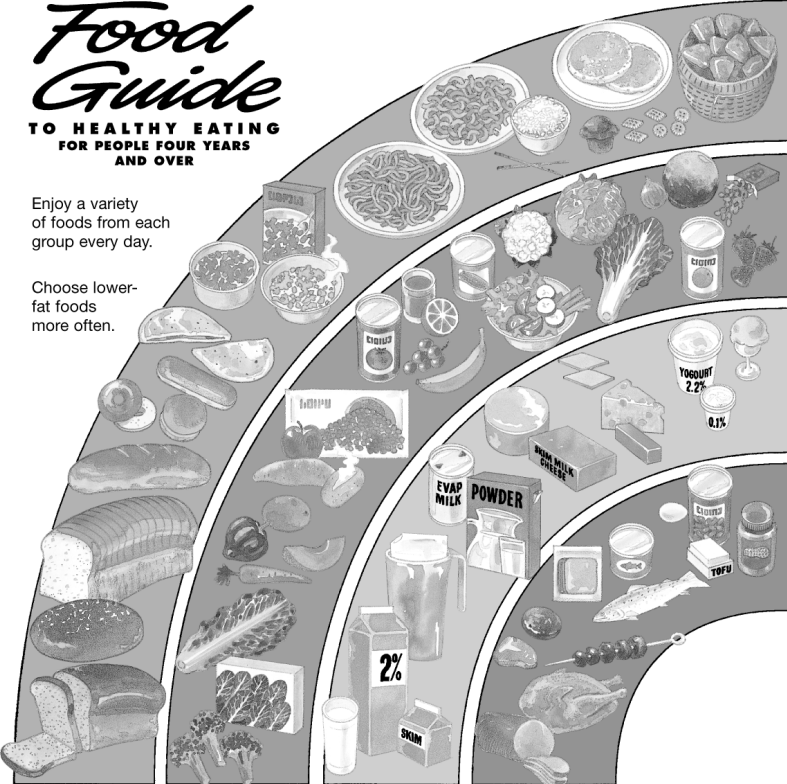
CANADA'S

Food Guide

**TO HEALTHY EATING
FOR PEOPLE FOUR YEARS
AND OVER**

Enjoy a variety of foods from each group every day.

Choose lower-fat foods more often.



Grain Products
Choose whole grain and enriched products more often.

Vegetables and Fruit
Choose dark green and orange vegetables and orange fruit more often.

Milk Products
Choose lower-fat milk products more often.

Meat and Alternatives
Choose leaner meats, poultry and fish, as well as dried peas, beans and lentils more often.






Figure 6-1 (Sheet 1 of 12) Canada's Food Guide

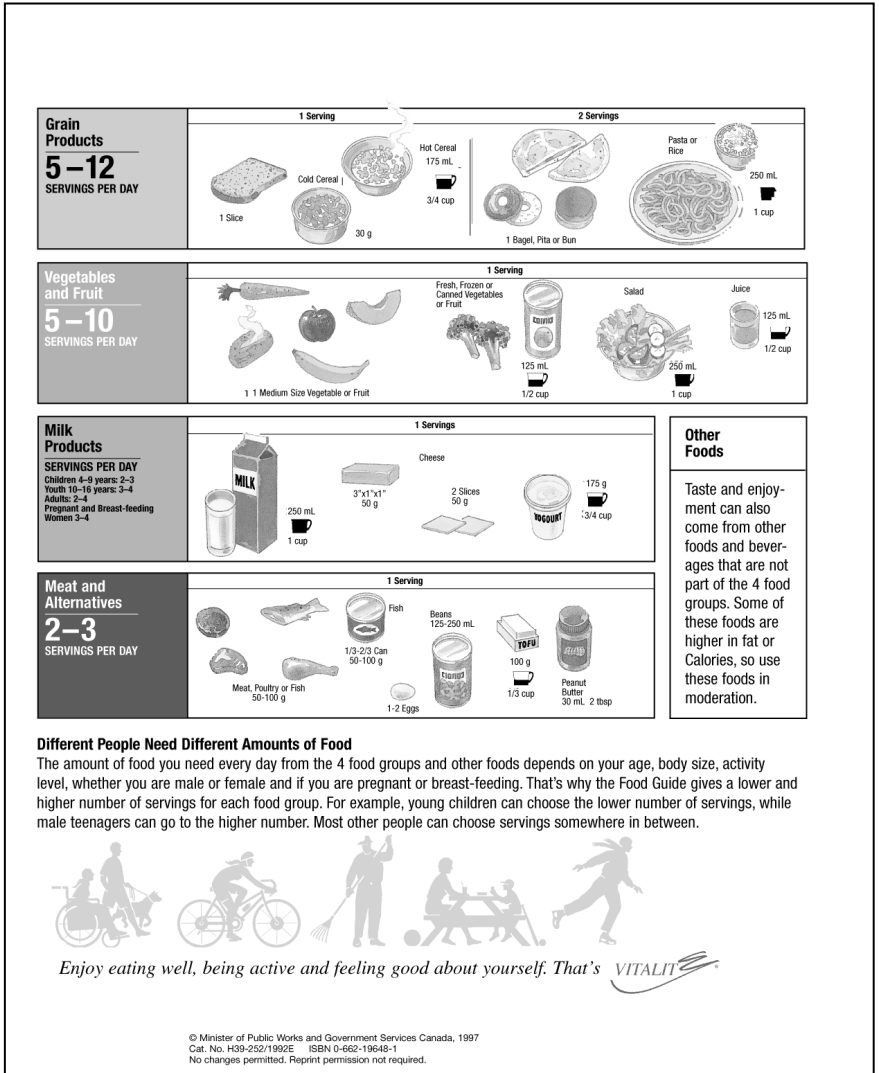


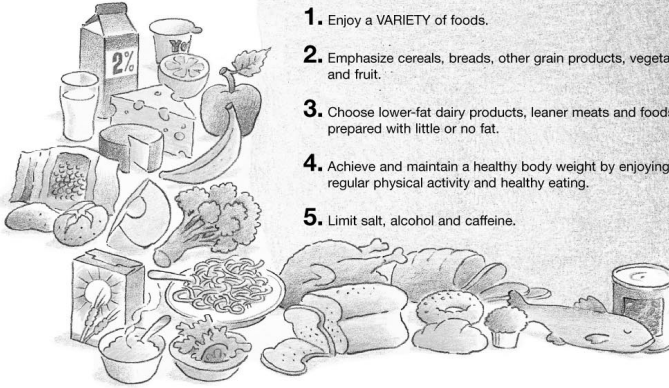
Figure 6-1 (Sheet 2 of 12) Canada's Food Guide

What is the Food Guide based on?

Canada's Food Guide to Healthy Eating is based on these guidelines from Health Canada:

Canada's Guidelines for Healthy Eating

1. Enjoy a VARIETY of foods.
2. Emphasize cereals, breads, other grain products, vegetables and fruit.
3. Choose lower-fat dairy products, leaner meats and foods prepared with little or no fat.
4. Achieve and maintain a healthy body weight by enjoying regular physical activity and healthy eating.
5. Limit salt, alcohol and caffeine.



Eating is one of the best things life has to offer. Food helps you celebrate with your family and friends. It nourishes your body. It gives you energy to get through each day. The right balance of food and activity helps you stay at a healthy body weight.

You don't have to give up foods you love for the sake of your health. But you do need to aim for variety and moderation. Let **Canada's Food Guide to Healthy Eating** help you make your choices.



Figure 6-1 (Sheet 3 of 12) Canada's Food Guide

What does the Food Guide tell you?

The rainbow side of the Food Guide gives you advice on how to choose foods.

'Enjoy a variety of foods from each group every day.'

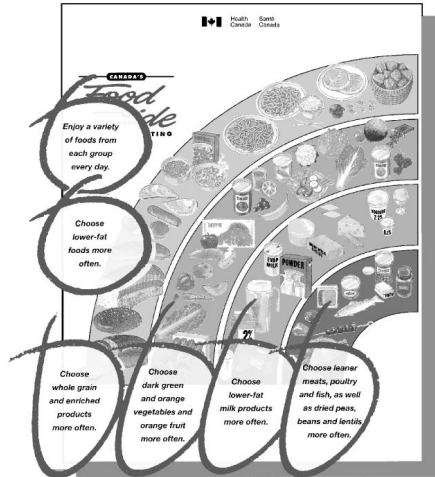
Try something new! Explore the rainbow of foods that make up the 4 food groups. Enjoy foods with different tastes, textures and colours.

The 4 food groups provide you with the nutrients you need to be healthy. You need foods from each group because each group gives you different nutrients. You also need to choose different foods from within each food group to get all the nutrients your body needs. Look at the chart on the opposite page for the key nutrients each food group offers.

'Choose lower-fat foods more often.'

Everyone needs some fat in their diet, but most people eat too much fat. Eating more breads, cereals, grains, vegetables, fruit, peas, beans and lentils will help you cut down on fat. You can also choose lower-fat dairy products and leaner meats, poultry and fish.

Each of the 4 food groups includes foods that contain fat. Eat lower-fat foods from each group every day. Choose smaller amounts of higher-fat foods. If you do, you'll be able to enjoy the foods you love and eat well at the same time.



Tips to Reduce Fat

- Spread less butter or margarine on bread, buns or bagels.
- Have salads with less dressing or with a lower-fat dressing.
- Try vegetables without butter, margarine or rich sauces.
- Try skim, partly-skim or reduced-fat milk products in recipes.
- Choose meat, poultry or fish that are baked, broiled or microwaved. Serve with light broth or herbs.
- Have fried or deep-fried foods less often.
- Have snacks such as chips and chocolate bars less often.

Figure 6-1 (Sheet 4 of 12) Canada's Food Guide

'Choose whole grain and enriched products more often.'

Whole grain products such as whole wheat, oats, barley or rye are suggested because they are high in starch and fibre. Enriched foods are recommended because they have some vitamins and minerals added back to them. Treat yourself to multi-grain breads, pumpernickel bagels, enriched pasta, brown rice, ready-to-eat bran cereals or oatmeal.

'Choose dark green and orange vegetables and orange fruit more often.'

These foods are higher than other vegetables and fruit in certain key nutrients like vitamin A and folacin. Go for salads, broccoli, spinach, squash, sweet potatoes, carrots, cantaloupes or orange juice.

'Choose lower-fat milk products more often.'

Lower-fat milk products have less fat and Calories, yet still provide the high quality protein and calcium essential to healthy eating. Whether it's milk, yogurt, cheese or milk powder, choose the lower-fat option. Look at labels and choose products with a lower % M.F. (Milk Fat) or % B.F. (Butter Fat). Then you can have the refreshing taste of milk products with less fat.

'Choose leaner meats, poultry and fish, as well as dried peas, beans and lentils more often.'

Many leaner meats, poultry, fish and seafood choices are available to help you reduce your fat intake without losing important nutrients. Be sure to trim visible fat. Try baking, broiling, roasting or microwaving instead of frying, and drain off extra fat after cooking. To lower your fat while increasing your intake of starch and fibre, choose foods like baked beans, split pea soup or lentil casserole.

Key Nutrients in Canada's Food Guide to Healthy Eating

Each food group is essential. That's because it provides its own set of nutrients.

Grain Products	+	Vegetables and Fruit	+	Milk Products	+	Meat and Alternatives	=	The Food Guide
protein				protein		protein		protein
carbohydrate		carbohydrate		fat		fat		fat
fibre		fibre						carbohydrate
thiamin		thiamin				thiamin		fibre
riboflavin				riboflavin		riboflavin		thiamin
niacin				niacin		niacin		riboflavin
folacin		folacin		vitamin B ₁₂		folacin		niacin
		vitamin C		vitamin A		vitamin B ₁₂		folacin
		vitamin A		vitamin D				vitamin B ₁₂
				calcium				vitamin C
iron		iron				iron		vitamin A
zinc				zinc		zinc		vitamin D
magnesium		magnesium		magnesium		magnesium		calcium
								iron
								zinc
								magnesium

Figure 6-1 (Sheet 5 of 12) Canada's Food Guide

What does the Food Guide tell you?

The bar side of the Food Guide shows you the serving sizes for different foods. It also explains that different people need different amounts of food.

What are 'Other Foods'?

'Other Foods' are foods and beverages that are not part of any food group.

They include:

- foods that are mostly fats and oils such as butter, margarine, cooking oils and lard
- foods that are mostly sugar such as jam, honey, syrup and candies
- high-fat and/or high-salt snack foods such as chips (potato, corn, etc.) or pretzels
- beverages such as water, tea, coffee, alcohol and soft drinks
- herbs, spices and condiments such as pickles, mustard and ketchup.

These foods can be used in making meals and snacks and are often eaten with foods from the 4 food groups.

More About 'Other Foods'

Water

- Always satisfy your thirst. Choose water often and be sure to drink more in hot weather or when you are very active.

Alcohol

- For most adults, moderate drinking means no more than 1 drink a day and no more than 7 drinks a week. More than 4 drinks on one occasion, or more than 14 drinks a week is a risk to health and safety.

1 drink = 1 bottle (or about 350 mL) of beer
 1 drink = 150 mL (or about 5 oz) of wine
 1 drink = 50 mL (or about 1 1/2 oz) of liquor

- If you are pregnant or breast-feeding, avoid alcohol.

Caffeine

- Use in moderation. Caffeine is found in drinks such as coffee, tea or colas and foods that contain cocoa. It's also in drugs such as cold remedies and headache medicine.

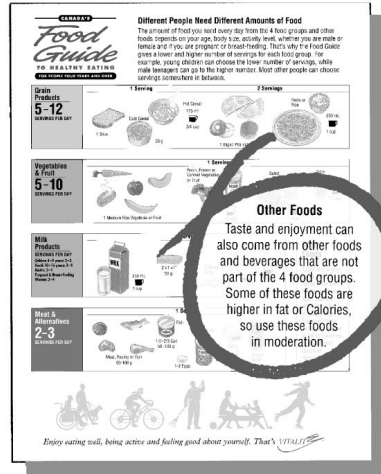


Figure 6-1 (Sheet 6 of 12) Canada's Food Guide

How many servings from each food group do I need?

Too many servings?

It may seem like a lot, so check to see how many you really need. And, you may be eating more servings than you realize. For example, a plate of pasta can count as 3-4 servings of Grain Products and a juice box as 2 servings of Vegetables and Fruit.

Because different people need different amounts of food, the bar side of the Food Guide suggests the following number of servings:

Grain Products

5-12
SERVINGS PER DAY

Milk Products

2-4
SERVINGS PER DAY

Children 4-9 years: 2-3 servings/day
Youth 10-16 years: 3-4 servings/day
Adults: 2-4 servings/day
Pregnant and Breast-feeding Women:
3-4 servings/day

Vegetables and Fruit

5-10
SERVINGS PER DAY

Meat and Alternatives

2-3
SERVINGS PER DAY

The number of servings you need every day from the 4 food groups and other foods depends on your age, body size, activity level, whether you are male or female and if you are pregnant or breast-feeding.

Most people will need to have more than the lower number of servings, especially pregnant and breast-feeding women, male teenagers and highly active people.

Different People Need Different Amounts of Food

Here are some examples of how people could choose their servings in one day.

FOOD PRODUCTS	MARIE	SERVINGS	DAVID	SERVINGS	LOUISE	SERVINGS
Grain Products	Marie is 5 years old. To meet her nutrient and energy needs, Marie has the smallest number of servings from each food group and adds 'other foods'. As she grows or is more active, Marie may choose more servings.	5	David is 17 and a competitive swimmer. To meet his nutrient and energy needs, David chooses the largest number of servings from each of the 4 food groups and adds 'other foods'. David has higher energy needs than most people and at times he may need to choose even more servings than those shown here.	12	Louise is 35 and not very active. Like most people, she eats different amounts of food from day to day to satisfy her nutrient and energy needs. As her appetite and activity level change, Louise may adjust the number of servings and amount of 'other foods' she eats.	6
Vegetables and Fruit		5		10		7
Milk Products		2		4		2
Meat and Alternatives		2		3		2
'Other Foods'						

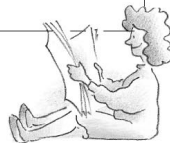


Figure 6-1 (Sheet 7 of 12) Canada's Food Guide

Your Healthy Eating Scorecard

What are serving sizes?

The bar side of the Food Guide explains serving sizes for different foods. For example, in Grain Products, 1 slice of bread = 1 serving, while 1 bagel, pita or bun = 2 servings.

The size of servings can vary within the Meat and Alternatives group. For example, 50-100 grams (g) of meat, poultry or fish = 1 serving. That way, a child may choose a smaller portion size while an adult may choose a larger portion size to get 1 serving.

The Food Guide uses both metric and household measures. That's because you usually buy or prepare foods using either of these measures.

Check off your food choices in the boxes below as you eat them throughout the day. On the bar side of the Food Guide you'll see what makes up 1 serving from each food group. If you like, make copies of this chart and use it over a longer period of time to check your progress.

FOODS

Grain Products

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Vegetables and Fruit

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Milk Products

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Meat and Alternatives

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Other Foods (list on the line below)

If you don't eat a lot, it's important to choose your food wisely. For example, women should choose foods high in iron such as beef or game meat, whole grain and enriched cereals, peas, beans and lentils. Let the statements on the rainbow side of the Food Guide help you make your choices. People who choose the lower number of servings but are still hungry or losing weight may need more servings from the 4 food groups and 'other foods'.

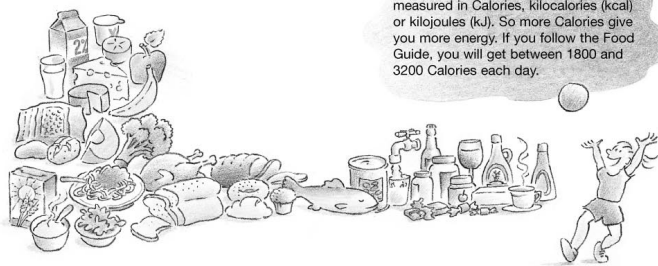
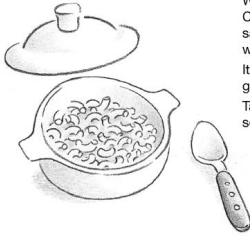


Figure 6-1 (Sheet 8 of 12) Canada's Food Guide

What about Combination Foods?



We often eat meals which have more than one kind of food in them. Casseroles, chili, moussaka, pizza, spaghetti, soups, stew and sandwiches are made from the foods of more than one food group as well as 'other foods'. These are called combination foods.

It is hard to know how many servings of each food group you are getting in foods of this kind.

Take **Tuna Noodle Casserole**, for example. One 500 mL (2 cup) serving may contain:

- 2 servings of Grain Products (250 mL or 1 cup of pasta)
- 1 serving of Meat and Alternatives (50 g or 1/3 can of tuna)
- 1/2 serving of Milk Products (125 mL or 1/2 cup of milk in white sauce)
- 1 serving of Vegetables and Fruit (125 mL or 1/2 cup of peas, celery and onions)
- 1 'other food' (5 mL or 1 tsp. butter or margarine in white sauce)

Here are 2 more examples:

One whole small (20 cm/8") **Ham, Pineapple and Cheese Pizza** may provide:

- 3 servings Grain Products (20 cm or 8" crust)
- 1 serving Vegetables and Fruit (50 mL or 1/4 cup of pineapple and 50 mL or 1/4 cup of tomato sauce)
- 1 serving Milk Products (50 g or 2 oz. of cheese)
- 1 serving Meat and Alternatives (50 g or 2 oz. of ham)

One large 400 mL (1 3/4 cup) serving of **Chili Con Carne** may contain:

- 2 servings of Vegetables and Fruit (125 mL or 1/2 cup tomato sauce and 125 mL or 1/2 cup of green peppers, onions and mushrooms)
- 2 servings of Meat and Alternatives (125 mL or 1/2 cup of kidney beans and 50 g or 2 oz. of ground beef)

To figure out the number of servings of each food group you have eaten in your combination foods:

1. List the main food items.
2. Estimate how much of each food item you ate.
3. Look at the bar side of the Food Guide to see roughly how many servings each food item provides.

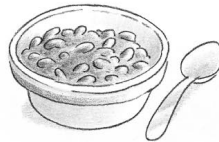
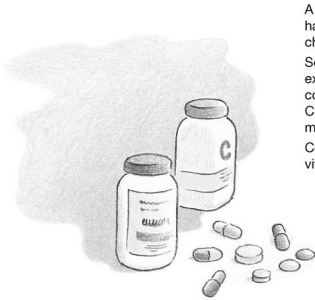


Figure 6-1 (Sheet 9 of 12) Canada's Food Guide

What about Vitamin and Mineral Supplements?

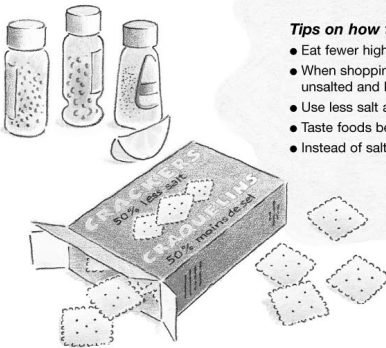


A multiple vitamin-mineral supplement can **not** replace good eating habits. You usually get all the nutrients your body needs by simply choosing a variety of foods from all 4 food groups and 'other foods'. Some people need certain supplements. Pregnant women often need extra iron and folacin. Elderly people who don't get any sun and don't consume margarine or enough milk may need extra Vitamin D. Children 12 years and under living in areas without fluoridated water may need fluoride supplements.

Consult your doctor or dietitian if you think you need to take a vitamin-mineral supplement.

WHERE DOES SALT FIT IN?

Most salt we eat comes from sodium chloride—better known as table salt. Most people get more than they need, so it's best to limit sodium and salt.



Tips on how to cut down on salt:

- Eat fewer highly salted snack foods.
- When shopping, check the labels. Choose foods that are unsalted and lower in salt or sodium.
- Use less salt at the table and when cooking.
- Taste foods before adding salt.
- Instead of salt, use spices, herbs or lemon juice.

Figure 6-1 (Sheet 10 of 12) Canada's Food Guide

Putting it all together

ENJOY:

- **Eating Well**
- **Being Active**
- **Feeling Good about Yourself**

Eating well is just one way to get the most out of life. It's also important to be active and feel good about yourself.

Eating well means following **Canada's Food Guide to Healthy Eating**. Use the ideas in this booklet to help you make wiser food choices. After all, food is one of life's great pleasures.

Being active means making physical activity a part of your everyday life. It helps you manage your weight and strengthen your heart, lungs and muscles. Find fun ways to be active in your own way. Walk part of the way to and from work. Head outdoors to skate, swim or hike. Play ball with the kids.

Feeling good about yourself means believing in yourself. The best way to do that is to accept who you are and how you look. So treat yourself well.

Healthy bodies come in a variety of shapes and sizes. A good weight is a healthy weight, not just a low weight. A healthy weight helps you stay active and lowers the risk of health problems.

Take a fresh approach to living. Enjoy eating well, being active and feeling good about yourself. That's Vitality!



VITALITY[®]



Figure 6-1 (Sheet 11 of 12) Canada's Food Guide

Healthy Eating Checklist

After reading this booklet, ask yourself: will I choose...

- a variety of foods from each of the 4 food groups?
- foods within the suggested number of servings for all 4 food groups?
- whole grain and enriched grain products more often?
- dark green and orange vegetables and orange fruit more often?
- lower-fat milk products more often?
- leaner meats, poultry and fish, as well as peas, beans and lentils more often?
- 'other foods' wisely?
- foods prepared with little or no fat?
- to enjoy eating with my family and friends regularly?
- to be active every day?



Figure 6-1 (Sheet 12 of 12) Canada's Food Guide

How Most Fire Extinguishers Work

1. Although the majority of extinguishers work with our directions, there are exceptions. Read the instructions on your extinguisher for variations.

Fix a picture in your mind that will fit the instructions on the extinguisher you will be using.

2. If there's a fire, call the fire department first. Get everyone outside. Then fight a small fire only. If the fire gets large, get out. Close doors to slow the fire spread.

3. Make sure you don't use one type extinguisher on another type fire – it may make the fire worse. Common errors (they can be fatal) are using water (A) on a grease or on an electrical fire (B or C).

Learn How

1. Pull

Pull the pin. Some units require the releasing of a lock latch, pressing a puncture lever, inversion, or other motion

2. Aim

Aim the extinguisher nozzle (horn or hose) at the base of the fire.

3. Squeeze

Squeeze or press the handle.

4. Sweep

Sweep from side to side at the base of the fire. Watch for reflash. Discharge the contents of the extinguisher.

Foam and water extinguisher require slightly different action. Read the instructions.

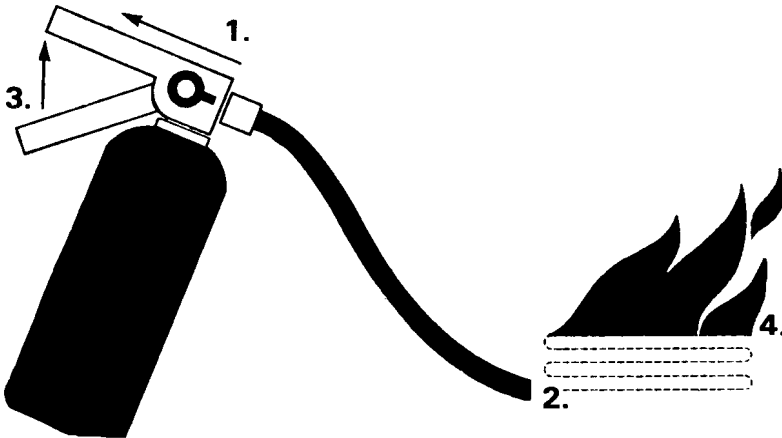


Figure 6-2 Fire Extinguisher Use

This Is Your ABCD's Of Portable Fire Extinguishers

You need an extinguisher at home

If you plan to buy one extinguisher, a multi-purpose dry chemical labeled ABC puts out most types of fires – wood, paper, and cloth, flammable liquid, or electrical fires.



If you buy more than one, you might want to get a BC for the kitchen, an A for the living room, and a ABC for the basement and garage.

	Ordinary Combustibles	
	Flammable Liquids	
	Electrical Equipment	
	Metals	

Figure 6-3 Classes of Fires

CHAPTER 7

PERFORMANCE OBJECTIVE 408

LEADERSHIP

SECTION 1

INTRODUCTION

1. As you have undoubtedly learned from your experiences as an NCO, leadership is not as easy as it seems at first. It requires more than good intentions and a knowledge of leadership principles. Last year, you learned that a good leader must have certain qualities and considerable self-discipline. You know self-confidence plays a large role in the way you direct your cadets.

2. As a leader you will be required to demonstrate good judgement in your decisions, in your statements, and in the way you deal with followers and their problems – especially if their problems could affect the smooth execution of your task. Young leaders often have considerable difficulty setting aside their own feelings and personal desires in order to devote the necessary attention to the performance of the group and its individual members. You may experience particular difficulty when you are called upon to command some of your friends. Another obstacle is the need to fulfil both the requirements of your superiors and the expectations of your followers. This begs the question: what exactly do followers want?

SECTION 2

WANTS OF A FOLLOWER

3. As a leader, one of your most difficult tasks is meeting the expectations of your followers. If you do not give your cadets what they expect, they will work to satisfy their own needs, even if it means taking action which is contrary to the group objectives. In other words, if the cadets do not like your system, they will do everything they can to bypass it and turn the situation to their advantage.

4. In order to complete your missions successfully, you must know your followers. The following is a general description of what most cadets expect:

- a. **Good Leadership.** It is important that the cadets be certain that you are acting in the group's best interests and that your decisions are not impulsive. Remember that trust must be won, and is never granted automatically. Leaders must constantly prove to the cadets that they are worthy of their trust.
- b. **To know What is Expected of Them.** Your cadets expect information. They want to know how, where, when, and above all, **WHY** you have asked them to do something. By keeping them informed, you make them feel involved in the decision-making process.
- c. **To Be Recognized for Good Performance.** It is important that you congratulate your followers when they turn in a good performance, just as you criticize them when their performance is sub-standard. If your cadets feel you are satisfied with them, they will be more inclined to maintain high standards.
- d. **To Be Treated With Dignity.** You demand respect from your cadets. Too often, leaders assume respect comes with their position or rank. However, respect must be earned. Treat your cadets with the same level of respect you expect from them.
- e. **To Have Opportunities for Promotions.** Although you are not responsible for promotions in your squadron, it is your duty as a leader to inform your superiors if your cadets perform well. In this manner, you increase their chances of advancement. You can also reward their efforts by assigning special duties to the most worthy cadets (eg, giving roll call, commanding the section).
- f. **To Enjoy a Certain Freedom of Action.** If you supervise your cadets too closely you may destroy their team spirit. Overly strict control can impede the group's social development and teach the cadets to fear making mistakes. Give them the chance to enjoy being cadets.

- g. **To Engage in Social Activities.** Cadets wish to have fun, make new friends and socialize among themselves. To foster team spirit, a leader should organize regular opportunities for the team members to develop the links that are so important in holding a group together.
- h. **To Receive an Explanation for Changes.** Nothing causes a team member more anguish or frustration than a leader who changes an established plan without providing an explanation. Followers of a leader who changes the plan frequently and for no apparent reason may view their leader as indecisive even if the leader was acting on orders. This does not mean that you are required to account for all your decisions to your cadets. Simply ensure that your cadets understand the situation.
- j. **To Be Assigned Stimulating Work.** When you assign tasks, ensure that your cadets feel their work is important to the success of the mission. They will rather quickly see through any attempt to just keep them busy.
- k. **To Be Treated Equally.** Avoid showing favouritism. Be sure to reward those who make an outstanding effort and reprimand those who perform poorly.
- m. **High-Contribution Opportunity.**

SECTION 3

MOTIVATION

- 5. Perhaps your most important task will be to **MOTIVATE** your cadets. Motivation, simply put, is the degree of willingness of an individual to perform a specific task.
- 6. To motivate your cadets, you must determine their needs and desires and influence them in a constructive manner so that they can achieve your objectives. Remember, as you learned in Level 2, leadership and group motivation are closely linked.

NEEDS OF A FOLLOWER

7. People are motivated to the extent that certain areas of their needs are met. These needs exist in a definite order of application (Figure 7-1).

8. The importance granted to the satisfaction of various needs varies from one person to another. A person's needs vary according to time, place and, often to a great extent, on the person's attitude towards superiors.

9. Needs can be arranged in order of priority. As soon as basic needs are satisfied, the more advanced needs occupy more of the individual's attention and become the motivating agents. Therefore, the needs of the second category do not become important until those of the first category have been satisfied.

10. A satisfied need is no longer motivating. Therefore, it is a leader's responsibility to determine which needs remain unsatisfied and to organize efforts in relation to those needs to stimulate performance or administer rewards or punishment. For example, an effective leader could use the fact that the cadets are thirsty to get them to pick up the pace when they are hiking by mentioning that a source of drinking water is nearby. This strategy, however, would not work if each cadet was carrying a bottle of fresh water. The need would not be present. In that case, the leader would have to appeal to another need, eg, the safety and warmth of the camp.

11. Ensure that you do not intentionally keep the cadets in a state of need in the hope of achieving still higher performance. Be aware that, after a certain point, if the need is not satisfied, the cadet's reaction may be the opposite of what you expected. There is a danger of cadets becoming discouraged or uninterested, in which case the objective will become secondary in their minds. You must, therefore, be well aware of the needs of your cadets, what motivates them and what will push them to surpass themselves.

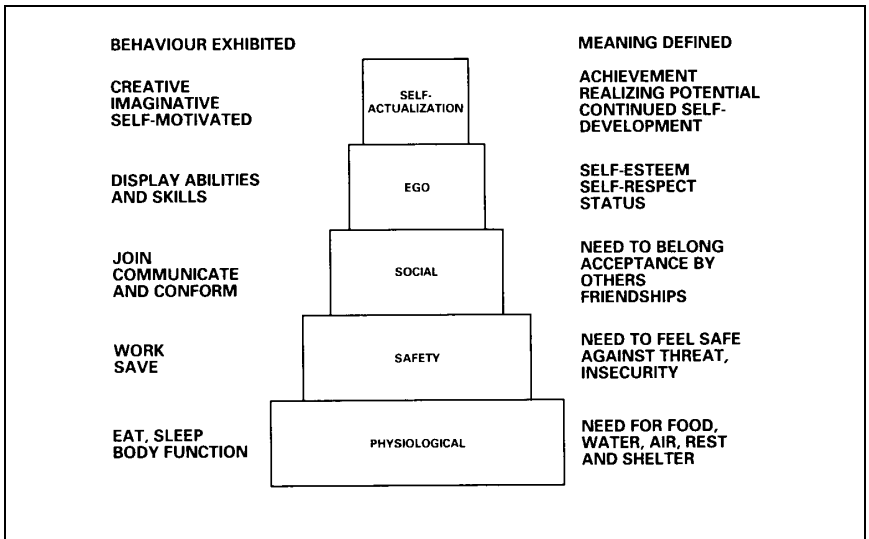


Figure 7-1 Table of Needs

INCENTIVES TO PERFORMANCE

12. You can employ many incentives likely to encourage the cadets to satisfy their aspirations and motivate them to improve their performance. The important thing is for them to improve their performance and well-being. Some of the most important positive incentives are as follows:

- a. **Promotion.** Promotions often depend on your recommendation and the evaluation of a cadet's performance. Ensure that only the best candidates are recommended for promotion by evaluating their performance impartially and objectively. If your cadets see, at the outset, that very good performance is rewarded by a promotion, they will do their very best.
- b. **Recognition.** You must recognize good performance and commend your cadets when they do well. However, praise should be used only when it is truly deserved. If praise is given too frequently, it becomes a doubtful motivator.

- c. **Competition.** Providing various competitive opportunities can help to enhance performance. Cadets may compete with themselves, with other cadets, or as members of a group competing with other groups. The habit of constantly improving performance will often reflect positively on the cadet's work.
- d. **Knowledge of the Results.** If you advise the cadets of their progress, they will almost certainly improve their performance, since they will be more aware of their weaknesses. Performance interviews are particularly important because they enable the leader not only to underline the points that need improvement but also to suggest concrete ways of improving the situation.
- e. **Participation.** One of the best incentives to job performances is that of encouraging participation in the decision-making process when an opportunity arises. Participation is ideally suitable when dealing with tasks to be performed. The advantages of participation are as follows:
 - (1) It is an opportunity to receive some good suggestions.
 - (2) The cadets become more confident when they realize they will be consulted and that their point of view will be taken into account.
 - (3) The cadets tend to identify more strongly with their work.
 - (4) The cadets develop a sense of responsibility.
- f. **Enthusiasm.** The enthusiasm of leaders and their superiors plays an essential role in motivating the cadets. Poorly motivated leaders usually have cadets who are even less motivated than they. Further, enthusiasm is contagious. If leaders are perceptive and enthusiastic, their cadets will probably turn in an excellent performance.



- g. **Organizational Efficiency.** The organization of a group's activities can affect motivation of its members. Cadets can be better motivated if the duties associated with each position are clearly defined, the chain of command is clearly indicated, the equipment is appropriate and the tasks are carried out in an orderly and conscientious manner.
- h. **Delegation.** Delegating authority to the cadets guarantees the effective execution of all the activities. Delegation stimulates interest and initiative. If leaders cannot organize their work so that some of it can be delegated, the cadets will have no opportunity to improve their skills and their sense of initiative will be stifled. Further, they will receive the impression that they are not trusted, especially if the leaders are unable to deal with serious problems because they devote too much time to routine tasks that they should have delegated.

- j. **Avoiding Overcontrolling.** Supervision involves verification and correction. One establishes supervisory mechanisms in order to compare the desired objective with the actual results. One of the best methods of supervision is, of course, direct supervision. Nevertheless, a leader must resist the temptation to supervise too closely, since this would become an obstacle to the execution of assigned tasks and give the impression that the leader does not trust the cadets; would leave no room for initiative or improvement on the part of the cadets; and would waste the leader's time.
- k. **Development.** By allowing the cadets to improve their skills, you improve their motivation and performance. You also prepare them to assume greater responsibilities in the future.
- m. **Good Selection.** If people hate their work, they will undoubtedly turn in a mediocre performance. Care must therefore be taken to assign tasks to one's subordinates that are consistent with their preferences and qualifications. Although there are tasks that nobody wants, a leader can be relatively flexible with regard to the need for carrying out such tasks because it is up to the leader to determine whether the tasks are truly necessary, and, if they are, they can be distributed on an equitable basis.

13. Each cadet wants to be treated fairly and recognized as an individual. Avoid treating cadets in a manner that gives them the impression they are simply pawns to be moved around as the need arises.

14. Each of your cadets has a different personality, different experiences and different needs. The cadets will therefore react to your incentives in a variety of ways. Everyone, yourself included, wants to be recognized for a personality and individual traits. Therefore, it is essential that you be able to recognize the traits that distinguish one cadet from another. Some of these factors include the following:

- a. upbringing;
- b. social class;
- c. cultural background;
- d. training;

- e. age;
- f. sex;
- g. race;
- h. personal problems;
- j. school problems;
- k. achievement;
- m. physical stature;
- n. intelligence;
- p. personality;
- q. heredity; and
- r. environment.

15. It is not easy to evaluate a subordinate's exact personality, especially when the person in question is a young adolescent whose personality is in a state of constant evolution. Therefore, you must adapt your leadership to suit the various situations that may arise and the persons under your command.

SECTION 4

LEADERSHIP APPROACHES

16. The three most common leadership approaches are as follows:
- a. **Autocratic Leadership.** This technique is used by leaders who want to ensure, above all, the obedience of their group. They establish the procedures to be followed and consider it their exclusive right to make the decisions.
 - b. **Democratic Leadership.** This technique involves group participation in determining which procedures will be followed. The

leader becomes a facilitator whose role is to encourage group involvement. The leader uses ideas and suggestions obtained through group discussion and consultation.

- c. **Free-rein Leadership.** The free-rein method is used only in certain situations. The leader becomes essentially a source of information at the service of the members of the group. The leader exerts only minimum control over the group members and relies on their sense of initiative to successfully carry out the mission.

17. It is your duty as a leader to choose the method that offers the best chances of success, ie, the one that will result in your followers turning in their best performance. To obtain superior performance, the following methods can be used:

- a. **The Autocratic Approach.** The following apply:

- (1) **Hostile Person.** If you encounter an individual who shows signs of hostility, you will need to assert your authority. The authoritative method has the effect of channelling aggressiveness and containing the hostile person's energy and using it for productive purposes. Be very careful not to confuse an authoritative attitude with a dominating one. Avoid useless verbal confrontations, since they can only increase the level of frustration.

- (2) **Dependent Persons.** Such cadets need firm guidance. Their feeling of dependence makes them feel insecure unless their leader is authoritarian and tells them exactly what to do. A firm leader reassures them. However, it is your responsibility to guide these cadets towards greater independence.

- b. **The Democratic Approach.** The following apply:

- (1) **Co-operative Persons.** A willingness to co-operate is not, in itself, a distinctive character trait. However, followers who possess this quality will usually respond best to the participative approach. Persons who co-operate do not usually lack aggressiveness. Rather, their aggressiveness, unlike that

of hostile individuals, is constructive. A cadet who co-operates energetically will proceed in the right direction with a minimum of control .

- (2) **Persons with Team Spirit.** Cadets who like team-oriented games will react best if your attitude toward them is participative. They need less direction because they view their work as part of a group project. They draw the greatest satisfaction from working in a small, friendly, united group.

c. **The Free-Rein Approach.** The following apply:

- (1) **The Individualist.** Their performance is best when you adopt a free-rein approach, provided they are competent. Even if they like to show off, let them do as they please unless the resentment of certain team members or the well-being of the group force you to change your attitude.
- (2) **The Loner.** Whether you refer to them as introverts, unsociable persons, or persons turned in on themselves, some persons have an aversion to social contact. The underlying reasons for such conduct are often complex. Whatever the reason for their isolation, these persons work best by themselves. The free-rein approach creates an atmosphere that is best suited to their peaceful disposition and lets them work in the most relaxed and effective manner.

FLEXIBILITY

18. Increased knowledge and understanding of the group in different situations will change the way you approach your followers. Adapt in relation to the situation and the objective. Be careful not to always use an authoritarian approach with some followers and a free-rein one with others. This might be perceived as a form of harassment towards some and favouritism towards others. Juggle the various methods in order to get your team members to work together. Each team member will make a different contribution to the life of the group. Therefore, do not expect them all to act and react in the same manner. Your followers will respect flexibility in your approach to different situations.

SECTION 5

QUALITIES OF A LEADER

19. Cadets all have their own image of the ideal leader. In movies, in the news and in daily life, adolescents search for role models, and when they find them, they will often imitate their main character traits. Young people need identification. There is a chance you are precisely the role model some cadets are trying to copy. To set a good example and thereby inspire confidence, you also must develop certain character traits. The four most important traits are as follows:

- a. **Integrity.** Integrity is a quality all leaders must possess, whether or not they understand its definition. It is defined as follows: uprightness, honesty, incorruptibility and faithfulness in keeping commitments and fulfilling responsibilities. In simple terms, integrity means:
 - (1) **Respect for One's Word.** Honest people have only their word, which is worth more than anything else. Their loyalty should never be questioned. Never make a promise unless you are certain of your ability to keep it. A leader's word is sacred!
 - (2) **Respect for Others' Property.** Honest leaders will do their utmost to take care of the property of others. They must also ensure that others observe property rights. Honest leaders never tolerate even the smallest theft.
 - (3) **Personal Dignity.** An honest leader's conduct will always be irreproachable. Personal dignity involves a demonstrated respect for the positions, jobs or situations of others.
- b. **Professional Competence.** Leaders must know their jobs. They must also have a general understanding of the work of their subordinates. Your followers will respect you if they know or feel that you know what you are doing and if they know they can count on your support when necessary.
- c. **Personal Discipline.** Good leaders are strict with regard to discipline. They must be able to make a group of persons observe the principles of good discipline. To do so, they themselves must

be disciplined. Leaders will never obtain total obedience to their orders unless they themselves obey orders. Before giving orders, a leader must be able to take them.

- d. **Sense of Responsibility.** A leader must have a keen sense of responsibility, encompassing every aspect of assigned duties, from the terms of reference of the task down to the smallest detail. This kind of responsibility has come to be known as professionalism. A leader must also be able to accept responsibility for errors without trying to cast the blame on superiors or cadets.

SECTION 6

THE ORDER GIVING PROCESS

TYPES OF ORDERS

20. For many young leaders, giving orders automatically means using an authoritarian approach and talking in a loud voice. Once again, remember that respect cannot be commanded, nor can it be imposed. An intelligent leader knows that, when giving orders, the **WAY** the results are obtained is just as important as the **RESULTS** themselves. When orders are given in the appropriate manner, the cadets know exactly what is expected of them and, as a result, their task is greatly simplified. You can give four different kinds of orders:

- a. **Direct.** The direct order is specific, concise and definitive. It allows no hesitation, indecision or disobedience.

– EXAMPLE –

"Cadet Greenwood, close the door."

- b. **Request.** The request is a softened direct order that has been qualified by the addition of certain expressions such as "would you like to", "could you", or "please".

– EXAMPLE –

"Cadet Greenwood, would you please close the door?"

- c. **Implied.** An implied order leaves much to the imagination, experience and intelligence of the recipient. What the leader wants done is implied and the recipient must demonstrate discernment and judgement in carrying out the order. This type of order is generally inadvisable.

– EXAMPLE –

"Cadet Greenwood, the door should be closed."



- d. **Call for Volunteers.** A voluntary request may or may not produce a person to perform the required task. You must not abuse this kind of order. Certain leaders avoid responsibility by constantly asking for volunteers so that they will not have to assign a task to a particular person or give a direct order.

– EXAMPLE –

"Will anyone volunteer to sweep the floor?"

WRITTEN ORDERS – VERBAL ORDERS

21. An order may be oral or written. Written orders should be consistent with the requirements of good writing in that they should be clear, concise, correct and coherent. A written order has an effect of permanence and should be used when:

- a. transmitting instructions to another location;
- b. precise figures or complex details are involved;
- c. it is necessary to hold someone responsible; and
- d. sequence is important and strict adherence is necessary.

22. Verbal orders have the advantage of the leader's personal impact. They should be given with the correct attitude. You must avoid adopting a paternalistic attitude towards your cadets and using systematic references to your superiors to give weight to your orders. Avoid sounding like a parrot or a puppet who simply repeats what you are told. Show you have the self-confidence of someone who is in complete control of the situation without constantly trying to justify your statements. Use oral orders in the following situations:

- a. in a local emergency;
- b. for minor details locally;
- c. to clarify a written order; and
- d. in routine matters.

THE ORDER GIVING PROCESS

23. In any given situation, you must decide what type of order is appropriate and what form the order should take. No matter what type of order you give, it is imperative that the following steps be observed:

- a. **Planning.** When you plan an order, ask yourself "what?", "when?", "where?", "why?", "how?" and "who?". Ensure that compliance is both reasonable and possible. Avoid superfluous orders. Have in mind a clear and well-defined idea of the order to be given. You must know the "what" of the order.
- b. **Preparation.** During the preparation, remember that all orders must be complete and clear. They should not be ambiguous. Adapt the order to its recipient, taking into account competence, strengths and weaknesses, attitudes and the best method of motivating the cadet. Always keep in mind the precise reason for the order, ie, know the "why".
- c. **Delivery.** The order must be clear, brief, appropriate and coherent. A legitimate order is given by a superior and is directed to the cadets. State the order in concrete terms; if necessary, use examples to facilitate understanding. Make the recipient aware of your expectations regarding the quality and quantity of the work to be carried out.
- d. **Confirmation.** Ensure that the recipient understands the order perfectly. One way to do so is to ask the recipient to repeat the order back to you. This method is particularly useful for orders involving a precise sequence or complex details.
- e. **Follow-up.** Perform a spot check while the order is being executed. If the task is not being correctly executed due to a misunderstanding, identify and rectify the problem.
- f. **Evaluation.** After the order has been executed, evaluate the results by observing the feedback. This will help to determine any further action necessary, help you to appraise our own effectiveness in giving orders and assist you in better understanding cadets.

SECTION 7

SUPERVISION

24. An effective leader needs to know more than just how and when to give orders. Indeed, even the clearest, most precise orders cannot guarantee a mission's success. The leader must also closely supervise their execution. Some followers will forget what they have been told to do, some will attempt to do as little as possible and some will not know exactly what they are supposed to do. Sometimes the orders given at the beginning of a mission will no longer apply, due to changes in the situation.

25. The goal of supervision is to ensure that your cadets carry out their orders promptly and correctly and in accordance with the directives of your superiors. Supervision indicates that a task is important. Further, it enables you to modify your orders as the situation evolves, to encourage and motivate the cadets when conditions change and to detect and remedy errors on the spot.

26. Supervision is an important part of leadership. It should be ongoing. The smooth operation of your squadron depends in part on how well NCOs like yourself perform as leaders. Your effectiveness in ensuring that your orders are followed and that standards are respected can make a difference.

HOW TO SUPERVISE

27. Supervision is a complex task. Its effectiveness depends on four essential procedures:

- a. Observe your cadets at work. Keep a certain distance in order to observe the entire group and avoid hovering over them so that they feel they are being constantly spied upon.
- b. Give appropriate orders when the situation changes.
- c. Check the work after it has been completed. Ensure that the results correspond to the standards you originally established.

- d. Praise the cadets for their work or criticize their results, but do not remain indifferent. Good work can be recognized in public or in private, but it is much preferable to deliver criticism in private. Your cadets will appreciate such measures and will be more inclined to correct the problems and improve their performance.

WHEN TO SUPERVISE

28. In most cases, supervision is neither imposed by your superiors nor requested by your cadets. You should demonstrate your initiative by always making a point of supervising your cadets while they work, giving additional orders required by changes in the situation, and examining the work once it has been completed.

29. Although supervision is a routine matter, at certain key moments it takes on particular importance:

- a. You must control the quality of the execution from the beginning.
- b. It is preferable to supervise and direct the execution of the work rather than wait until the work has been completed to check it.

30. When you delegate a task, you do not, in any way, delegate final responsibility for it. Your mission as a leader is to ensure that all quality and quantity standards are complied with. Therefore, it is in your interest to ensure that team members perform their duties responsibly.

WHO TO SUPERVISE

31. Although it is your responsibility to supervise all your cadets, some of them will require particular attention:

- a. Cadets who have already done similar work and have successfully completed their task do not require strict supervision or constant direction. Use the time saved to supervise the others.
- b. Persons who have not worked well in the past should be strictly supervised and their work should be examined with particular scrutiny. This additional supervision should be carried out discreetly and must not give the supervised cadets the impression they are being singled out.

- c. If, for a given task, your cadets are divided into two groups, it is preferable that you concern yourself with the larger group and delegate the other to an assistant. It is important for you to make use of your assistant's experience. All too often, leaders will try to supervise everything and as a result lose sight of important details.

WHAT TO SUPERVISE

32. It is impossible to supervise everything both successfully and simultaneously. Attempting to do so would simply waste time and energy. Concentrate on the following points:

- a. the degree to which the work meets established standards;
- b. the group behaviour;
- c. the quality of the work performed; and
- d. the time allotted to the task.

SECTION 8

CONCLUSION

33. Being an NCO requires special qualities that can make you a respected and effective leader. However, you must understand that leadership is not the domination of a group by one individual – that would be dictatorship! You must learn to know your followers, their needs and their expectations and understand what motivates them. To do so, you must listen to them.

34. Leadership also requires that you learn certain techniques precisely and that you accurately reflect the situation. You must make an extra effort to supervise your cadets and provide the support they expect. You are a member of the team, just as they are!

35. You are an important member of your squadron. Do not doubt this fact. Your superiors expect you to make decisions, demonstrate initiative, protect and care for your followers and perform your tasks with a minimum of supervision. Do not be afraid to make decisions or to make errors – your skills as a leader can only improve as a result.



36. Because you are in a position of leadership, you will encounter situations that require you to take a position. It is important that you be able to react to changing situations. An incorrect decision is not a tragedy, especially if the error eventually leads you to find a solution. You gain experience when you make a mistake following an incorrect decision, but when you take no decision for fear of making an error you leave the situation unchanged and abdicate the responsibility to someone else. Your followers expect you to make decisions.

37. Filling a command role will not always be an easy task since your cadets expect a great deal of you. You must be the role model on whom they can count and from whom they will copy their actions and attitudes.

You are their direct superior, their confidant and their friend and they will try to attract your attention. Always remember that respect attracts respect; it has to be earned. Of course, your cadets will always react to your orders. But will they do so because they have complete confidence in you or because you have forced them to do so...

SECTION 9

CASE STUDIES

38. This section describes some situations that will test your judgement and ability to make decisions. Try to answer them individually or with colleagues of the same rank. There are no single answers to these problems. You must rely on your judgement. What would you do if...

CASE STUDY NO. 1

Cadet Anthu Ziastic is in his first year with the squadron. His dress has always surpassed the required standards and he participates actively in all group activities. He is a nominee for the trophy for best Level 1 recruit and best recruit in the band. He stood first in his section on most inspections. Cadet Ziastic exerts a very positive influence on all the members of your group. It would be difficult to ask more of a cadet. It even looks as if he will be recommended for promotion to corporal. However, he is not chosen for summer camp for administrative reasons.

A few weeks before the annual review, his performance drops off dramatically. His boots are no longer as shiny, his hair is longer, he does not smile as easily – in sum, he is but a shadow of his former self. Rumour has it that his marks at school are also way down, to the point that his parents have, as punishment, forbidden him from participating in the annual inspection. Rumour also has it that his parents blame the decline in his school marks to the fact that he is too heavily involved in squadron activities. His attitude is beginning to affect the rest of the group, which in turn creates problems for you.

1. What is your evaluation of the situation?
2. What concrete steps will you take?
3. Suggest two solutions to the problem.

CASE STUDY NO. 2

During an evening training session, you decide to observe a lesson on drill, to be presented by your best friend, Corporal Sharp. Everything is going fine until a section member starts talking to his neighbours. Corporal Sharp takes him off the parade ground and leaves the assistant instructor in charge.

After a few minutes, you decide to see what is going on. To your great surprise, Corporal Sharp is shouting at the cadet. He says, "Now listen to me carefully... If you don't settle down quickly, I'll send you before the commanding officer and then there'll be no summer camp for you! **Is that clear?**"

Noticing your presence, he tells the cadet to rejoin the ranks and remain quiet. Once the cadet has gone, he turns to you and says, "You can't even teach a class without being interrupted by imbeciles like him! I hope he learned his lesson!"

When you mention to him that his approach was much too aggressive and that he should never treat a cadet roughly, he responds "I know, but I've just been feeling strange lately. My girlfriend left me two weeks ago and now she's going out with the sergeant... I got carried away!" Then he looks at you coldly and says, "And besides that, what difference does that make to you? It's none of your business! You just better not tell anyone about it, otherwise there'll be trouble!" With that, he turns on his heels and disappears without returning to finish his lesson.

1. What is your evaluation of the situation?
2. What do you do?
3. What factors might influence your decision?

CASE STUDY NO. 3

Your superior orders you to inspect the entire section, as a replacement for the sergeant who had to stay home. Normally, you would have been very proud to accept such a responsibility, but there is a catch! Because of your studies, you did not have time to polish your boots, iron your uniform, or cut your hair this week. You are the only available NCO in your section and the inspection must take place.

1. What do you do?
2. Suggest an alternative.

CASE STUDY NO. 4

Three cadets from your section ask to meet with you. At the meeting, they state their intention to leave the squadron, giving the reason that no one pays any attention to them. When you ask them the name of their corporal, they say they don't know it. After two months in the squadron, they have received only a phone call telling them what uniform to wear – but they haven't even received their uniforms! No one seems to care about them except for one corporal, who keeps telling them to stay still and look straight ahead!

They say that they heard the weekly messages on four occasions from a neighbour, who is the sergeant of another section, a half-hour before the evening began. Finally, they spent several entire evenings at the squadron without anyone even speaking to them. These three cadets wish to leave your squadron and join the town's scout troop.

1. What is your evaluation of the situation?
2. What do you do?
3. Suggest two solutions.

CASE STUDY NO. 5

Your section wins the first three "section of the month" awards for its superior inspection results, participation, attendance and team spirit. However, in January, the section finishes third. You notice a lack of enthusiasm and concentration, a decline in attendance and a negligence regarding uniforms.

You know that the traditional funding campaign will soon take place, along with a few parades in the community. You do not want your section to come in third again, or even less, wear poorly maintained uniforms in the parade. However, appeals for solidarity and words of encouragement no longer seem to motivate your cadets.

1. What is your evaluation of the situation?
2. What can you do, at your level, to improve the situation?
3. Suggest two alternatives.

CASE STUDY NO. 6

You are attending the annual brunch of the city's Optimist Club. On the programme are the regional finals of the Optimists' public speaking competition. The theme is "Adolescents of the '90s". After several good presentations, to your great surprise, one of your cadets steps up. This cadet is timid during training and never raises his voice. He is content to follow and comply with his superiors' directives. He is very effective in the section, but his shyness will probably prevent him from being promoted to corporal next year, especially since the competition is so intense between him and two other cadets.

You watch his presentation open-mouthed, as he sings the praises of the cadets of your unit who, in his view, hold the key to the future! His conviction wins him first prize and a standing ovation from the 150 people in the room.

1. Do you report this event to your superiors? Why?
2. Do you believe that the special projects that your cadets carry out outside the squadron should be recognized by the squadron?

MOMENTS OF REFLECTION...

"It is not enough to have a good mind; the main thing is to use it well."

– René Descartes

"It's in your moments of decision that your destiny is shaped."

– Anthony Robbins

"Some people see things as they are and ask 'why?'. I dream of things that never were, and ask, 'why not?'"

– George Bernard Shaw

"Imagination is more important than knowledge."

– Albert Einstein

CHAPTER 8

PERFORMANCE OBJECTIVE 409

INSTRUCTIONAL TECHNIQUES

SECTION 1

INTRODUCTION

1. Take a few seconds to imagine yourself in a classroom attending a course given by a teacher you find extremely boring. You yawn incessantly... The hands of the clock seem to be standing still... It would not take much more to put you to sleep on the corner of the desk. Now imagine the same class, the same material, but presented by the most energetic and enthusiastic teacher. You do not even notice the time passing and, in no time, the lesson is over and you have to close your books and leave the room.

2. What happened? Why do you perceive some teachers differently from others? What are the factors that cause you to prefer one teacher over another? Is it the course material, the teacher's sense of humour or way of teaching, the notes you have to take, or your ability to understand the material?

3. If you could replace your teacher for awhile, what would you do to make things more interesting? What would you change? What would you do to make all your students understand and appreciate the material?

4. Starting this year, you will have the chance to experience education from the other side of the desk. In a few weeks, you will be able to judge first hand what must be done to make a lesson interesting. You will be placed on the "firing line" for 15 minutes! But have no fear – you will be given ample time to prepare and will be brimming with confidence when you make your presentation before the group.

SECTION 2

THE INSTRUCTOR

5. Clearly, instructors occupy a position of trust. They are expected to seek the truth and then share it. Few people have so much influence over so many other people as instructors have over their cadets. Instructors' moral conduct and professional integrity must be beyond reproach. They must help their cadets realize their full potential, regardless of a cadet's physical, mental, social, racial or religious characteristics. They must teach with drive and enthusiasm.

6. An instructor's ultimate goal should be to make the subject so interesting that the students achieve the objectives without feeling they are in a training situation. This goal has even more relevance for cadets, since everything must be done to avoid recreating the classroom situation that they experience every day at school. The instructor must offer a different and dynamic alternative to the traditional classroom.

7. To do so is no small task. You must understand that there is no magic formula that will make all the students learn the same thing, at the same speed and with the same ease, while having fun. Good teaching requires a certain level of preparation and practice. You will learn a few techniques and principles that will facilitate your task somewhat. Try them. They may be of tremendous assistance to you.

8. Before learning certain principles of instruction, you must know the three stages of the learning process and understand that you, the instructor, will play a key role in each of these stages. Cadets must, above all, **want** (or be encouraged) to learn. They must then **learn** the subject taught by the instructor. Finally, they must **remember** the material they have learned.

9. Throughout this course, you will acquire skills that will help you become an instructor. As you read this chapter, never forget that instructors, as leaders, must do everything in their power to relate what they are teaching to the student. They must make their course understandable, interesting and challenging.

SECTION 3

PRINCIPLES OF INSTRUCTION

10. Most instructors have learned their art; they are not born to it. For some persons, speaking in front of a group and taking care of all the students seems to come naturally, but for others, the situation is quite the opposite. Here are six teaching strategies to apply as often as possible during your preparation. It is impossible to use them all at once, but use as many of them as possible. Besides making your teaching much more interesting, they will help you to face your class with more confidence.

FIRST PRINCIPLE – EMPHASIZING KEY POINTS

11. You must structure your lesson in a manner that brings out and emphasizes important points:

- a. Clearly define why you are teaching something. Identify the main points of the lesson.
- b. Organize the class time in a way that emphasizes the key points. Assemble the points in order of importance and divide up the time accordingly.
- c. Devote sufficient time to practical exercises. Avoid extremely lengthy explanations and demonstrations. Let the cadets get involved in the learning process. They will learn more quickly and easily by **PARTICIPATING**.
- d. Use teaching aids that appeal to as many of the five senses as possible (taste, smell, touch, hearing and, of course, sight).
- e. Repeat important points often. When a group of cadets hears you say, "Watch out, this is important, you must remember...", they will probably remember the point in question.

SECOND PRINCIPLE – PARTICIPATION

12. Courses must enable the cadet to participate in a way that is intellectually or physically valid. The following are applicable:

- a. You must have the cadets answer questions by studying the problem with them and expanding on the subject as much as possible.
- b. Organize the lesson to allow as many cadets as possible to participate in practical exercises.
- c. A secondary effect of participation is that it enables shy cadets to become more self-confident by encouraging them to express themselves.

THIRD PRINCIPLE – INTEREST

13. The lesson must stimulate the interest of the cadets. The following are applicable:

- a. A good way to stimulate the interest of cadets is to leave the classroom. Consult the schedule and see whether certain parts of the lesson could be held in real situations. Let the cadets see a specialist perform what they are learning.
- b. Try to stimulate the cadets' curiosity. Inform them at the outset of the advantages of this new knowledge.
- c. Use various instructional aids to appeal to as many senses as possible.
- d. Remember that above all, an **enthusiastic** instructor will maintain the students' interest.

FOURTH PRINCIPLE – CONFIRMATION

14. The lesson must confirm the cadets' knowledge. The following are applicable:

- a. The best way to determine whether the cadets have understood, is to ask them questions or have them perform a practical exercise.
- b. Divide the lesson into easy stages and question the cadets on the subject taught before moving on to the next stage.
- c. Review at the beginning of each lesson.
- d. Analyze the cadets' questions. This will indicate which points require more attention. Learn to present material at the speed at which your cadets are able to absorb it.

FIFTH PRINCIPLE – COMPREHENSION

15. The lesson must begin at the cadets' level of knowledge and progress according to their speed of comprehension. The following are applicable:

- a. When you give a theoretical lesson, divide the material in logical parts and proceed in stages. Ensure that your cadets reach each level before you proceed to the next one.
- b. At the beginning of the lesson, ask questions to ensure that the cadets have the necessary knowledge.
- c. Constantly monitor the cadets' facial expressions! Frowning eyebrows or empty stares often indicate that something is amiss and that the cadets do not understand.

SIXTH PRINCIPLE – SUCCESS

16. The cadet must be able to assimilate the material of the lesson. The following are applicable:

- a. Divide the lesson into logical stages and provide clear explanations to help the cadets to assimilate the subject and thereby derive a certain satisfaction.
- b. Make the cadets aware of their progress and congratulate them for their good work. We all like to receive compliments for a job well done.
- c. A cadet who is headed for failure needs to be corrected. You must determine the reason and take appropriate action.

SECTION 4

VERBAL SUPPORT

17. The art of teaching is like the art of selling – conviction is the key to success. If an idea is worth communicating to the class, it is worth communicating well. Most of the time, an idea must be clarified, explained, or proved to ensure that it is properly understood. Verbal supports are tools used to clarify, prove, illustrate, emphasize what you are trying to explain, provide variety and stimulate interest.

18. In the following paragraphs, we shall discuss the five categories of verbal support, ie, **comparisons, reasons, examples, statistics** and **testimony**. Use the mnemonic "CREST" to help you to remember them. Examples and comparisons are very useful for giving explanations; statistics, reasons and proof are generally used to add variety and confirm an affirmation; repetition is used to highlight a particular point.

19. You must use your common sense, ingenuity and experience to help you combine the various kinds of verbal support effectively. Your choice will depend on your particular tastes and the objectives involved. Verbal supports must be natural, effective and based on the objectives of the lesson you are teaching.

COMPARISONS

20. A comparison is a bridge the instructor uses to link the unknown to the known. An example is used to clarify and simplify an idea. Examples must always be linked to the cadets' previous experience. Nothing would be gained by comparing one thing the cadets do not know to another thing they do not know! Often, a metaphor can be used to add variety and stimulate interest. You will use comparisons to create images in the minds of your cadets. Because they are young, they can more easily retain an image than a hodgepodge of theories.

– EXAMPLE –

Light as a feather.

REASONS

21. Reasons are assertions that support facts or convictions. Even the most unthinking cadet constantly asks "why?". You must answer this question. Good instructors take pains to justify their affirmations whenever they can. The "why" in each cadet should never go unanswered. By providing reasons, you often ensure a better reaction to what you are explaining. Once you have explained the "how", common sense dictates that you explain the "why". Young cadets are curious and crave knowledge. To ensure that you can satisfy their curiosity, prepare yourself adequately.

– EXAMPLES –

22. One example is a sample, situation or model that is similar to the notion the instructor is trying to explain. Examples are used to illustrate what has just been affirmed. The best examples may be those linked to personal experiences. For example, instructors can draw widely on their own experience. Instructors can also draw on the experiences of others or on their imagination. It is very important that these examples be chosen in relation to the cadets' knowledge and subjects covered.

– EXAMPLE –

Age is not a determining factor in exceptional achievements. For example, Marie-Claire Blais wrote her first novel at 19 years of age and won the Governor-General's literary prize for it.

STATISTICS

23. The best way to make statistics more understandable is to present them in the form of graphs, diagrams or samples. You must be careful not to use too many statistics because cadets can tire of them fairly quickly. Restrict their use to key points that need to be proven.

TESTIMONY

24. Occasionally, you will find it useful to quote or summarize the ideas of a recognized authority. The person cited must be an authority in that field. Patrick Roy is surely a specialist in the art of stopping pucks, but it would be best not to quote him on air navigation – even if he has spoken on the subject. Ensure that individual quotes are short and deal exclusively with the subject at hand. You should not use too many quotes. Ensure that the cadets know the authors of the quote and why they are authorities in their field. This is necessary to ensure credibility.

25. You have just learned about the five principal types of verbal support. Lessons that would otherwise be dull and difficult to follow become interesting, logical and clear when verbal supports are used in an intelligent manner. You will find the cadets to be very receptive to verbal supports, especially when they are presented in a humorous manner. It is appropriate to use verbal supports when the subject is more theoretical and arduous.

SECTION 5

QUESTIONING METHODS

26. What is the best way to determine whether your cadets have properly understood the material? What is the best way to find out if your students are following the lesson attentively? What is the best way to stimulate and maintain interest? Ask questions!

27. Like all other teaching devices, questions have particular goals. One goal is to **stimulate mental activity**. Do not forget that learning itself involves mental activity; cadets will understand better if their curiosity is aroused and if they ask themselves questions. Asking questions can also serve to stimulate and maintain interest. You can bombard your cadets

with audio-visual material, but often, once the novelty has worn off, its effectiveness declines dramatically.

28. Your questions are essential to the direction and functioning of your classes, particularly in relation to learning. They will probably be your principal method of determining your own effectiveness. The answers you receive will enable you to verify the effectiveness of your teaching. If no one can answer your questions, you should probably simplify your teaching.

29. Most of the time, we ask questions to **verify knowledge acquired**. In practice, the only way to verify progress is to ask questions. They serve to test abilities and knowledge.

TYPES OF QUESTIONS

30. Questioning is an important instrument. To derive maximum benefit from it, you should know the main types of questions:

- a. **Lead-off.** As the name implies, the lead-off question is one used to start a discussion or lecture on a new topic. It is designed to start the trainee thinking about the topic. It must therefore be thought-provoking. A verbal or written response is not the objective of this type of question.
- b. **Follow-up.** Once you have started the cadets thinking about the topic, you can further stimulate their thinking by using a follow-up question. This type of question is designed to keep them thinking about the topic at hand. A verbal or written response is not the objective of this type of question.
- c. **Overhead.** An overhead question is one asked without indicating who is to reply. It is addressed to the entire group. You will, of course, expect to get several answers to this type of question. You must be careful to give everyone a chance to voice an opinion.
- d. **Direct.** A direct question is the opposite of an overhead question: someone is supposed to answer it. When cadets have said nothing, you can ask for their views on a point you believe they know something about. This will perhaps give them confidence to answer further questions voluntarily. You can also use the direct question to give inattentive trainees a jolt. Trainees who have to

admit that they did not hear the question are likely to be more attentive in the future.

- e. **Reverse and Relay.** Reverse and relay questions are used to answer questions the cadets ask you, the instructor. To keep the discussion in the hands of the cadets, you may either reverse the question, returning it to the person who asked it, or pass it on to another cadet. Using reverse and relay questions is following the procedure known as "throwing back questions" and offers continuance of the cadet-centred teaching approach. Be careful, however, not to use this type of question to hide your own ignorance of the subject. The cadets will realize your subterfuge relatively quickly.

CHARACTERISTICS OF A GOOD QUESTION

31. Your questions must be brief and clear. It is preferable to avoid asking ambiguous questions. Prepare your questions carefully and, if necessary, write them down, word for word, in the lesson plan. Avoid questions that are too long or those that have more than one answer, because they might confuse the cadets. Expressions like "Could you tell me...?", "Who can tell me...?", etc, are not clear enough and should be avoided. Questions should be direct and should begin with an interrogative pronoun "Is..?", "Why...?" and so on.

32. Questions should be **simple**. That does not mean they should insult the cadets' intelligence but rather that the vocabulary you employ should match the cadets' level of comprehension and specialization in the subject.

33. The questions should **make the cadets think**. You must avoid questions whose answers are obvious. The cadets will quickly grow tired of answering simply for the sake of answering. The questions should challenge the cadets. A question is worthless if the cadets can already see the answer in a graph, on the blackboard or in their notes. Such questions should be avoided, since they serve no purpose other than confirming that the cadets know how to read.

HOW TO ASK QUESTIONS

34. The following is a questioning method designed to produce the desired effect:
- a. ask the question;
 - b. pause;
 - c. indicate which cadet should answer;
 - d. listen to the answer; and
 - e. always confirm the correct answer.

SECTION 6

PREPARING A LESSON

35. A knowledge of the principles of instruction, verbal supports and questioning methods will be extremely useful to you in front of the class. Although such knowledge will certainly help to give you self-confidence, it will not be enough to make you a good instructor. The quality of your teaching will be directly proportional to **your preparation**. You must develop good work habits and a good knowledge of the tools at your disposal.

36. There are many important tools you must use to prepare and teach your lessons:
- a. the course training plan;
 - b. the lesson plan; and
 - c. visual aids.

THE COURSE TRAINING PLAN

37. The course training plan is a document that presents, in detail, all the instructional objectives on which you must base your training. It also answers the question, "**What exactly should I teach?**" It is normally kept by your squadron training officer. There is a course plan for every level of the air cadets' training programme. The information the course plans contain must be respected to the letter. You must not change the contents of courses by adding or removing material, unless otherwise indicated. The course plan follows national standards that are identical for every squadron throughout Canada.

38. The course training plan is divided into four distinct chapters:

- a. **Chapter 1 – General.** This chapter provides a general description of the training at the given level.
- b. **Chapter 2 – Specifications for Course Management.** This chapter describes the administrative aspects of the training.
- c. **Chapter 3 – Evaluation.** This chapter describes the evaluation procedures for each PO, level grading system, and evaluation formulae that every squadron must use.
- c. **Chapter 4 – Lesson Descriptions.** This chapter explains, in detail, what subject is to be taught in each lesson. This is the heart of the course plan (Figure 8-1).

39. As the instructor, you will refer primarily to Chapter 4 of the course plan for the material to include in your lesson plan. All the information you require concerning objectives, subjects, evaluation, lesson length and standards are contained in this chapter.

40. All teaching objectives are designed to make the student more competent. The training system used by the cadets is based entirely on the achievement of objectives. Therefore, you will find objectives for the level, each course and each lesson. During the coming weeks, you will become familiar with the terms **PERFORMANCE OBJECTIVE (PO)** and **ENABLING OBJECTIVE (EO)**.

PERFORMANCE OBJECTIVE

41. The PO is the objective that describes the **performance** required of each cadet in order to pass a particular course, eg, the performance objective for the Level 2 leadership course is **leading subordinates**. If the cadets lead subordinates in accordance with the standards established in the course training plan, they achieve the objective of the leadership course. For administrative purposes, every PO is identified by a specific number.

– EXAMPLE –

PO 408 Leadership – Lead subordinates.

ENABLING OBJECTIVE

42. Each course is divided into several lessons. These lessons contain the material that cadets must know to **enable** them to pass the course, eg, PO 408 can be divided into five lessons (just as a mathematics course at school consists of many lessons). Each of these lessons has a specific objective that must be achieved by the end of the period. Every EO is identified by a number that always follows the corresponding PO number.

– EXAMPLES –

EO 408.01 – Identify the principles of leadership.

EO 408.02 – Identify the qualities of a leader.

EO 408.03 – etc.

EO 408.04 – etc.

EO 408.05 – etc.

LESSON SPECIFICATIONS

43. In addition to the POs and the EOs, Chapter 4 of the course plan provides the following information (Figure 8-1):

- a. **Conditions.** The conditions define the environment in which the cadet must meet the required standards.
- b. **Standard.** The standard indicates the level of ability that the cadet must achieve in order to achieve the EO.
- c. **Teaching Points.** These are the precise points to be taught in this lesson.
- d. **Time.** This indicates the amount of time required to teach this lesson.
- e. **Suggested Methods.** This suggests a teaching method for the lesson.
- f. **Substantiation.** The "why" of the lesson. Why is this lesson important to the cadet? How does it relate to the other EOs?
- g. **References.** References used in the preparation of the lesson.
- h. **Training Aids.** Visual aids suggested to the instructor.
- j. **Learning Aids.** Instructional aids used by the cadets.
- k. **Test Details.** Indicates the type of evaluation that **must** be used to evaluate the lesson. It is important to comply with the details provided for this level.
- m. **Remarks.** Remarks or comments specifically pertaining to this lesson. They are specifically addressed to the instructor.

CHAPTER 4: LESSON SPECIFICATIONS COURSE TITLE: LEVEL THREE		CTS NUMBER: A-CR-CCP-265/PC-001	
ENABLING OBJECTIVE AND TEACHING POINTS		TRAINING DETAILS	
PROPULSION: 416.01		5. TIME – One 35 minutes period.	
1. PERFORMANCE – Explain propellers. 2. CONDITIONS: a. Given – diagrams, – models; and b. Denied – assistance. 3. STANDARD – The cadet will correctly explain the propellers functioning including: a. the function of a propeller. b. the pitch, and c. types of propellers. 4. TEACHING POINTS – a. The function of a propeller – (1) the function of a propeller is to convert the torque, or turning movement, of a crankshaft into thrust, or forward movement. (2) the propeller is so designed that, as it rotates, it moves forward along a corkscrew or helical path. In so doing, it pushes air backward with the object of causing thrust in the forward direction.	6. METHOD/APPROACH: Lecture.		
	7. SUBSTANTIATION: A basic knowledge of propellers will enhance the cadets' knowledge of propulsion systems.		
	8. REFERENCES: a. From the Ground Up; and b. Level Three Handbook.		
	9. TRAINING AIDS – a. diagrams; and b. models.	10. LEARNING AIDS –	
	11. TEST DETAILS – The cadet will be checked independently and will have to answer questions on the subject matter.		
12. REMARKS –			

Figure 8-1 Lesson Description

THE LESSON PLAN

44. After you have read the course plan and clearly identified the objectives to be achieved, decided on which teaching strategies to use and determined which visual aids are required, just one step remains in your preparation: a LESSON PLAN.

45. It is often hard to remember things accurately, so organize each lesson on paper. The lesson plan is essentially the equivalent of a topographical map or game plan that a trainer uses in sports. It enables you to **organize your lesson, remain faithful to the objectives, serves as an**

occasional reminder and is your **best protection against stage fright and memory lapses!** The lesson plan contains information taken from the course plan as well as information and ideas provided by the instructor.

46. Instructors, even the most experienced ones, will do their best teaching if they have carefully prepared the course. The quality of instruction depends largely on lesson preparation.

PREPARING THE LESSON PLAN

47. The lesson plan contains four basic sections:

- a. **Introduction.** Prepares the cadets for what will follow;
- b. **Development.** Main part of the lesson;
- c. **Performance Check.** Measures the cadets' progress; and
- d. **Conclusion.** Brings together the various parts of the lesson.

INTRODUCTION

48. The goal of the introduction is to attract the cadets' **interest** and focus their attention on the material to be taught. The way you start the lesson will determine how interested your students will be in your lesson. Surprise them with unexpected questions, startling declarations, etc. Avoid always starting your lessons with the following type of statement: "OK, good, today we will discuss..." You must create the spark that will induce the cadets to concentrate on your teaching.

49. The introduction must also provide the cadets with the precise **reasons** why they should become familiar with, know, understand, apply or execute the object of the lesson. You must answer the question that all cadets ask themselves. "Why is it important for me to learn this subject?"

50. Finally, the introduction must provide a **general overview** of the subject to be taught. A clear and concise presentation of the objective and the key points provide the cadets with a "road map" of the lesson. They know where they are going and are more inclined to continue paying attention.

51. The introduction must occupy approximately 10 per cent of the total time allotted to the lesson. For a 35-minute lesson, this represents 3.5 minutes. Do not forget the importance of attracting their attention to the subject being taught. Use an imaginative opening approach.

DEVELOPMENT

52. The development is the part of the lesson plan that follows the introduction. The aim of the development is to teach and practise the instructional material set out in the course plan. Most of your lessons will include several teaching points that are reflected in the structure of the development.

53. It is here that you organize the contents of your lesson. To do so, determine which subject is of primary importance and which one is of secondary importance. Ensure that the material is organized in a logical sequence. To do so, arrange it from past to present, simple to complex and known to unknown.

54. The development must contain more than the main ideas to be presented. It must be a complete plan of what must be taught to the cadets and what methods and techniques will be used. Here are a few suggestions on how to expand your lesson plan:

- a. Write down interesting questions to ask during the presentation. This is one of the most effective ways of encouraging active participation on the part of the cadets. These questions will lead to other ones that will naturally initiate discussions. Do not make the mistake of believing that you must wait until the end of the lesson before asking questions.
- b. Include diagrams, graphs, etc, in the plan in order to facilitate the task of accurately transcribing them onto the blackboard.
- c. Write down the processes that you will use in the lesson. These may include comments such as, "Ask the cadet to explain", "Ask the cadet to demonstrate", or "Initiate a discussion on...". These instructions make the lesson plan a working guide, since they describe what must be done and how it will be done.
- d. Underline important ideas and sequences to highlight them and make the plan easier to follow. However, be careful not to abuse this technique, because this can conceal important ideas. The same principle applies to the use of bolding, arrows or circles around words, maxims, expressions or phrases. We recommend

the use of colours to highlight important points. However, try to keep your plan as simple as possible.

- e. Insert notes as a reminder of the illustrations, examples, anecdotes, etc, that you intend to use. These notes must be explicit enough to help you remember the essential details; they should appear at the point where the material is to be used.

55. You must ensure that the cadets thoroughly understand every point before you go on to the next one. You gain nothing by proceeding too quickly. Take the time to answer questions

56. The development should not occupy more than 75 per cent of the lesson time. This would represent about 26 minutes of a 35-minute lesson. Divide your teaching and practice well so as to allow sufficient time for each of the teaching points.

57. Remember that the lesson plan is **not** a briefing. You should not write every detail of everything you will say. Limit yourself to general titles and comments that will help to direct your teaching. Ideally, your writing should be large enough so that you can **consult** your lesson plan even if you are standing and it is laying on the desk.

PERFORMANCE CHECK

58. This part of the lesson can be referred to as an "evaluation", "final verification", "test", etc. Whatever you call it, its goal remains the same: to evaluate the cadets' progress and ensure that each of them has achieved the objectives set out in the EO. It must also let the cadets know where they stand and indicate to the instructor which parts of the lesson need to be covered in greater depth.

59. The performance check for each PO and EO is included in the course plan. It is important that you respect these indications. Very few EOs require the cadets to make a written evaluation. Most involve oral questions or practical confirmations. It is important to avoid recreating the evaluation system used in schools whereby a final examination is required at the end of the course. If your cadets understand each lesson and accomplish all the required actions as the course proceeds, then there is no need to review the subject.

60. The questions you ask throughout the lesson should indicate how well the cadets have understood the material. Therefore, it is important that you remain alert in this regard and are able to recognize the clues that indicate a cadet is having problems. If you notice that the subject requires further explanations, review it at the beginning of the next lesson.

61. The goal of evaluations is to determine the cadets' knowledge. Do not try to trick them with questions that are too difficult. Simply ensure that they have understood the most important points. Make your questions simple and direct.

CONCLUSION

62. The conclusion of each lesson has three main functions: it **summarizes** the material taught, **re-emphasizes the important points** and **prepares the cadets to tackle the next objective** with confidence and interest. The conclusion should not occupy more than 5 per cent of the lesson time

63. The following pages contain sample lesson plans. The best lesson plan or the best lesson plan format is the one that the instructor finds easiest to use. Perhaps your squadron has adopted a specific format. It is up to you to determine whether you can work with it easily.


<u>LESSON PLAN</u>	
PO/EO: 408.02	REFERENCE: CCP-268/PT-001
SUBJECT: LEADERSHIP	TIME: 35 minutes
TOPIC: METHODS OF LEADERSHIP	INSTRUCTOR: Sgt GREENWOOD
INTRODUCTION - GIVE STUDENTS COMPLETE KNOWLEDGE AND UNDERSTANDING OF 3 METHODS OF LEADERSHIP - GIVE CADETS ABILITY TO EFFECTIVELY EVALUATE AND CONTROL ANY SITUATION - LEADERS NEED TO KNOW HOW TO REACT WHEN DEALING WITH DIFFERENT SITUATIONS	<u>3 1/2 min</u> <u>MAXIMUM</u>
BODY <u>① what? AUTOCRATIC LEADERSHIP</u> - ONE LEADER why? ▶ SOME SITUATIONS NOT PRACTICAL FOR MANY PEOPLE TO BE IN CHARGE where? ▶ UNFAMILIAR OR DANGEROUS SURROUNDINGS when? ▶ EMERGENCY SITUATIONS ▶ WHEN FOLLOWERS ARE IMMATURE, UNFAMILIAR OR INCOMPETENT page 1 of 3	<u>EXAMPLES</u>  eye contact!

Figure 8-2 (Sheet 1 of 3) Sample Lesson Plan


<p>② <u>WHAT? DEMOCRATIC LEADERSHIP</u> - SEVERAL LEADERS</p> <p>why? ▶ LEADERS NEED OPINION OF OTHERS ▶ GET TO KNOW THE FOLLOWERS BETTER ▶ GET FOLLOWERS INPUT INTO WHAT HAPPENS TO THEM</p> <p>where? ▶ IN * FAMILIAR * SAFE * COMFORTABLE... SURROUNDINGS</p> <p>when? ▶ WHEN TIME IS NOT A FACTOR ▶ WHEN DEALING WITH MATURE AND FAMILIAR GROUP</p> <p>③ <u>WHAT? FREE-REIN LEADERSHIP</u> - LEADER OVERLOOKS SITUATION - FOLLOWERS ACT ON OWN INITIATIVE, MAKE THEIR OWN DECISIONS</p>	<p>VOICE CONTROL</p>  <p><u>EPICUS</u></p> <p>ASK QUESTIONS ???</p>
<hr/> <p>CONCLUSION</p>	
<p>page 2 of 3</p>	

Figure 8-2 (Sheet 2 of 3) Sample Lesson Plan

<p>why? ▶ DEVELOPS LEADERSHIP POTENTIAL IN FOLLOWERS</p> <ul style="list-style-type: none">▶ FOLLOWERS MAY BE MORE KNOWLEDGEABLE THAN LEADER▶ ALLOWS ROOM FOR NEW AND CREATIVE IDEAS <p>WHERE? ▶ IN VERY FAMILIAR SURROUNDINGS</p> <p>WHEN? ▶ WHEN DEALING WITH MATURE GROUP</p> <ul style="list-style-type: none">▶ LOTS OF TIME	<p><u>ANSWER</u> <u>ALL QUESTIONS</u></p>
<p>CONCLUSION</p> <ul style="list-style-type: none">▶ CONFIRMATION▶ GO OVER AIM AND MOTIVATE AGAIN▶ STATE NEXT LESSON▶ P.O. CHECK	
<p>page 3 of 3</p>	

Figure 8-2 (Sheet 3 of 3) Sample Lesson Plan

SECTION 7

INSTRUCTIONAL AIDS

64. Teachers have used instructional material for centuries. Everyone knows the old saying attributed to Confucius, "One picture is worth a thousand words." The saying was true then and is still true today – perhaps even more so in this era of television and video.

65. Occasionally you will find that words are not sufficient to explain more complicated teaching points. In such cases, you will need to use your imagination and reproduce actual situations in the classroom. Instructional material has the advantage of providing cadets with a model on which they can base their associations. Instructional material can appeal to the five senses. It is often said that about 75 per cent of learning takes place visually.

GUIDELINES FOR USE

66. Before choosing what material to use in your lesson, you must consider the following points:

- a. **Planning.** To determine whether the material is necessary and when it should be used, clearly establish the objective of the lesson. You must know what you wish to communicate! Gather all the necessary data from support material, organize the material into a lesson plan, and finally, determine what ideas should be supported with training aids.
- b. **Simplicity.** The aids should be simple but must also be compatible with the appropriate objectives. Resist the temptation to use aids as a crutch. However, visual symbols and slogans can replace lengthy explanations. Avoid graphs that are too complicated. Remember that you are trying to make everything seem as simple as possible to the cadets!
- c. **Heard and Seen.** Aids are worthless if the cadets can neither see them nor hear them. All lettering must be large enough to be seen easily by those cadets farthest from the aids. Use contrasting colours. Test the aid in the environment in which it will be used.

- d. **Organization.** The effectiveness of aids can be increased by making sure you use them in the right order.
- e. **Rough Draft.** The effectiveness of aids and the ease of their preparation can be increased by initially planning them in rough draft form. The rough draft should be carefully checked for accuracy of information, grammar, spelling, basic balance, clarity and simplicity.

SOURCES OF IDEAS

67. Instructors who have no specific training in instructional material often have difficulty finding good ideas. As a result, they often use very similar and very uninteresting material. However, several resources are easily available to those who take the trouble to look:

- a. Almost every school has an art or graphic art section whose artists and audio-visual staff can suggest new methods.
- b. The other instructors are an invaluable source of ideas on instructional aids. Their own teaching methods can sometimes suggest an idea. Sometimes, by simply asking their advice, you can obtain new, interesting and specific suggestions.
- c. Advertisements in newspapers and magazines, on television and in stores can suggest new ways of illustrating ideas.
- d. Finally, if you simply let your imagination run free, it can become an excellent source of ideas.

TYPES OF INSTRUCTIONAL AIDS

68. To support your teaching, you must select instructional aids that will simplify the teaching in the eyes of the cadets. Here are some types of instructional aids:

- a. **Actual Equipment.** No instructional aid can be more effective than the actual object. Indeed, your cadets will not learn to fly suitably before they actually have the opportunity to fly an aircraft. Similarly, they will have a better understanding of how to operate a rifle if they use one.

- b. **Simulators.** Simulators reproduce the operations of actual material relatively faithfully. The best example is that of flight simulators that teach pilots to fly.
- c. **Mock-ups.** These cover a wide range and include such aids as the scale model aircraft or the sand table used to reproduce a survival site.
- d. **Human Beings.** This resource is often forgotten. Think of first aid or drill instructors.
- e. **Visual Material.** Diagrams, charts, photographs, etc, can all be used. This type of instructional aid is often easy to obtain or easy to produce.
- f. **Electronic Material.** Movie projectors, slides and overhead projectors are sometimes available and can prove very useful for those who know how to use them.

A FEW SUGGESTIONS

69. You probably have a blackboard (greenboard) or an overhead projector in your classroom. These instruments will be very useful if you know how to use them. The following paragraphs present several basic principles regarding their use (without going into the technical details).

- a. Do not speak to the blackboard or the screen. The students do not particularly enjoy communicating with the teacher's back. Your words will not have the required clarity or force. Further, you risk losing control of your class.
- b. Do not make the chalk "screech".
- c. Do not write out all the material in detail. The blackboard and overhead projector should be used to support your teaching, but they should not take your place! Limit information on the blackboard to key points, explanations, directives and your own presentation.

- d. Print, do not write. Clear, legible writing requires experience and skill. You can use coloured chalk to indicate important points and contrasts. Ensure that your lettering is large enough to be read by even those cadets who are farthest away from the blackboard.
- e. It is preferable to use a pointer and step away from the board so that everyone can see.
- f. Turn off the projector once you have finished your explanation in order to focus the cadets' attention on you.
- g. Keep a rag to wipe the chalk dust from your hands, or use a chalk holder. Otherwise, you might have an unpleasant surprise!
- h. Ensure that your transparencies for the overhead projector are in the exact order in which you will need them. Label them properly. It is very embarrassing to have to search for your transparencies while standing in front of the group

SECTION 8

CONCLUSION

70. You will be required to prepare and present a 15-minute lesson. You now have all the necessary theoretical knowledge. Teaching is no more difficult than giving an oral presentation – something you have already done a few times.

71. The quality of your teaching will depend in large part on the quality of your preparation. The better prepared you are, the better you will be able to cope with the stress and the questions of the cadets.

72. Familiarize yourself with the POs and EOs, apply the principles of instruction, master your theory, plan good visual aids and, above all, be sure to prepare and use your lesson plan properly.

73. Imagine that you are in a class, in front of a group of cadets. YOU are now the teacher! What kind of teacher would you like to become? What will you do to create and maintain the interest of your students? The ball is now in your court.

CHAPTER 9

PERFORMANCE OBJECTIVE 416

PROPULSION

SECTION 1

INTRODUCTION

1. Most large modern airplanes are powered by jet engines. This is not the case for smaller, lighter planes that still benefit, in their daily operation, from the use of the good old propeller.
2. Airplane engines have changed a great deal over the years, regardless of whether we refer to the carburettor system, the fuel system or the engine itself. The pioneers of aviation had to rely on fair winds to increase their speed above the mechanical limits of the engine. Today's pilots can adjust the engine mechanics to increase its power limits almost infinitely.
3. Air cadet planes are equipped with propellers and powered by engines. Do you know exactly how propellers work? Where does the engine power come from?

SECTION 2

PROPELLER

4. A propeller is simply a series of rotating airfoils, or blades, with streamlined surfaces shaped much like an aircraft wing. The two or more blades meet at a centre hub that is attached to the crankshaft of the aircraft engine. Because of their shape, the blades develop thrust that pulls the aircraft through the air in the same manner as propeller blades on a boat work their way through the water.
5. The function of a propeller is to convert the torque, or turning motion, of the crankshaft into thrust, or forward speed.

6. To do this, the propeller is designed so that when it rotates, it moves forward along a corkscrew or helipad path. In so doing, it pushes air backward, causing a reaction, or thrust, in the forward direction. Unlike the jet engine which moves a small mass of air backward at a relatively high speed, the propeller moves a large mass of air backward at a relatively slow speed.

7. As soon as a propeller blade starts rotating, the flow of air drawn around the blade creates a force that is exactly the same as that created by the flow of air on the aircraft wing, except that the horizontal wing is lifted upward, while the "rotating wing" or blade is pulled forward.

BLADE ANGLE

8. The propeller blade is an airfoil section, similar to the airfoil section of wing. As such, it meets the air at an angle of attack as it rotates, and thus produces lift and drag, in the same way that the airfoil section of a wing does. In the case of a propeller, however, these forces are designated as **THRUST** and **TORQUE**.

PITCH

9. The forward distance travelled by a propeller in one revolution is called the **PITCH**. The angle at which the blade is set determines pitch. When a blade is set at a large angle the propeller will travel forward a greater distance per revolution and therefore move the aircraft faster. This position is called "coarse pitch" and is much like high gear in an automobile. Conversely, when the blade is set at a "small angle" or "fine pitch", it will revolve at a higher speed and enable the engine to develop more power, much like low gear on an automobile.

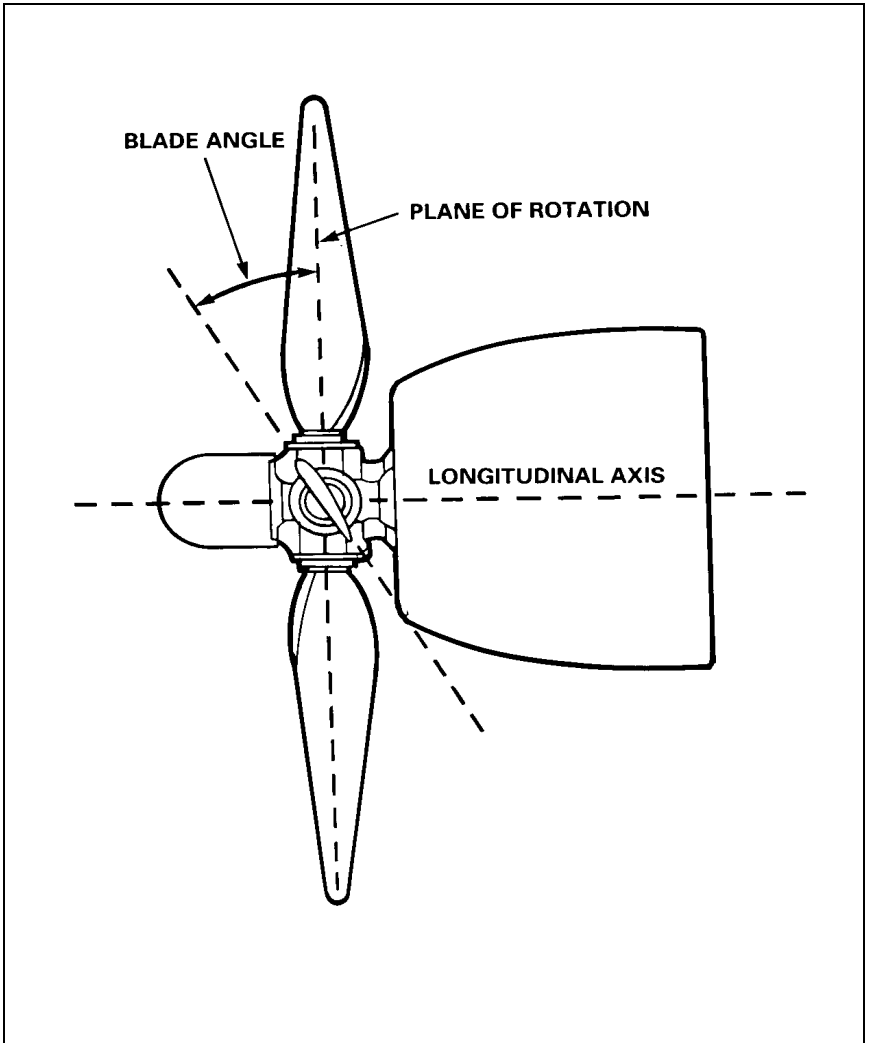


Figure 9-1 Blade Angle

TYPES OF PROPELLERS

10. Propellers may be classified under four general types, as follows:
 - a. **Fixed-Pitch Propeller.** It is a one-piece construction and has only one pitch setting. Since the fixed-pitch propeller cannot be adjusted to meet the varying requirements encountered during take-off, cruise and high-altitude flying, a compromise pitch setting is necessary. Accordingly, cruising power is chosen as being the most desirable setting for maximum efficiency. Because of their limitations, fixed-pitch propellers are found only on low-powered, light aircraft.
 - b. **Adjustable-Pitch Propeller.** It is a variation of the fixed-pitch type and is subject to similar limitations. The blades can be adjusted on the ground, when the engine is stopped, to increase the performance during a particular condition of flight. However, since the setting is constant and cannot be changed in flight, maximum propeller efficiency is possible only at the selected setting. The adjustable-pitch propeller has a split hub and two or more blades usually made of steel or aluminium alloy.
 - c. **Controllable-Pitch Propeller.** It has two pitch settings, either of which may be selected in flight. Fine pitch gives full engine revolutions per minute (rpm) when maximum power is required for take-off. Course pitch is used for cruising and for high forward speeds.
 - d. **Constant Speed Propeller.** It is a controllable-pitch propeller with a governor unit added. This type of propeller adjusts itself automatically to flight and power variations. Thus, with a constant, speed propeller, it is possible to obtain full power from the engine at any altitude or flight condition.

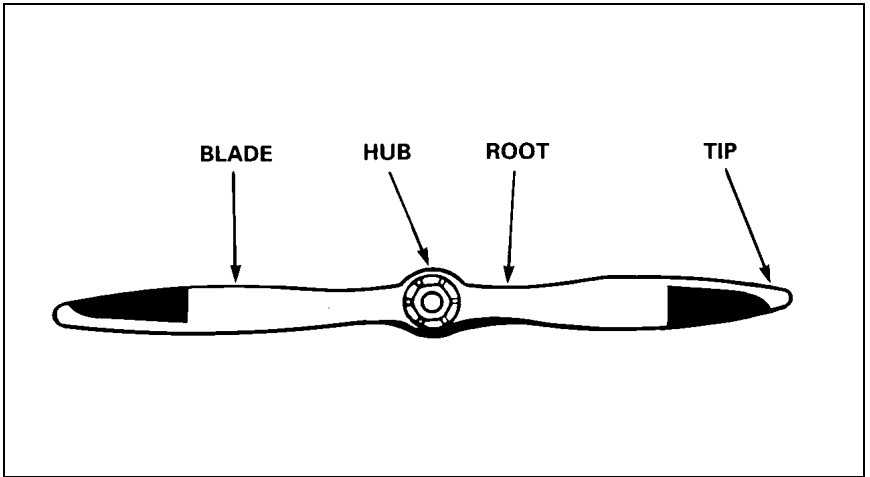


Figure 9-2 Fixed-Pitch Propeller

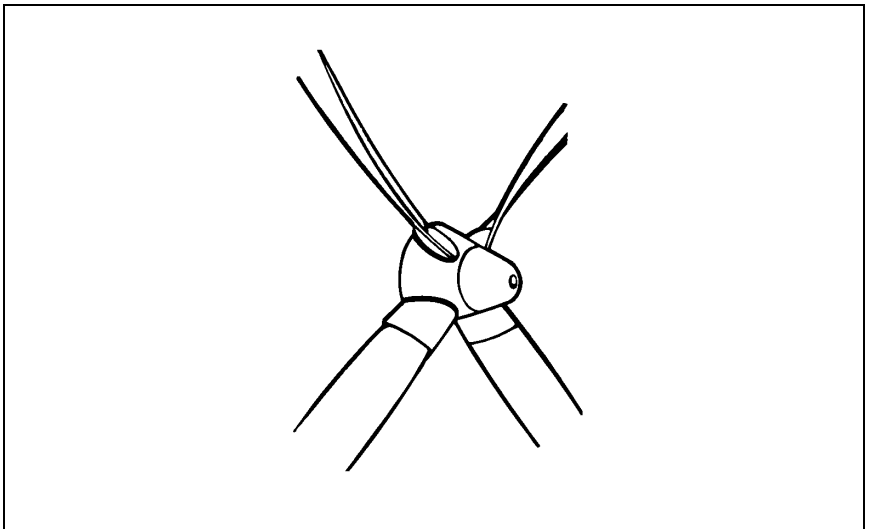


Figure 9-3 Controllable-Pitch Propeller

SECTION 3

FUEL SYSTEM

FUEL TANKS

11. As you learned last year, there are only a few differences between a plane engine and a car engine. Both are equipped with spark plugs, cylinders, valves and pistons. They are also both linked to a fuel tank.

12. The location, size and shape of fuel tanks vary with the type of airplane in which they are installed. There are two types of fuel tanks used on aircraft.

- a. **Permanent Tanks.** They are located in the fuselage or wing structure where the fuel supply is stored for normal operation. A drain is provided in each tank to allow removal of any water or dirt that may have collected.
- b. **Auxiliary Tanks.** Either fixed or drop type, they can be fitted when a greater than normal fuel supply is required. They are located on the external structures of the wings or fuselage similar to the ones on the space shuttle!

13. The tanks are made of materials that will not react chemically with any aviation fuel. Aluminium alloy is most widely used.

FUEL SYSTEMS

14. Fuel systems are designed to deliver clean fuel to the engine, at correct pressure and in sufficient quantity to meet the engine's demands. They must be highly reliable and able to deliver fuel at any altitude and during all aircraft manoeuvres, including in some cases, inverted flight!

15. There are two types of fuel systems.

- a. **Gravity Feed System.** The gravity feed system is the simplest kind, but is only suitable for light aircraft with a high wing where the fuel tank can be located well above the engine. The tanks are mounted in the wings above the carburettor, with gravity causing the fuel to flow from the tanks, past the fuel selector valve to the carburettor.
- b. **Fuel Pump Fuel System.** This type of fuel system differs from the gravity feed type in that the engine-driven fuel pump supplies

the pressure that keeps the fuel flowing to the engine. This type of system is in use in low wing airplanes and in any airplane with a high performance engine.

PROBLEMS WITH THE FUEL SYSTEM

16. The various tanks and other components of the fuel system are joined together by fuel lines made of aluminium alloy metal tubing and flexible synthetic rubber or teflon hose to allow fuel to be driven freely to the other components of the engine, where it will be burned. However, from time to time, the fuel system may be the object of some problems. The most common problems are listed in the paragraphs that follow:

DETONATION

17. Detonation is characterized by the inability of a fuel to burn slowly and is generally defined as an abnormally rapid combustion, replacing or occurring simultaneously with normal combustion. Detonation is also characterized by its almost instantaneous nature, as contrasted with the smooth progressive burning of normal combustion.

18. Under conditions of detonation, cylinder pressure will rise quickly and violently to peaks that are often beyond the structural limits of the combustion chamber. Detonation is dangerous and costly. It puts a high stress on engine parts and causes overheating, warped valves and piston damage.

19. Detonation is caused by the use of incorrect fuel; by overheating, sometimes caused by too steep a climb that reduces the flow of air around the cylinders; or by too lean a mixture.

PRE-IGNITION

20. Pre-ignition is another trouble-maker that is sometimes confused with detonation. Pre-ignition, however, is a premature ignition of the mixture due to glowing carbide particles, or "local hot spots". It is often experienced when attempting to start a hot engine and usually results in a backfire through the intake manifold.

21. Damage to an engine from pre-ignition can be disastrous, causing warped pistons, cracked cylinder heads and other serious damage.

VAPOUR LOCK

22. Vapour lock in the fuel line can be caused by high atmospheric temperatures, causing the gas to vaporize and block the flow of liquid fuel in the line.

SECTION 4

THE CARBURETTOR

23. During the induction stroke of the four-stroke cycle, a charge of vaporized fuel and air is drawn into the engine. This mixture of fuel and air is necessary for combustion. The necessary oxygen is readily obtained from the surrounding atmosphere, but the fuel must be metered to the engine to maintain the right proportion of fuel to air. The supply of this mixture to the engine must also be metered to control the power output.

ROLE OF THE CARBURETTOR

24. The combustion process in the cylinder relies on a proper mixture of fuel and air to achieve optimum efficiency. The function of the carburettor is to measure the correct quantity of gasoline, vaporize this fuel, mix it with the air in the proper proportion and deliver the mixture to the cylinders. Too rich a mixture (an excess of fuel), however, as well as lowering the combustion temperature, results in unburned wasted fuel being expelled through the exhaust system. Too lean a mixture may also cause rough engine operation, sudden "cutting out", "popping back" or backfiring, detonation, overheating or appreciable loss of power. It may also be responsible for engine failure.

MIXTURE CONTROL

25. The need to have a mixture control system is occasioned by the fact that, as altitude increases, the density of the air decreases. Carburetors are normally calibrated for sea level operation, which means that the correct mixture of fuel and air will be obtained at sea level with the mixture control in the full rich position.

26. As altitude increases, a given volume of air weighs less. It is obvious then that at high altitudes, the proportion of air by weight to that of fuel will become less, although the volume remains the same.

27. To correct that condition, a mixture control is fitted to the carburettor. This device adjusts the amount of gas being drawn from the nozzle and thereby restores the proper fuel to air mix. The mixture control, on some airplanes, is an automatic device. Most commonly, it is a manually operated control that is operated by the pilot.

HOW THE CARBURETTOR WORKS

28. As we just saw, the carburettor delivers a mixture of air and fuel to the engine. It is therefore equipped with an intake for the air and one for the fuel (Figure 9-4).

29. Fuel flows through the fuel supply lines, past the fuel strainer and enters the carburettor at the float valve. It flows into the float chamber where its level is controlled by a float that opens or closes the float valve as it rises or falls. When the float rises to a predetermined level, it shuts off the float valve. No additional fuel can then enter the carburettor until fuel is used by the engine. The float chamber is vented so that the pressure in the chamber equalizes with the atmospheric pressure as the airplane climbs and descends.

30. The level of gasoline in the float chamber governs the level of gasoline in the nozzle (Figure 9-6). That level has to be at atmospheric level.

31. Outside air passes through the carburettor air filter that is located at the carburettor air intake in the front of the engine cowling. It is then drawn through the Venturi where its speed is increased. A low pressure area is thereby created in the throat of the Venturi. The reduced pressure around the nozzle draws the fuel, which is under atmospheric pressure, from the jet in the form of a fine spray.

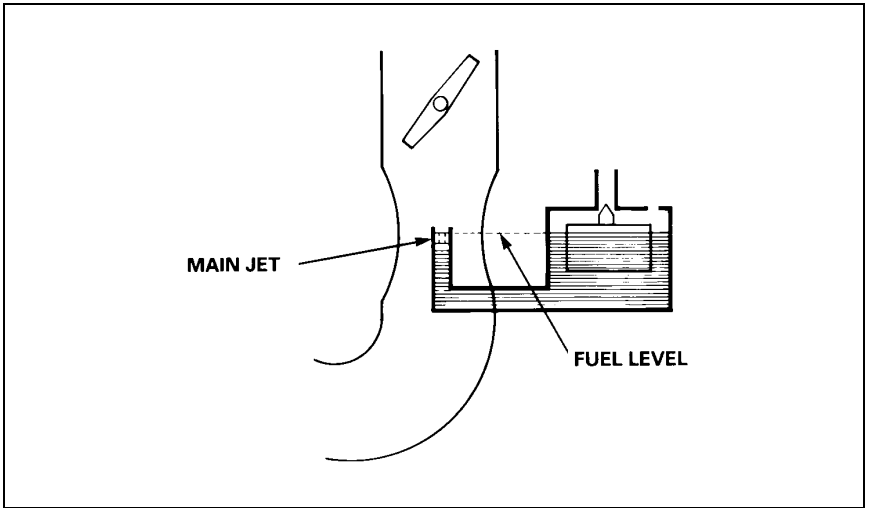


Figure 9-6 Main Jet

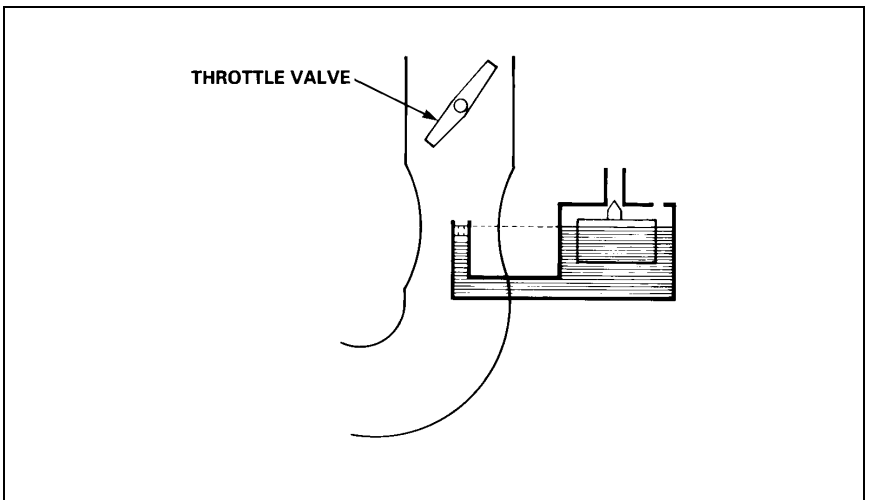


Figure 9-7 Throttle Valve

32. The mixture of air and vaporized fuel regulated in volume by the throttle valve, enters the intake manifold and then is distributed to the individual cylinders. The throttle valve (Figure 9-7) is connected directly to the throttle control on the instrument panel of the airplane. By means of the throttle, the pilot is able to control the amount of fuel/air mix that enters the engine, thereby controlling the power output.

33. Forward movement of the throttle opens the throttle valve, increasing the volume of fuel/air mixture entering the engine and consequently the speed of the engine. Aft movement of the throttle closes the throttle valve and reduces the volume of fuel/air mixture entering the engine. You will get the same effect by pushing the accelerator pedal of a car. By doing so, you open the throttle valve and increase the speed of the pistons.

34. In order to compensate for the lack of oxygen at high altitude and to increase their power, some engines are now equipped with compressors. They do not replace the engines themselves, but increase the power by compressing the air/fuel mixture

SECTION 5

SUPERCHARGING

35. An engine designed to operate at normal sea level atmospheric pressure is called a normally aspirated engine. As we have already learned, as altitude increases, the density of the air decreases. As the air becomes less and less dense with altitude, the engine is capable of producing less and less power. This is indicated by the decreasing rate of climb and eventually the total inability to climb any higher.

36. The supercharger is an internally driven compressor, powered directly from the engine. It is installed downstream from the carburettor and compresses the fuel/air mixture after it leaves the carburettor. This is called forced induction.

37. Forced induction may be used to increase the power, or "soup-up" an engine at low altitudes. In this case the pressure over and above the sea level atmospheric pressure that is forced into the manifold is called boost.

SECTION 6

TURBOCHARGING

38. In many modern airplanes, the job of supplying the engine with dense air when the plane is operating in the thin air at high altitudes is accomplished by a turbocharger. A turbocharger is powered by the energy of the exhaust gases.

39. The hot exhaust gases, which are discharged as wasted energy in a normally aspirated engine, are directed through a turbine wheel, or impeller, and turn this wheel at high rpm. The turbine wheel is mounted on a shaft on which is mounted a centrifugal air compressor. Each is enclosed in its own housing. The compressor, therefore, turns at the same speed as the turbine wheel. As more exhaust gases are directed over the turbine, the compressor will turn faster and the air supplied to the engine by the compressor will be denser, allowing the engine to produce more power.

40. The turbocharger is a particularly efficient system since it uses engine energy to maintain horsepower without using any engine horsepower as its source of power (as does the supercharger). The turbocharger is installed between the air intake and the carburettor so that it compresses the air before it is mixed with the metered fuel in the carburettor.

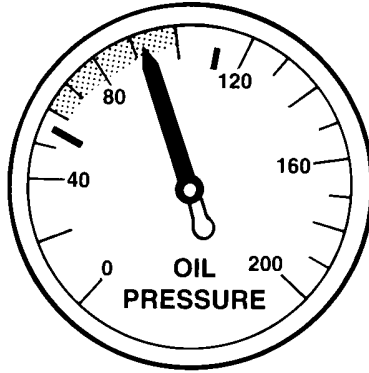
SECTION 7

ENGINE INSTRUMENTS

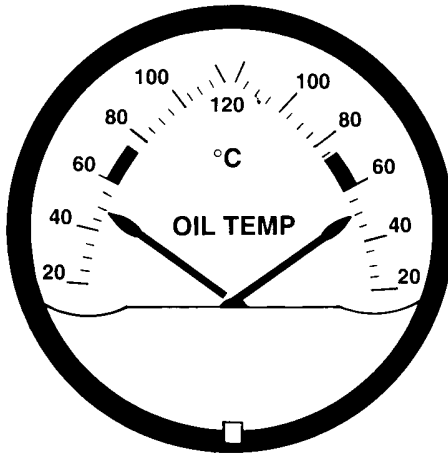
41. An engine, whether it be that of a car, or even more so, that of a plane, is a grouping of complex mechanical parts that are interrelated, from which we demand great power and maximum efficiency. It happens that on occasion, the demands made of each metal part cause overheating or an increase in pressure, indicating a poor functioning.

42. Pilots have access to a series of dials that provide them with essential information regarding the engine's status. The instruments hooked up to the engine are the following:

- a. **Oil Pressure Gauge.** The oil pressure gauge is one of the principal engine instruments. It indicates the oil pressure supplied by the oil pump to lubricate the engine. High oil pressure will force oil into the combustion chamber. There it will burn, causing a smoky exhaust, and badly carbonate piston heads, rings, valve seats, cylinder heads, etc. If the pressure is permitted to drop low enough, there will be no film of oil at all between the working surfaces of the engine, and metal will be rubbing on metal – with such ruinous results as burned out main bearings.
- b. **Oil Temperature Gauge.** It gives a reading of the temperature of the oil in degrees Fahrenheit or Celsius. The relationship between the oil temperature and oil pressure is critical. The viscosity varies according to temperature change. Extremely low oil temperature is undesirable. Cold oil does not circulate freely and may cause scoring of the engine parts. Low temperature would be accompanied by a corresponding rise in pressure. It should always be remembered that oil, in addition to lubrication, acts as a coolant.
- c. **Cylinder Head Temperature Gauge.** It records the temperature of one (or more) of the engine cylinder heads. The instrument gives a reasonably good indication of the effectiveness of the engine cooling system. High temperatures decrease the strength of metals and result in detonation, pre-ignition and eventual engine failure.
- d. **Carburettor Air Temperature Gauge.** Its purpose is to enable the pilot to maintain a temperature that will assure maximum operating efficiency and warn of icing conditions in the carburettor that may lead to engine failure. It may be installed to record the mixture temperature or to record the intake air temperature.



Oil Pressure Gauge



Oil Temperature Gauge

Figure 9-8 (Sheet 1 of 2) Engine Instruments

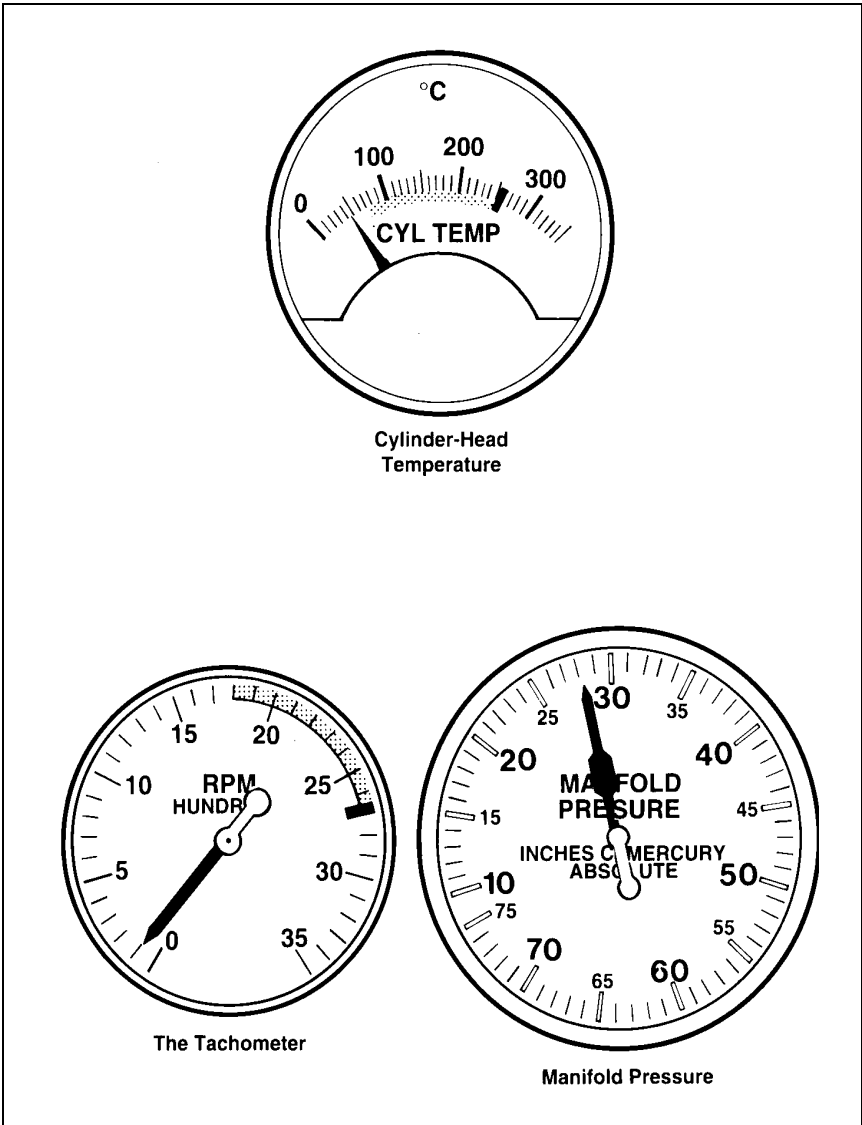


Figure 9-8 (Sheet 2 of 2) Engine Instruments

- e. **Outside Air Temperature Gauge.** It records the ambient air temperature, that is, the temperature of the free air surrounding the airplane. The temperature recorded by the gauge enables the pilot to select the proper manifold pressure, to calculate the true airspeed and altitude and warn of conditions that may cause ice formation.
- f. **Tachometer.** It is an instrument that shows the speed at which the engine crankshaft is turning in hundreds of rpm. The rpm is directly proportional to the power output of the engine. On an airplane fitted with a fixed-pitch propeller, the tachometer is the only instrument on the instrument panel that displays information about engine power settings.
- g. **Manifold Pressure Gauge.** It indicates in inches of mercury the pressure of the fuel/air mixture in the engine intake manifold at a point between the carburettor and the cylinders.

TEST YOURSELF

1. What are the particular characteristics of the four types of propellers?
2. Where are the fuel tanks located in a plane using the gravity feed system?
3. What is the function of the carburettor?
4. Why is it necessary, in a plane, to have a fuel/air mixture control system?
5. If the pilot pushes on the accelerator, the plane will accelerate. Explain the mechanics that cause the engine to accelerate.
6. Supercharging is produced by an internally driven compressor, powered directly from the engine itself. Where does the turbocharger power come from?
7. Name five of the engine instruments and their use.

CHAPTER 10

PERFORMANCE OBJECTIVE 417

NAVIGATION

SECTION 1

INTRODUCTION

1. The Earth on which we live is a ball, or sphere, technically an oblate spheroid. Not knowing any better, the human race has for centuries lived on the outside of the sphere – enduring heat and cold, clouds and rain, snow and sleet, fog, mist and mortal uncertainty. Cities of the future may be located underground in a world of perfectly regulated conditions of heat, light and fresh air.

2. Meanwhile, we must make the best of our world, such as it is. Humans are restless souls, and travel and curiosity have always been two of their most cultivated and persevering habits. To make it possible to move about on this great terrestrial sphere then, they must have some master plan to enable them to define position, direction and distance.

SECTION 2

TYPES OF NAVIGATION

3. There are several methods of navigation used by pilots to find their way from place to place on this Earth of ours:

- a. **Pilotage.** Pilotage is navigation by reference to landmarks such as mountains, cities and rivers.
- b. **Dead Reckoning.** Navigation by use of predetermined vectors of wind and true airspeed and precalculated heading, ground-speed and estimated time of arrival
- c. **Radio Navigation.** Navigation by use of radio aids, that is, navigation signals broadcast by radio stations on the ground or from satellites.

- d. **Celestial Navigation.** Navigation by measuring angles to heavenly bodies (sun, moon and stars) to determine position on the Earth.
 - e. **Inertial Navigation.** Navigation by self-contained airborne gyroscopic equipment or electronic computers that provide a continuous display of position.
4. Most pilots use these various methods of navigation in combination. The use of pilotage by itself is limited by visibility (you have to be able to see the landmarks) and by familiarity with the area over which the flight is being conducted. Therefore, pilotage in combination with dead reckoning is a more effective method of navigation.

SECTION 3

NAVIGATION PROCEDURES FOR A FLIGHT

5. In pilot navigation, thorough pre-flight preparation is required to reduce much of the navigational work in the cockpit. This allows the pilot to focus attention on flying the aircraft and communicating with the air traffic control facilities. Plotting in flight is reduced to a minimum. The pilot must have a well prepared log form and map, and must study the route carefully.
6. As opposed to general beliefs, pilots only have a limited choice of routes to follow while in the air. They cannot suddenly decide to fly in a straight line to the airport or spin around at any altitude they wish, just as a car driver also has a limited choice of routes to go from one city to another. A driver would not drive across a field or face the highway traffic in the opposite direction to save some time!
7. The air space is divided in corridors you can compare to a major highway with many levels. It is regulated for safety reasons. Would you believe that in Canada and the USA there are currently 200 000 registered aircraft and there may be as many as 10 000 airborne at any one time!
8. Pre-flight preparation entails a number of essential steps that must be completed before take-off. These are listed as follows:
- a. selection of route;

- b. analysis of weather;
- c. preparation of map or chart;
- d. preparation of flight logs;
- e. reviews of Notices to Airmen (NOTAMs); and
- f. completion of the flight plan.

9. Navigation in the atmosphere deals with movement in three dimensions as distinct from the two-dimensional movement of surface vehicles. Although aircraft fly above, and not on, the surface of the Earth, their movement is invariably expressed as motion relative to the surface of the Earth. As a first step in the study of navigation, then, consideration must be given to the form of the Earth.

SECTION 4

EARTH

SHAPE OF THE EARTH

10. For the purpose of navigation, the Earth is assumed to be a perfect sphere. However, spinning through space and centrifugal force have caused it to become flattened slightly at the poles and bulged at the equator just as if you were applying pressure to either side of a beach ball.

ROTATION OF THE EARTH

11. The Earth makes one rotation each day about an imaginary line called the "spin axis". The two points at which the spin axis terminates on the surface of the Earth are called the "poles". **EAST** is defined as the direction in which the Earth is rotating; while **WEST** is the direction opposite to east (Figure 10-1). The North Pole lies to the left of an observer facing east and the South Pole lies to the right.

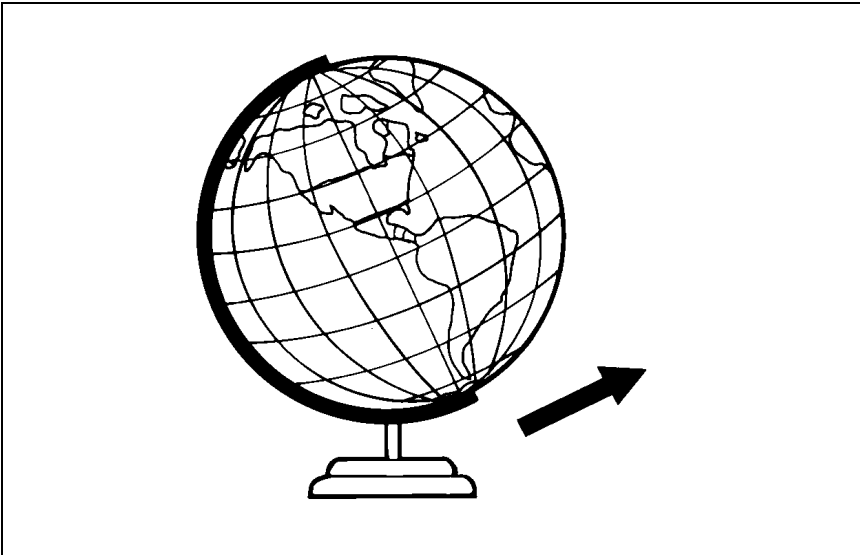


Figure 10-1 Rotation Axis

LATITUDE AND LONGITUDE

12. As a well-planned modern city is an orderly gridwork of intersecting streets and avenues, so ancient masterminds have divided the surface of our sphere into a geometrical pattern of intersecting circles called the Graticule. Those running north and south are meridians of longitude (Figure 10-2). Those running east and west are parallels of latitude.

13. There are two lines by which grid references are calculated: the **Equator** (Figure 10-2), a great circle on the surface of the Earth lying equidistant from the Poles, and the **Prime Meridian**, which is the meridian passing through Greenwich, England.

14. Longitude is measured from 0 to 180 degrees east and west of the Prime Meridian. The Prime Meridian is numbered 0. The meridian on the opposite side of the Earth to the Prime Meridian is the 180th and is called the International Date Line. Here the time changes a day. Longitude is measured in degrees ($^{\circ}$), minutes ($'$) and seconds ($''$). There are 60 minutes in a degree and 60 seconds in a minute.

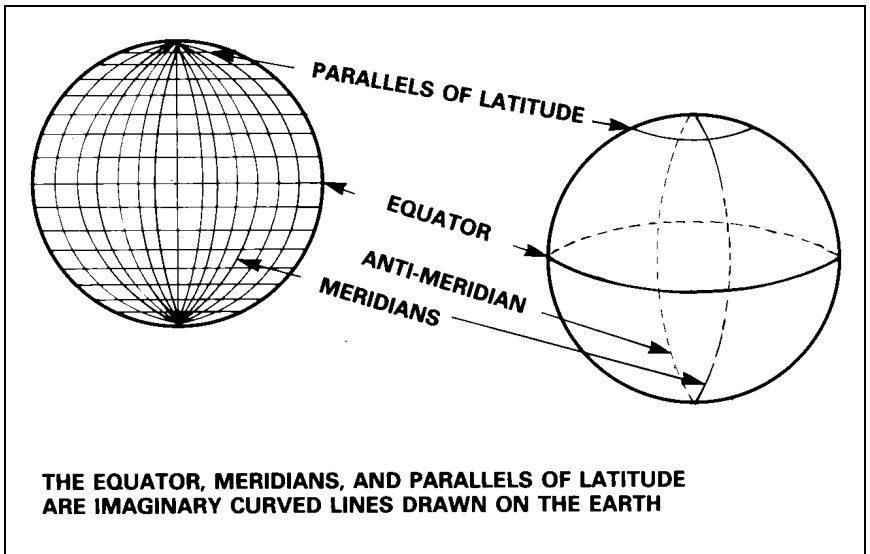


Figure 10-2 Equator, Meridians and Parallels of Latitude

15. Latitude is measured from 0 to 90 degrees north or south of the Equator, which is numbered 0 degrees. Latitude is also expressed in degrees, minutes and seconds.

EARTH'S MAGNETISM

16. The Earth is a magnet and like any other magnet has a North and a South Magnetic Pole. Lines of force flow between these two poles creating a magnetic field that surrounds the Earth. A compass needle will be influenced by the earth's magnetic field and will lie parallel to one of the magnetic lines of force with its north seeking pole pointing to magnetic North. The magnetic line in which the compass needle lies is called the Magnetic Meridian.

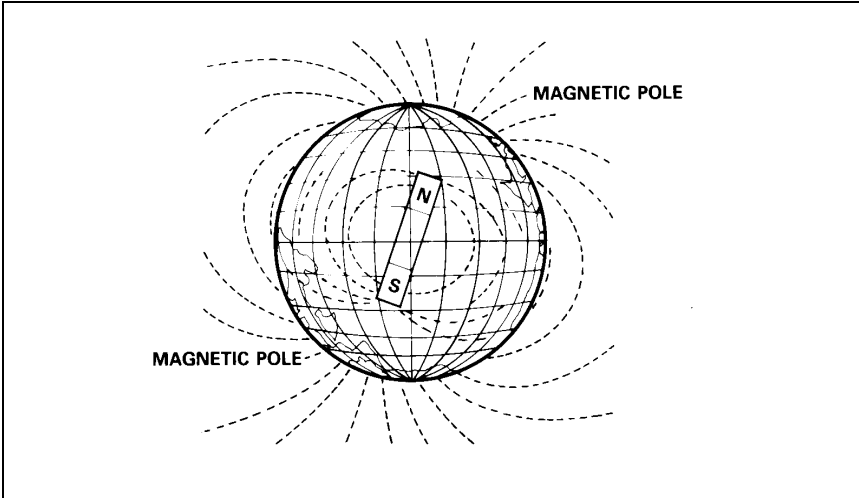


Figure 10-3 Earth's Magnetism

VARIATION

17. The angle between the true meridian and the magnetic meridian in which the compass needle lies is called the Magnetic Variation. Since the Magnetic North Pole is not stationary, but moving in a somewhat erratic circle, obviously the variation is not constant at any one place, but changes slowly from year to year. This is called the **annual change**. This has to be taken into consideration when using old maps.

18. It can, therefore, be seen that if the Magnetic Pole lies west of the True Pole from a given point, the compass needle will point west of True North. Hence, the magnetic meridian will lie west of the true meridian.

ISOGONIC LINES

19. The direction of the Earth's magnetic field is measured, periodically, over most of the Earth's surface. The results of such a survey are plotted on a chart. Lines are drawn on the chart joining places having the same variation and these lines are called **ISOGONIC** or **ISOGONAL LINES**. Isogonial lines are not straight lines but bend and twist due to the influence on the magnetic field of local magnetic bodies below the Earth's surface.

20. The isogonic lines are numbered east and west according to whether the compass variation is to the east or west of True North.

AGONIC LINES

21. In each hemisphere there will be places where the North Pole and the North Magnetic Pole will be in transit, that is, where they will lie in the same straight line. These places will, therefore, have no magnetic variation. Lines drawn through places of "no variation" are called **AGONIC LINES**. Like the isogonic lines, they twist and curve due to the local attraction of magnetic bodies in the Earth.

SECTION 5

GEOGRAPHICAL CO-ORDINATES

22. The location of cities, towns, airports, etc, may be designated by their geographical co-ordinates, that is, the intersection of the lines of latitude and longitude marking their position on a map. It is exactly like locating a specific place in your town. As an example, the arena in your city may be located at the intersection of Royal and Notre-Dame Streets, the city itself being located on a map at the intersection of the 75th Meridian West and the 40th Parallel North.

23. When a position is being recorded by the latitude and longitude method, the latitude co-ordinate, by convention, is written first and is followed by the longitude co-ordinate. The latitude and longitude of Winnipeg, Manitoba will be written as 4954N 9714W, meaning Winnipeg is 49 degrees 54 minutes north of the equator and 97 degrees 14 minutes west of the prime meridian.

DETERMINE THE DIRECTION

24. The term "direction" can be defined as "the path pursued by a moving body" or "the point to which one moves or at which one looks". The direction to a certain destination can be maintained with ease when the destination is visible from the point of departure. On most navigation trips, however, direction must be obtained from a map and the aircraft heading must be in the proper direction throughout the trip. Direction, then, is an essential part of navigation, and there must be a method of expressing it.

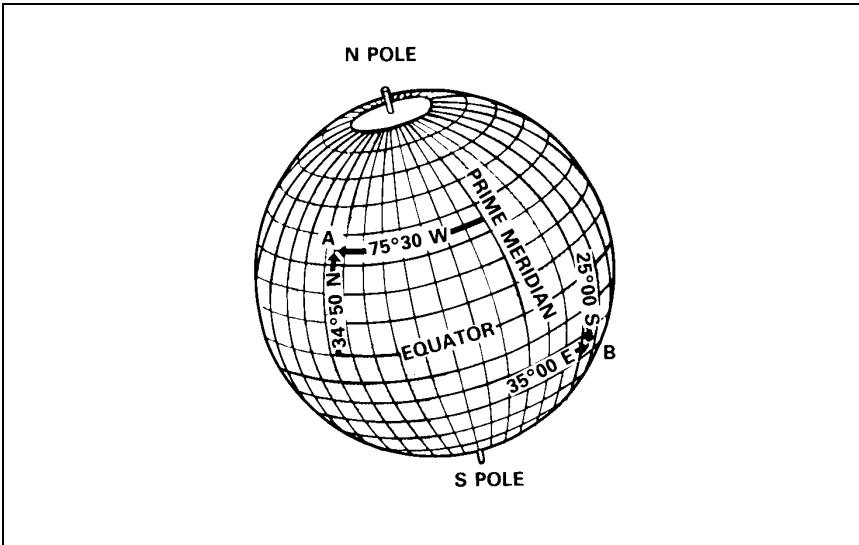


Figure 10-4 Measuring the Latitude and the Longitude

DIRECTION EXPRESSED AS AN ANGLE

25. While planning their flights, pilots draw a line between the departure point and the expected arrival point. They then calculate the angle this line makes with a north line passing through the point (Figure 10-5). The angle is always measured clockwise from the particular chosen datum and using the compass rose (Figure 10-5). The direction of the datum itself is referred to as the magnetic north direction (eg, 48 degrees north, 270 degrees north, etc)

26. Navigation uses the meridian as a reference line, or datum, because it is a north-south line. By convention, direction is measured clock-wise from north to the nearest degree and is expressed as a three-figure group. North is given the symbol 000 (for clarity, it is expressed verbally as "360") and therefore, east, which is 90 degrees from north, is 090 and west is 270 etc. The resulting circle of direction is known as the compass rose. It replaces the usual cardinal and intermediate points because the number of named directions is small and their names are too cumbersome for use in navigation.

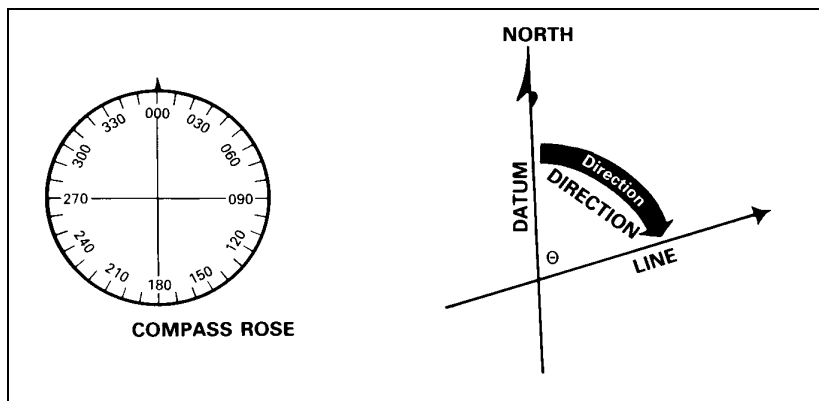


Figure 10-5 Direction Expressed as an Angle

TRUE DIRECTION

27. The geographical North Pole, known as true north, is the reference point for measurement of true direction. The direction of true north never changes; all maps and charts use true north as a datum. Unfortunately, there is no convenient method of measuring true north directly and continuously; therefore, in navigation, true direction must be derived from magnetic direction.



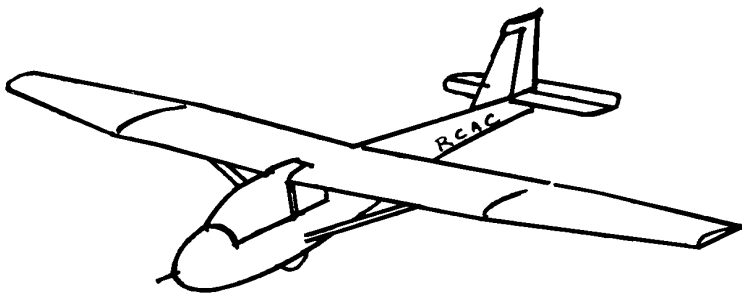
SECTION 6

CONCLUSION

28. Pilots must be able to do more than identify their position and calculate the direction while flying. They also have to calculate the speed, the amount of fuel and the duration of the flight. They must be able to read aeronautical maps using a navigation compass, a protractor, the engine instruments, etc. Flying a plane demands more than just being able to read a map. It is a question of safety. While in the air, pilots are too busy flying the plane to take care of the preparation.

29. This chapter has discussed the basic elements of air navigation, primarily from the pilot's point of view. However, whether one deals with pilot type navigation or the more conventional long-range type of navigation, such as that carried out by a professional navigator, there are three main points to be determined:

- a. the correct heading to direct the aircraft to the desired destination;
- b. the position of the aircraft at any time; and
- c. the time at which the aircraft will reach any particular position.



30. Are you interested in learning more about flying? Why don't you join your squadron flying club? Ask the flying instructor, other cadets or the training officer about pilot's training. Maybe you will be among the lucky cadets who will be wearing wings and flying a plane soon, who knows?

SOMETHING TO THINK ABOUT...

Life is either a daring adventure or nothing

Helen Keller

Seeing's believing, but feeling's the truth.

Thomas Fuller MD

CHAPTER 11

PERFORMANCE OBJECTIVE 418

RADIO COMMUNICATION

SECTION 1

SPEECH TRANSMISSION TECHNIQUES

1. During the Proficiency Level Two radio communication course, you learned that the phonetic alphabet is used to avoid confusion when transmitting difficult or unusual words, or when using numbers.
2. The efficient use of radio depends of a large extent on the method of speaking and on the articulation of the operator. As the distinctive sounds of consonants are liable to become blurred in the transmission of speech and as words of similar length containing the same vowel sounds are apt to sound alike, special care is necessary in their pronunciation.
3. When using radio, speak all words plainly and each word clearly to prevent words from running together. Avoid any tendency to shout, to accent syllables, or to talk too rapidly. The following points should be kept in mind when using radio:
 - a. **Speed.** Keep the rate of speech constant, neither too fast nor too slow. Remember that the operator receiving your message may have to write it down.
 - b. **Rhythm.** Preserve the rhythm of ordinary conversation. In separating words so that they are not run together, avoid the introduction of unnecessary sounds such as "eer" and "um" between words.
 - c. Do not shout into the microphone.
 - d. Keep a distance of 1 inch between the lips and the microphone when transmitting.

- e. Profane or obscene language is strictly prohibited.

TIME AND DATE

4. The 24-hour system should be used to express time in the aeronautical service. Time should be expressed and transmitted by means of four figures, the first two denoting the hour past midnight and the last two the minutes past the hour.

– EXAMPLES –

- 12:45 a.m. is expressed as 0045.
- 12 :00 noon is expressed as 1200.
- 11:45 p.m. is expressed as 2345.
- 12:00 midnight is expressed as 2400.
or 0000.
- 1:30 a.m. is expressed as 0130.
- 1:45 p.m. is expressed as 1345.
- 4:30 p.m. is expressed as 1630.

SECTION 2

PROCEDURAL WORDS AND PHRASES

5. While it is not practical to set down precise phraseology for all radiotelephone procedures, slang expressions such as "OK", "REPEAT", "TENFOUR", "OVER AND OUT", "BREAKER BREAKER", "COME IN PLEASE", etc, should not be used. You should use the words and expressions in the following list when required.

WORD OR PHRASE	MEANING
ACKNOWLEDGE	Let me know that you have received and understood this message.
AFFIRMATIVE	Yes, or permission granted.

Figure 11-1 (Sheet 1 of 4) Procedural Words and Phrases

WORD OR PHRASE	MEANING
BREAK	Indicates the separation between portions of the message (to be used when there is no clear distinction between the text and other portions of the message).
CHANNEL	Change to channel...before proceeding.
CLEARED	Authorized to proceed under the conditions specified.
CONFIRM	My version is...Is that correct?
CORRECTION	An error has been made in this transmission (message indicated). The correct version is...
DISREGARD	Consider this transmission as not sent.
GO AHEAD	Proceed with your message.
HOW DO YOU READ?	Self-explanatory.
I SAY AGAIN	Self-explanatory (use instead of "I REPEAT").
MAYDAY	The spoken word for distress communications.
MAYDAY RELAY	The spoken word for the distress relay signal.
MONITOR	Listen on (frequency).
NEGATIVE	No, or that is not correct, or I do not agree.

Figure 11-1 (Sheet 2 of 4) Procedural Words and Phrases.

WORD PHRASE	OR	MEANING
OUT		Conversation is ended and no response is expected.
OVER		My transmission is ended and I expect a response from you.
PAN PAN		The spoken word for urgency communications.
READ BACK		Repeat all of this message back to me exactly as received after I have given "OVER" (do not use the word "REPEAT").
ROGER		I have received all of your last transmission.
ROGER NUMBER		I have received your message Number ____.
SAY AGAIN		Self-explanatory (Do not use the word "REPEAT").
STAND BY		I must pause for a few seconds or minutes, please wait.
SEELONCE		International expression to indicate that silence has been imposed on the frequency due to a distress situation. The aeronautical phrase is "STOP TRANSMITTING".
SEELONCE FEENEE		Is the international expression for a distress cancellation. The aeronautical expression is "DISTRESS TRAFFIC ENDED".

Figure 11-1 (Sheet 3 of 4) Procedural Words and Phrases

WORD OR PHRASE	MEANING
SEELONCE MAYDAY	Is the international expression to inform an individual(s) that a distress situation is in progress. The command comes from the aircraft in distress. The aeronautical phrase is "STOP TRANSMITTING MAYDAY".
THAT IS CORRECT	Self-explanatory.
VERIFY	Check coding, check text with originator and send correct version.
WILCO	Your instructions received, understood and will be complied with.
WORDS TWICE	(a) As a request: Communication is difficult, please send each word twice. (b) As information: Since communication is difficult, I will send each word twice.

Figure 11-1 (Sheet 4 of 4) Procedural Words and Phrases

SECTION 3

MESSAGE HANDLING PROCEDURES

6. The message should generally consist of four parts:
 - a. the call-up;
 - b. the reply;
 - c. the message; and
 - d. the acknowledgement or ending.

RADIO-TELEPHONE CALLING PROCEDURE

7. Before transmitting, you will listen for a period long enough to satisfy yourself that you will not cause harmful interference to transmissions already in progress. If such interference seems likely, you should wait for the first break in the transmission. The identifier of the station being called is always spoken first, followed by the words "THIS IS" and your station's identifier.

– EXAMPLE –

CESSNA ONE FOUR THREE – FOXTROT ALPHA
ROMEOQUEBEC THIS IS – TANGO ZULU UNIFORM YANKEE.

SINGLE STATION CALL

8. If you wish to establish communication with a specific station, the following items will be transmitted in the order indicated:

- a. The call sign of the station called (not more than three times, once if radio conditions are good).
- b. The words "THIS IS".
- c. The call sign of your station.
- d. The frequency on which you are transmitting.
- e. The invitation to reply ("OVER").

– EXAMPLE –

TORONTO TOWER
THIS IS
CESSNA ONE EIGHT FIVE – FOXTROT APHA DELTA
TANGO
OVER

GENERAL CALL

9. If you wish to establish communication with any station within range or in a certain area, the call should be made to "ALL STATIONS" using the same procedure as a single station call.

– EXAMPLE –

ALL THE STATIONS
THIS IS
TORONTO AIR RADIO

MULTIPLE STATION CALL

10 If more than one station is to be called simultaneously, the identifiers may be transmitted in any convenient sequence followed by the words "THIS IS" and your call sign. As a general rule, operators replying to a multiple station call should answer in the order in which they have been called.

– EXAMPLE –

CESSNA FOX TROT NOVEMBER INDIA INDIA
PIPER FOXTROT X-RAY QUEBEC QUEBEC
PIPER GOLF LIMA LIMA DELTA
THIS IS
TORONTO TOWER

REPLYING

11. Operators hearing a call directed to their station will reply as soon as possible and advise the calling station to proceed with the message with the words "GO AHEAD", or not to proceed with the message with the words "STAND BY", followed by the anticipated number of minutes of delay.

– EXAMPLE –

PIPER FOXTROT X-RAY QUEBEC QUEBEC
THIS IS
TORONTO TOWER

GO AHEAD
OVER
PIPER FOXTROT X-RAY QUEBEC QUEBEC
THIS IS
TORONTO TOWER
STAND BY TWO MINUTES
OVER

12. When operators of a station hear a call but are not sure of the identity of the calling station, they should reply immediately using the words "STATION CALLING", their station's identification, and the words "SAY AGAIN", and "OVER".

– EXAMPLE –

STATION CALLING CESSNA FOXTROT NOVEMBER
JULIET INDIA
SAY AGAIN
OVER

CORRECTIONS

13. If you make an error in transmission, you should use the word "CORRECTION" and give the correct version transmitted.

– EXAMPLE –

OVER OTTAWA AT TWO SEVEN CORRECTION TWO EIGHT
PROCEED TO DOCK FOUR CORRECTION DOCK FIVE

14. If the receiving station requires the repetition of a message, the operator should use the words "SAY AGAIN". If repetition of only a portion of a message is required, the receiving station should use the following:

- a. SAY AGAIN ALL BEFORE... (first word satisfactorily received); or
- b. SAY AGAIN... (word before missing portion) TO... (word after missing portion); or
- c. SAY AGAIN ALL AFTER... (last word satisfactorily received).

SECTION 4

DISTRESS COMMUNICATIONS

15. Distress communications should be conducted in accordance with the procedures outlined in this section. These procedures will not, however prevent a station in distress from making use of any means at its disposal to attract attention, to make its position known and to obtain assistance.

16. The spoken word for distress is "MAYDAY". It indicates that the station sending the signal is either:

- a. threatened by grave and imminent danger and requires immediate assistance; or
- b. aware that an aircraft, ship or other vehicle is threatened by grave and imminent danger and requires immediate assistance.

17. The distress call will only be sent on the authority of the person in command of the station. The distress call should comprise:

- a. the distress signal "MAYDAY" spoken three times;
- b. the words "THIS IS";
- c. the call sign of the station in distress spoken three times.

– EXAMPLE –

MAYDAY MAYDAY MAYDAY
THIS IS
PIPER FOXTROT X-RAY QUEBEC QUEBEC

18. The distress call has absolute priority over all other transmissions. All stations that hear it are to cease any transmission immediately capable of interfering with distress traffic and continue to listen on the frequency used for the distress call.

DISTRESS MESSAGE

19. The distress message should follow the distress call as soon as possible. It should include as many as possible of the following elements:

- a. the distress signal "MAYDAY";
- b. the call sign of station in distress (once);
- c. the nature of the distress condition and kind of assistance required (ie, what has happened);
- d. the intention of the person in command;
- e. the particulars of its position;
- f. the number of persons on board and injuries (if applicable);
- g. any other information that might facilitate rescue; and
- h. the call signal of the station in distress.

ACKNOWLEDGEMENT OF RECEIPT OF A DISTRESS MESSAGE

20. The acknowledgement of receipt of a distress message shall be given in the following form:

- a. the call sign of the station in distress;
- b. the words "THIS IS";
- c. the call sign of the station acknowledging receipt; and
- d. the words "RECEIVED MAYDAY".

SECTION 5

URGENCY COMMUNICATIONS

21. The urgency signal indicates that the station calling has a very urgent message to transmit concerning the safety of an aircraft, ship or other vehicle, or the safety of a person. The urgency signal is "PAN PAN" spoken three times. It should be used at the beginning of the first station. The urgency signal and the urgency message may be addressed to all stations or to a specific station.

22. The urgency signal has priority over all other communications except distress. Stations that hear the urgency signal are to continue to listen for at least three minutes on the frequency on which the signal is heard. After that, if no urgency message has been heard, stations may resume normal service. All stations that hear the urgency signal must take care not to interfere with the urgency message that follows it.

URGENCY MESSAGE

23. The urgency signal must be followed by a message giving further information of the incident that necessitated the use of the urgency signal. When the urgency message does not contain a specific address and is acknowledged by a station, that station will forward the information to the appropriate authorities.

24. The urgency message should contain as many as required of the following elements and, if possible, in the following order:

- a. the urgency signal "PAN PAN" (three times);
- b. the name of the station addressed or the words "ALL THE STATIONS" (three times);
- c. the words "THIS IS";
- d. the identification of the aircraft;
- e. the nature of the urgency condition;
- f. the intentions of the person in command;
- g. the present position, the flight level or the altitude and the heading;
and
- h. any other useful information.

FALSE DISTRESS SIGNAL

25. Any person who knowingly sends, transmits, or causes to be sent or transmitted any false or fraudulent distress signal, message, call or radiogram of any kind is guilty of an offence and is liable, on summary conviction, in the case of an individual, to a fine not exceeding \$5000 or to imprisonment for a term not exceeding one year, or to both, or, in the case of a corporation, to a fine not exceeding \$25 000.

DISTRICT OFFICES OF THE DEPARTMENT OF COMMUNICATIONS

26. The **STUDY GUIDE FOR THE RADIOTELEPHONE OPERATOR'S RESTRICTED CERTIFICATE (AERONAUTICAL)** is available at a district office of the Department of Communications in one of the following cities:

Corner Brook, Nfld	Saut Ste Marie, Ont
St John's, Nfld	Sudbury, Ont
Halifax, NS	Thunder Bay, Ont
Sydney, NS	Timmins, Ont
Charlottetown, PEI	Toronto, Ont
Bathurst, NB	Windsor, Ont
Moncton, NB	Brandon, Man
Saint John, NB	Winnipeg, Man
Chicoutimi, Que	Regina, Sask
Montreal, Que	Saskatoon, Sask
Quebec, Que	Calgary, Alta
Rimouski, Que	Edmonton, Alta
Rouyn, Que	Grande Prairie, Alta
Sept-Îles, Que	Cranbrook, BC
Sherbrooke, Que	Kelowna, BC
Trois-Rivieres, Que	Langley, BC
Belleville, Ont	Prince George, BC
Hamilton, Ont	Prince Rupert, BC
Kenora, Ont	Vancouver, BC
Kingston, Ont	Victoria, BC
Kitchener, Ont	Whitehorse, YT
London, Ont	Fort Smith, NWT
North Bay, Ont	Yellowknife, NWT
Ottawa, Ont	

CHAPTER 12

PERFORMANCE OBJECTIVE 419

AIRCREW SURVIVAL

SECTION 1

INTRODUCTION

1. To identify your position on unknown ground requires knowledge and some specific abilities that may contribute to saving your life. It may also help rescuers to trace you in case of emergency.
2. The easiest way to identify your position is to look around for landmarks such as rocks cliffs or buildings. But these will be of no importance if you cannot identify the ground on which you stand. It would be like calling a cab at the intersection of two streets. not knowing the city in which you are standing!
3. The use of maps implies the understanding of the information it intends to provide in order that one may form a true mental picture of the ground without actually seeing it. Although we may fail to notice it. topography or map reading is part of everyday life: planning a trip with a travel map: looking for the shortest route to school or for a hiking trip in the country; inquiring where one is and where one is headed during a vacation trip; or directing a person to a particular area or street. Becoming familiar with map reading enables a person not only to make interesting outings but also to go fishing or hunting without fear of getting lost. At times, it can even assist in the search for a lost person.

SECTION 2

TYPES OF MAPS AND THEIR USE

4. In general, maps can be divided into two classes:
 - a. those that record natural and man-made features on the Earth's surface and that may be used for finding your way around in a general or detailed manner; and
 - b. those that record other kinds of specific information in a variety of ways. The name of the type of map will often indicate the use of the map.
5. **Topographical Maps.** The maps with which map reading is mainly concerned. They show, in as much detail as their scale allows, the physical features of the ground – rivers, streams, hills, valleys, woods, etc. Their purpose is to present a complete and accurate picture of the ground as it exists.
6. **Street Maps.** Large scale maps drawn in great detail. They, therefore, show streets, public buildings, churches, schools, parks, historical, sites, libraries, firehalls, police stations, etc.
7. **Road Maps.** Show road networks (highways, country roads, etc), cities and towns. The mileage between points may be indicated. Their use is limited to movement by road.
8. **Relief Maps.** Three-dimensional maps built to show an actual model of the ground. They are bulky and expensive in time and money.
9. **Outline Maps.** Maps with only sufficient detail to indicate the general plan of the country, eg, rivers, main cities, etc. They are used to record special information such as the location of units, eg, all the Cadets Corps in the province.
10. **Air Photo Maps.** Air photographs produced in whatever scale is required. They are gridded to coincide with the map of the same coverage and, as photographs, are used to show exact detail in its correct relationship. They do not reflect contour height and are of limited value for cadet training.

11. **Statistical Maps.** They show distribution of population, schools hospitals, industry, sewer and water distribution systems, etc. They are used by persons who require the specific information they portray, ie, city engineers, city planners, politicians, etc.

12. **Map Scale.** Maps are also referred to or subdivided by scale. Scale is the relationship or ratio between distance on the map and on the ground, ie, 1:50 000 map means that one unit of measure on the map is equal to 50 000 of the same units on the ground.

SECTION 3

CARE AND MAINTENANCE OF MAP SHEETS

13. A map sheet is made of paper. Some may be linen backed but all are fragile. Unless it is treated with care, a map will soon come apart. Maps are often precious and the supply is never unlimited. Preserve them with care. Wet, grime, wind, folds and tears are the great enemies of maps. The quickest way to destroy a map is to open it full-out in the wind. Even a slight breeze can catch the sheet and start tears that quickly spread. A map can also be destroyed if it gets very wet and is not properly dried.

14. Here are some good ways to take care of map sheets:

- a. Store the maps properly when not in use.
- b. Protect the map sheet from wet and grime by using:
 - (1) a map board covered with hard plastic;
 - (2) plastic coating – sheets or sprays; and
 - (3) a plastic bag.
- c. If the map gets wet, open it fully and dry it at the first opportunity.
- d. Fold the map properly.
- e. Never fully open a map where the wind can catch it.

HOW TO FOLD A MAP

15. Lay the map sheet face up on a hard flat surface as though you were reading its information.
16. Fold the map in half by bringing the top of the map sheet down to the bottom of the sheet.
17. Fold the top half of the map sheet into half again.

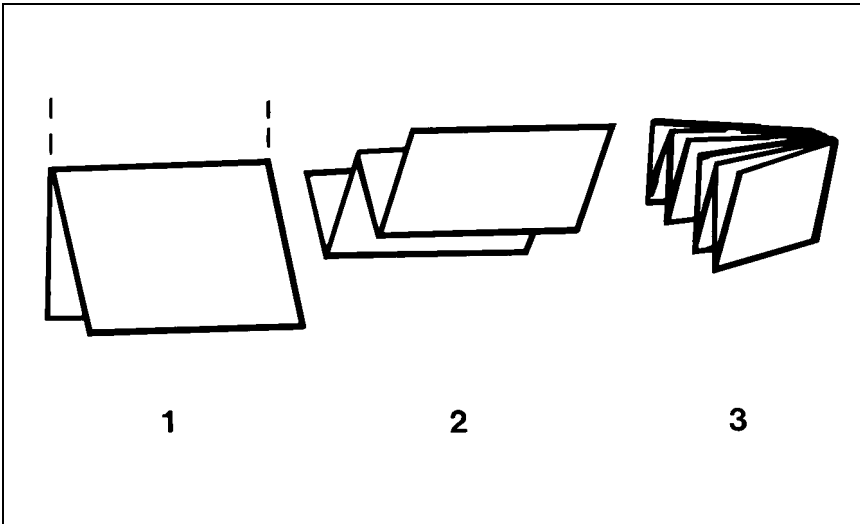


Figure 12-1 How to Fold a Map

18. Turn the map over and fold the bottom half in half to match the fold described in paragraph 17.

19. Fold the folded map in half from left to right. The folded map will now fit into a service map case or folder or onto a clip board.

SECTION 4

MARGINAL INFORMATION FOUND ON TOPOGRAPHICAL MAPS

20. To become proficient at map reading you must be able to interpret the information and symbols found in the margin of your map and also identify them on the map and on the ground.

21. Here is the most important information found on topographical maps:

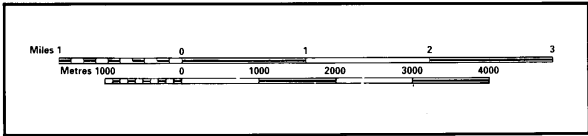
- a. **Name of Map Sheet.** For simplicity and ease of reference, map sheets are named. The name will be the name of the major community covered by a map sheet or in more remote areas without a community, the name of the district or area.



- b. **Number of the Map Sheet.** A map index may show many dozens of map sheets on a single plate and to do so permits space for a number only. The numbering system is organized in a regular pattern as reference to any map index will show. Maps are ordered from a supplier using mainly the number, but for clarity, usually include the name and scale of the sheet.

VANIER
21 M/2
EDITION 4

- c. **Scale Bars.** Maps have scale reference bars shown in yards, metres and miles. They permit the measurement of distances in whatever unit of measure is required.



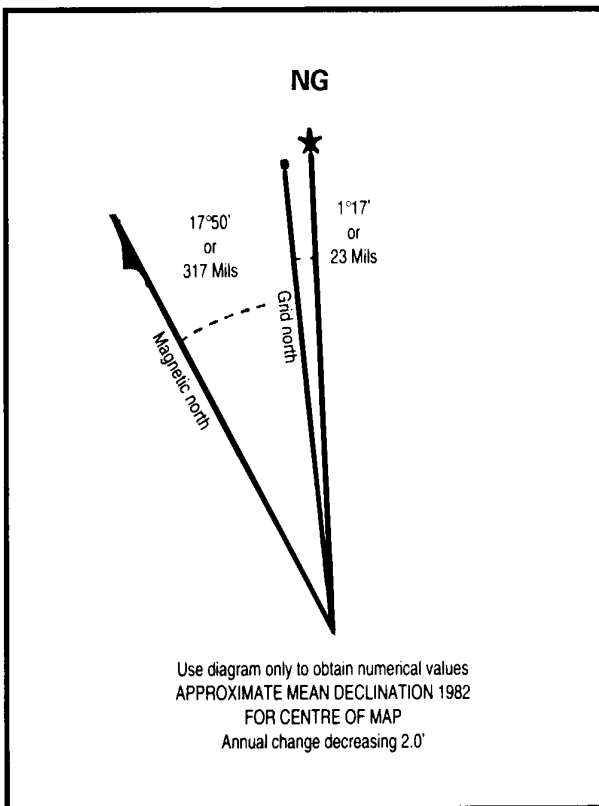
- d. **Date of Map Data.** The date of the map indicates the amount of change that may be expected to have occurred, eg, a map sheet dated 1985 will be much more reliable in showing its information than a map dated 1965. Always use the latest dated map available but do not be surprised at any change that may appear and expect considerable change in an older map.

Produced by the SURVEYS AND MAPPING BRANCH,
DEPARTMENT OF ENERGY, MINES AND RESOURCES.
Updated from aerial photographs taken in 1980. Culture check
1981. Published in 1983.

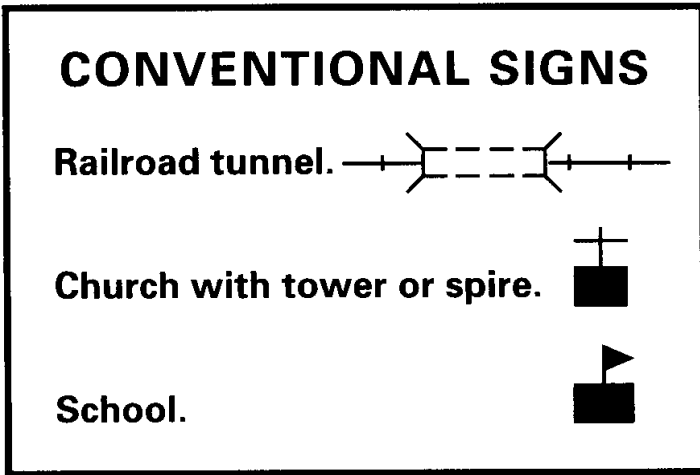
Copies may be obtained from the Canada Map Office, Department
of Energy, Mines and Resources, Ottawa, or your nearest map
dealer.

© 1983. Her Majesty the Queen in Right of Canada.
Department of Energy, Mines and Resources.

- e. **Magnetic Declination.** Magnetic north is different from true north and grid north. The difference is called magnetic declination. The amount of declination differs slightly from map to map and can change by a fixed amount each year. The amount of declination applicable to each map sheet and the amount and direction of annual change is given in the margin of each map sheet. This is required when working from map to compass with bearings or from compass to map.



- f. **Reference Plates of Conventional Signs.** The symbols used on the map to portray objects or features on the ground are called conventional signs. The conventional signs used on a particular map sheet are shown on the plates of conventional signs. If an object on the map cannot be identified, you should refer to the conventional sign plate.



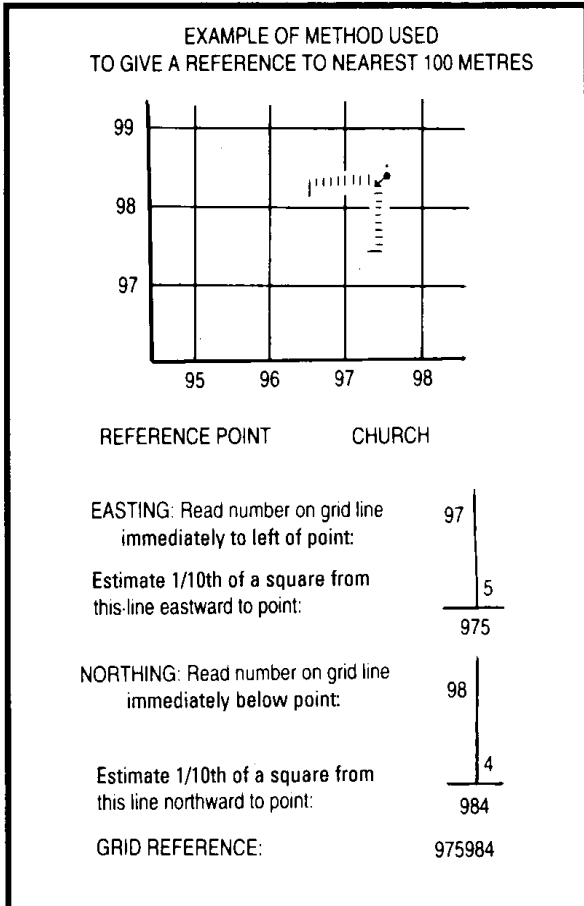
- g. **Map Scale.** Maps are printed in many scales. The most common that air cadets will use is 1:50 000 or 1:25 000. The scale is given to help avoid errors in estimating or measuring distance. It also indicates the amount of detail that will be shown. The larger the scale the more detail. The smaller the fraction the larger the scale. Scale is also shown as so many inches are equal to so many miles on the ground to permit a quick estimation or measurement of distance.

Scale 1:50 000

- h. **Index to Adjacent Map Sheets.** This identifies the map sheets adjacent to an surrounding the map sheet in use by numbers. This Information is required when a single map sheet does not cover the entire ground area used and adjacent map sheets need to be ordered.

21 M/6	21 M/7	21 M/8
21 M/3	21 M/2	21 M/1
21 L/14	21 L/15	21 L/16


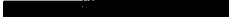





- j. **Explanation of a Grid Reference.** This is a brief description of how to give a standard military grid reference. It is used by persons who do not know how to give a grid reference and as a reminder to those who may have forgotten or are unsure. You will learn all about grid references in a later period.




CONVENTIONAL SIGNS

22. Conventional signs are the symbols used to illustrate various objects or features on the ground. Colour is used both for contrast and as an aid to identification. For example, woods are green, lakes, rivers, canals etc, are shown in blue. The illustrations that follow are not drawn to scale, nor are they shown in colour. On a map they will be much smaller than shown here. where they have been enlarged for clarity.

a. **Roads.** The following apply:

- | | |
|--|---|
| <p>(1) Paved. More than two lanes wide. Dividing lines indicate divided highway. Coloured solid red. Highway number shown frequently.</p> |  |
| <p>(2) Paved. Two lanes wide. Narrower than 22a(1). Coloured solid red. Highway number shown frequently.</p> |  |
| <p>(3) Paved. Less than two lanes wide. Coloured red and white in equal bars.</p> |  |
| <p>(4) Gravel Surface. Two or more lanes wide. Coloured red and white bars with more white than red.</p> |  |
| <p>(5) Gravel Surface. Less than two lanes wide. No colouring.</p> |  |
| <p>(6) Dirt Surface. No specified width but usually two lanes or less. No colouring.</p> |  |
| <p>(7) Cart Track. No specified width but usually one lane. Long dashes in black.</p> |  |

(8) **Foot Path or Trail.** Short dashes in black. 

b. **Railroads.** The following apply:

(1) **Single Set of Tracks.**



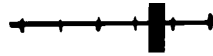
(2) **More than One Set of Tracks.**



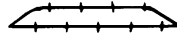
(3) **Railroad Station.** City, town, etc, with scheduled stops.



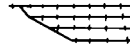
(4) **Railroad Stop.** Non-scheduled stops.



(5) **Railroad Siding.** Usually on single set of tracks.

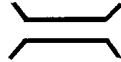


(6) **Railroad Yard.** Usually on larger scale maps.



c. **Bridges.** The following apply:

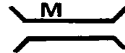
(1) **Basic Symbol.**



(2) **Iron or Steel Bridge.** Most railway bridges are steel.



(3) **Masonry (Concrete) Bridge.**



(4) **Wood Bridge.**

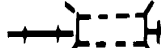


(5) **Restricted Load Limits.** In this illustration, a wood bridge with loads limited to 5 tons.



d. Tunnels. The following apply:

(1) **Railroad Tunnel.**



(2) **Road or Highway Tunnel.**

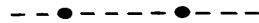


e. **Transmission Lines.** The following apply:

(1) **Telephone Telegraph Line.** or



(2) **Electrical Power Lines on Poles.**



(3) **Electrical Power Lines on Towers.**



f. **Buildings.** The following apply:

(1) **House or Isolated Building.** Black square.



(2) **Barn or Isolated Building.** Black rectangle.



(3) **Building or Buildings in a Built-up Area.** Downtown core of a city or town.



(4) **Post Office.**



(5) **Telegraph Office.**



(6) **Church, Basic Symbol.**



(7) **Church with Tower or Spire.**



(8) **School.**



(9) **Hospital.**



g. **Woods.** The following apply:

(1) **Deciduous Woods.**



(2) **Coniferous Woods.**



(3) **Mixed Woods.**



(4) **Orchard.**



h. **Heights.** The following apply:

(1) **Benchmark, Basic Symbol.**

Brass or metal markers located in a surveyed location.



(2) **Benchmark with Elevation Shown.** Height shown is height above sea level.



(3) **Spot Heights.** Usually shown at top of hill or spur.

.656

(4) **Horizontal Control Point.** The location is surveyed.



(5) **Contour Lines.** Coloured mainly in brown. Height is above sea level.



(6) **Depression Contour Lines.** Characteristics similar to contour lines, subparagraph 22h(5).



j. **Water Features.** The following apply:

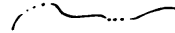
(1) **Large River.** Coloured in blue. Current flow may be indicated by arrow.



(2) **Small River or Stream.** Blue.



(3) **Intermittent River or Stream.** Coloured blue.



(4) **Icefield or Glacier.** Coloured blue and white.



(5) **Lake.** Coloured blue.



(6) **Marsh or Swampland.** Coloured blue.



(7) **Canal.** Straight lines filled in with blue.



(8) **Irrigation Ditches.**



(9) **Wharf.** Constructed parallel to shore.



(10) **Pier or Jetty.** Extend outward from the shore.



k. **Miscellaneous Symbols.** The following apply:

(1) **Tower, Radio Antenna, etc.**



(2) **Windmill or Windpump.**



(3) **Cemetery.**



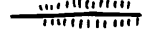
(4) **Historical Site.**



(5) **Cutting.** Shown here along a road.



(6) **Embankment.** Shown here along a railroad.



(7) **Rock Quarry.**



(8) **Sand or Gravel Pit.**



(9) **Mine.**



(10) **Reservoir.** Straight lines filled in with blue. Shape will approximate the actual reservoir.



(11) **Canal Locks.**



(12) **Dam.** Material of which dam is constructed may be shown. Name of dam may be included.



SECTION 5

PRINCIPLES OF GRID REFERENCES

23. Now that you know what can be found on a map, you need to learn how to indicate the position of a specific object. You must learn to "read" a map. A grid reference is a method used to accurately indicate a specific point on a map. The principle of all systems of grid references is the same.

24. If you look at Figure 12-2, you will notice that point "A" can be given by indicating its distance right of the line Y-Y and above the line X-X. It does not matter how far away point "A" is; if those distances are accurately given, point "A" can only be at one location.

25. Maps are printed so that north is at the top of the map sheet when the printing is the right way up. For this reason the line Y-Y runs approximately north-south and the line X-X runs approximately east-west. The position of a point can then be indicated by its distance east of Y-Y and north of X-X.

26. All military topographical maps have a system of lines running north-south and east-west parallel to Y-Y and X-X in a regular pattern that forms a network of squares called a **grid**.

27. Each of the lines running north-south or south to north are numbered consecutively from left to right using the numerals 00 to 99 and repeating across the country. For instance, the map you are using may be located in a specific area numbered from 72 to 98 on the east-west and 31 to 58 on the line north-south.

28. The sequence of letters and numbers or numbers alone that indicate a specific location is known as a grid reference. The letter-number combination is not repeated anywhere else on earth.

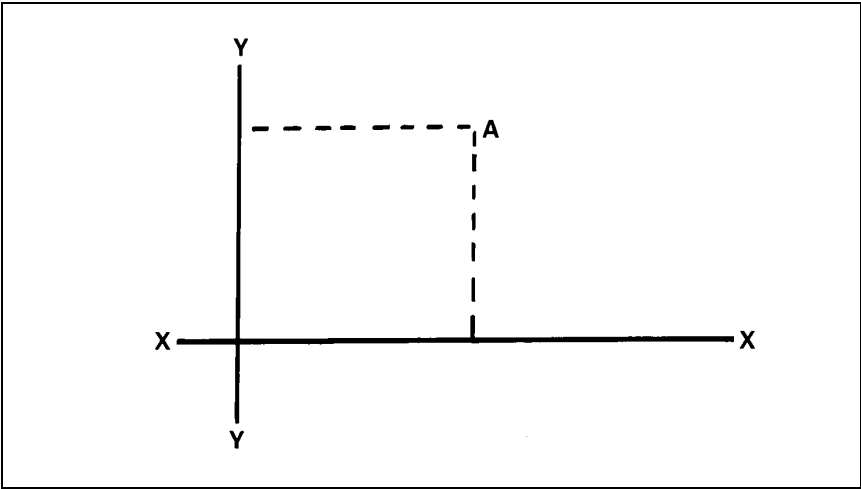


Figure 12-2 Principle of Grid References

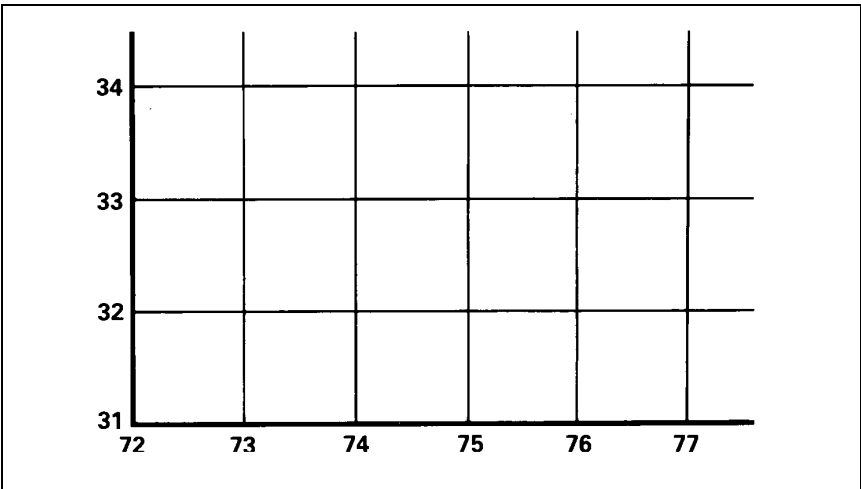


Figure 12-3 Grid System

ORDER OF WORKING A GRID REFERENCE

29. To ensure that everyone will understand the same thing by a grid reference it is necessary to use a standard system in giving and reading grid references.

30. Grid reference numbers are always an even number of digits: four, six or eight figures. The number of digits used is determined by the accuracy required. A four-figure grid reference refers to 1 000 metre square and is accurate to within 1 000 metres of the object on the ground. A six-figure grid reference refers to a 100 metre square and is accurate to within 100 metres

31. The distance to the east or easting is always the first half of the grid reference. The distance to the north or northing is always the second half of the grid reference.

FOUR-FIGURE GRID REFERENCES

32. A four-figure grid reference is used to identify the location of a main feature such as:

- a. a village that occupies most of the grid square:
- b. a road intersection or road junction where there is only one road intersection or road junction in the grid square; and
- c. any feature when there is only one of this kind in the grid square.

33. Look at Figure 12-4, at the post office that is circled and located in the grid square known as 7433. To locate this, read **left to right** until you come to easting 74; then read **from bottom upwards** until you come to northing 33. The grid square in which the post office is located is identified by the grid lines that define its west and south lines.

34. To be sure that you understand the sequence for indicating a four-figure grid reference, identify the grid squares at Figure 12-4 in which the church, the post office, the school and the cemetery are located.

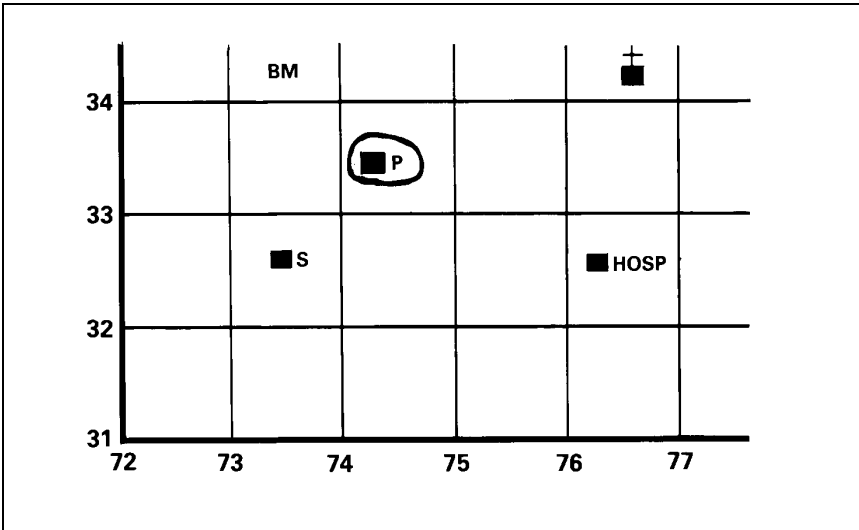


Figure 12-4 Four-Figure Grid References

SIX-FIGURE GRID REFERENCES

35. A six-figure grid reference is used when there are two or more features located in the same grid square, ie, two crossroads or two bridges, etc. We need to identify not only the grid square but the specific crossroads bridges, etc, in that grid square.

36. To do this, imagine a grid square divided into 100 smaller squares and estimate in which small square the object lies.

37. Look at Figure 12-5 which is an enlargement of grid square 7632 and contains several bridges, plus other details to illustrate the procedure.

38. The numbering of the lines forming the small squares indicates the number of 1/10ths **east** of grid line 76 and **north** of grid line 32. They will not be found on any normal topographical map but are imaginary units of measure.

39. Each of the bridges in Figure 12-5 may be referred to as bridge grid reference 7632. This does not, however, indicate any specific bridge and is not a satisfactory grid reference. If you were sent to rendezvous at bridge grid reference 7632 you would not know which bridge to choose.
40. To indicate a specific bridge, a six-figure grid reference is used.

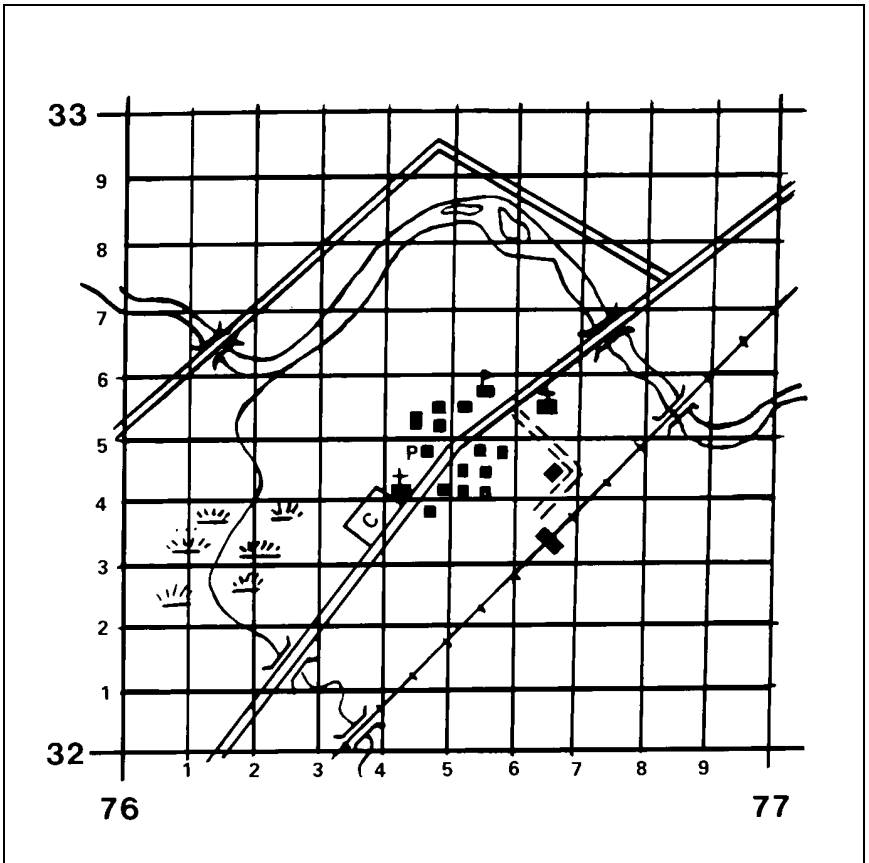


Figure 12-5 Six-Figure Grid Reference

41. For example, the bridge in the upper left of Figure 12-5 may be specifically located by referring to a small imaginary square (100 metre square) in which it is located. To arrive at this square we note that it is east of grid line 76, 1/10th of the distance to grid line 77; therefore, the easting is read as 761. The same bridge grid is located north of grid line 32, 6/10ths of the way to grid line 33; the northing is read as 326. The complete grid reference to that particular bridge is grid reference 761326.

42. Find the grid reference for the bridges in Figure 12-6.

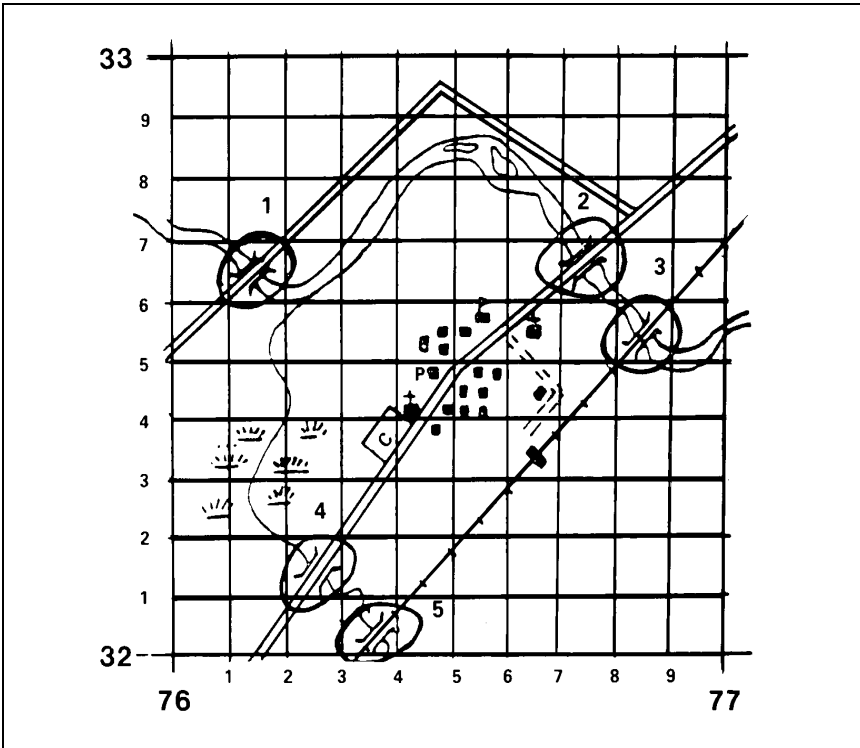


Figure 12-6 Finding a Six-Figure Grid Reference

SECTION 6

THE COMPASS AND ITS PARTS

43. The compass has many parts and just a few rules about their care and maintenance. As the compass is one of the navigational tools you will use during this course you must learn how to use it and care for it in order to arrive at your destination. Refer to Figure 12-7 for the parts of the compass.

- a. **The sight** is used to take a bearing off a distant object.
- b. **The sighting mirror** is used in conjunction with the sight in order to read the bearing.
- c. **The sighting line** is used to help take a bearing.
- d. **The declination adjusting screw** is used to apply the local declination to the compass.
- e. **The luminous orienting points** are used to line up the orienting arrow and the magnetic needle at night.
- f. **The orienting arrow** is used to line up the orienting arrow and the magnetic needle during daylight hours.
- g. **The safety cord** is used to secure the compass around your neck or wrist.
- h. **The adjustable wrist lock** is used to shorten the cord to fit snugly around your wrist.
- j. **The screwdriver** is used to turn the declination adjusting screw.
- k. **The luminous points** are used to read off the back bearing at night and to help line up other parts of the compass when taking a bearing at night.

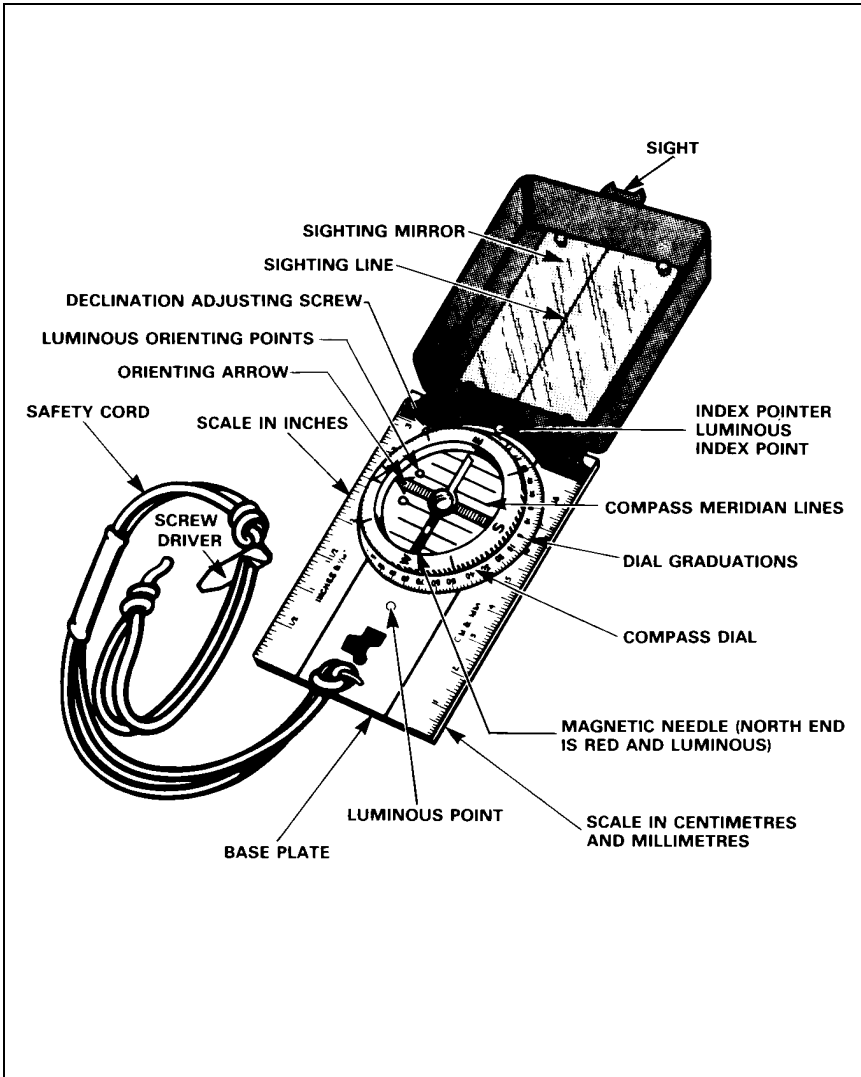


Figure 12-7 Parts of a Compass

- m. **The magnetic needle** is used to indicate north.
- n. **The compass dial or housing** is used to help determine the bearing.
- p. **The dial graduations** are used to give a quantitative reading as to direction in mils or degrees.
- q. **The compass meridian lines** are used to line up the compass with the meridian lines on the map.
- r. **The luminous index pointer** is used to read off the forward direction.

SECTION 7

POINTS OF THE COMPASS

44. Before we take a look at the compass itself, we must learn what makes the compass work and why it is able to help us navigate across the country.
45. As we learned in Chapter 10. Navigation, the Earth is considered an enormous magnet. Magnetic north is different from geographical north and the needle of all compasses in the world will point toward magnetic north.
46. Unlike aeronautical navigation where you measure direction with the compass rose (360 degrees), the compass has four cardinal points and many intermediate points. The pattern for creating the intermediate points is quite simple. The four main directions; north, east, south and west are bisected and combined to create an intermediate point such as north-east. North-east is half way between north and east. Similarly, south-east is half way between east and south. South-west is half way between west and south.

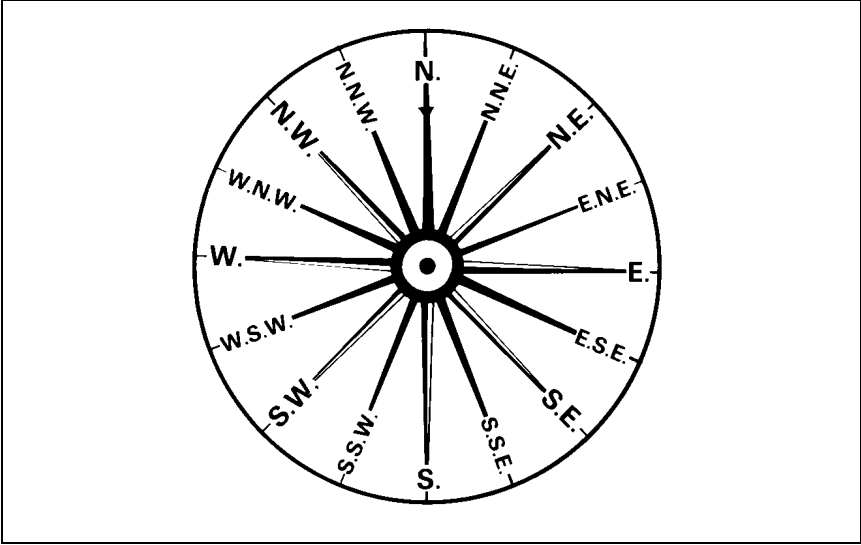


Figure 12-8 Points of the Compass

47. Each of these points is again bisected and named in relation to the intermediate points just described. NNE is north of north-east, ENE is east of north-east, ESE is east of south-east and SSE is south of south-east, etc.

SECTION 8

TAKE A COMPASS BEARING

48. When you travel in town on the public transport system for your city you might take, for example, the number 105 bus to get to school, the number 24 bus to get to the gym and the number 96 bus to get home again. The different numbers on each bus indicate a different route to travel. A compass uses a system of bearings similar to the bus routes of your city public transportation. The difference between the two systems, is that the compass bearings are universal and mathematically accurate. Each compass bearing is a route to travel.

49. The bearings are measured in two different ways. The system with which everyone is most familiar is the system of degrees. There are 360 degrees in a complete circle. That means that half a circle is 180 degrees and a quarter of a circle is equal to 90 degrees. A compass bearing of 90 degrees is the same as saying the compass bearing is due east.

50. The army needs a more exact system of bearings, however so they use a system called mils. Instead of 360 degrees in a circle, there are 6 400 mils in a circle. With more than 17 times the number of divisions, it is much more accurate. So, a compass bearing of due south is equal to 3 200 mils and a compass bearing of due east is equal to 1600 mils.

51. Before you can take a bearing or follow a bearing you need to take into account the declination. Take the screwdriver that is attached to the safety cord and put into the declination adjusting screw that can be found on the top or the bottom of the compass housing.

52. Now you are ready to take a bearing. Open the cover of the compass about 50 to 70 degrees, as shown in Figure 12-9.

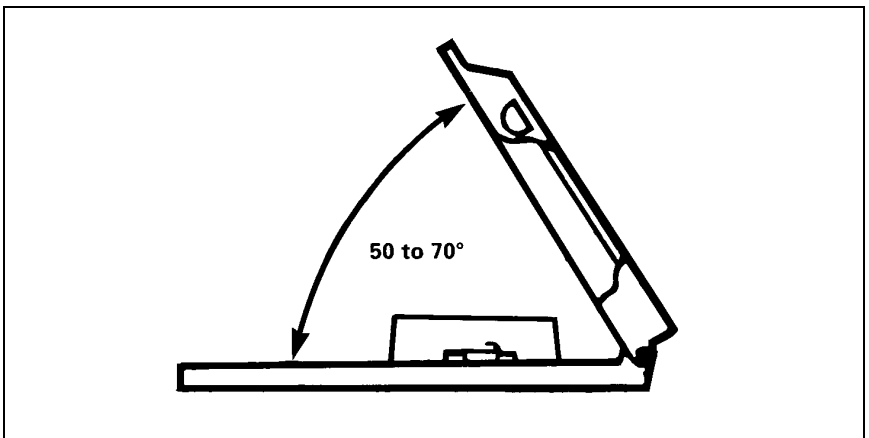


Figure 12-9 Compass

53. Place the safety cord around your neck and hold the compass in the palm of your hand. Raise the compass to eye level while keeping the safety cord tight. This will help to steady your hand and compass plus maintain the correct distance from your eye to the compass.

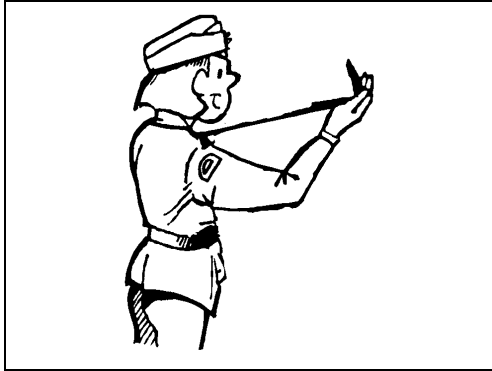


Figure 12-10 Holding the Compass

54. Turn your body until the object comes into the sight (1). The compass sighting line must be level and aimed at the object. This can be seen from the sighting line in the mirror (2) as it must go through the centre of the luminous points (5), the luminous index pointer (3) and through the centre of the housing (4).

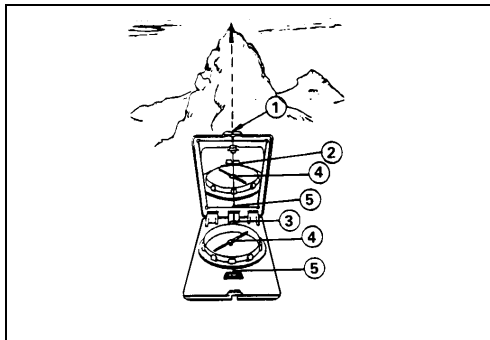


Figure 12-11 Taking a Compass Bearing

55. Next, turn the compass dial until the magnetic needle (red end) is inside the orienting arrow. Remember to keep the sight and your destination lined up at the same time.

56. Once you are satisfied that all this is done, open the cover and look at the reading next to the luminous index pointer. This reading is the compass bearing from where you are standing to the object you were looking at in the sight. You have just taken your first compass bearing!

57. What if your instructor asks you to follow a bearing of 3 200 mils (due south)? Turn the compass housing until 32 appears opposite the luminous index pointer (32 is short for 3 200). Open the cover, put the safety cord around your neck and hold the compass up to eye level. Turn your body until the magnetic needle (red end) is lined up with the orienting arrow. Then look through the sight to find an object ahead of you. This object is due south (3 200 mils) of your position. All you have to do now is to put away the compass and hike toward the object you chose!

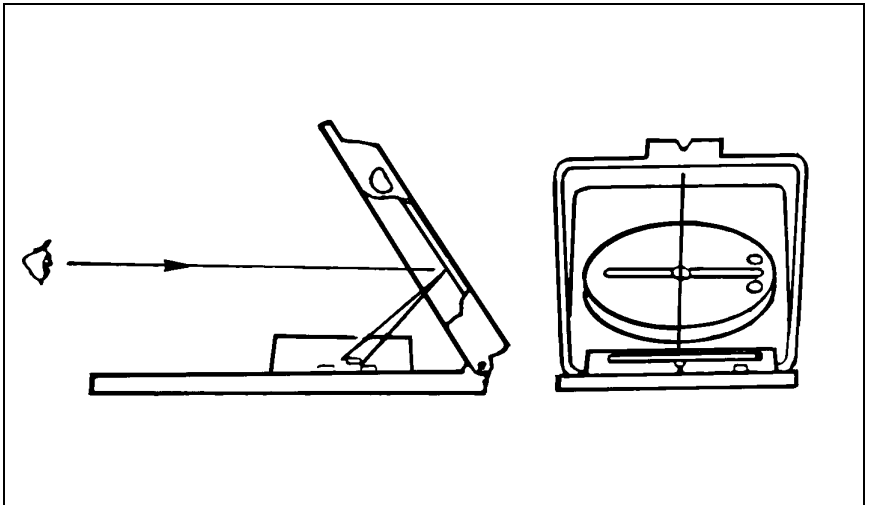


Figure 12-12 Compass Bearing

SECTION 9

SEARCH TECHNIQUES – LAND

58. Air cadet squadrons often participate in exercises and training in rugged and wooded terrain that could lead to an inexperienced or inadequately supervised cadet becoming separated from the party possibly injured or temporarily lost. An item of equipment such as a compass or a sleeping bag, may be lost or misplaced.

59. Individual cadets, as citizens of Canada, may belong to agencies that provide search parties to assist police or as individuals, may volunteer assistance. This is an excellent example of good citizenship.

60. In theory, ground searching appears simple and straightforward. In practice, however, members of a ground search party soon find that it is a demanding and monotonous task.

61. To carry out an effective search, a leader should not try to control more than 10 or 12 cadets in one search party. The method used will depend on terrain, the number of personnel available, and the object/person being sought. The methods described in the following paragraphs are those most commonly used but they may be modified to suit local conditions.

TYPES OF SEARCHES

62. Normally there are only four types of ground search. They include the following:

- a. **Track Crawl.** This type of search may be carried out by one or more cadets who will search along a trail or a given track.
- b. **Parallel Sweep.** This type of sweep (Figure 12-13) employs a group of cadets, who are spread out in a particular formation at specified distances apart, for one sweep of an area.

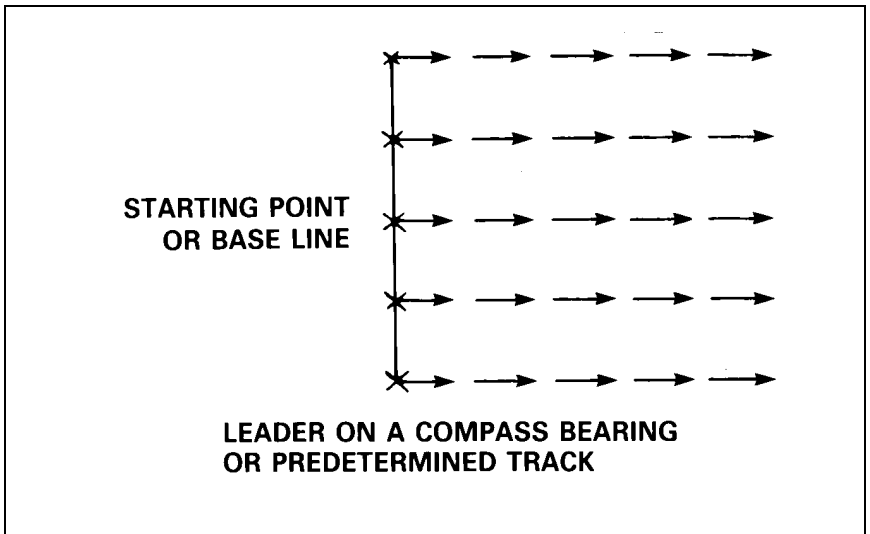


Figure 12-13 Parallel Sweep

- c. **Creeping Line Ahead.** This type of search is the most commonly used and is the same as the parallel sweep type except that the searchers continue in formation until a specified area is thoroughly searched (Figure 12-14).
- d. **Contour Search.** This type of search is used to search steep slopes that cannot be covered by travelling in a straight line. One cadet or more may be employed to search around the slope maintaining the same altitude until the sweep is completed. Each successive sweep will be at the next lower unsearched altitude. Contour searches usually start from the top and descend in progressive sweeps until the search area is covered (Figure 12-15).

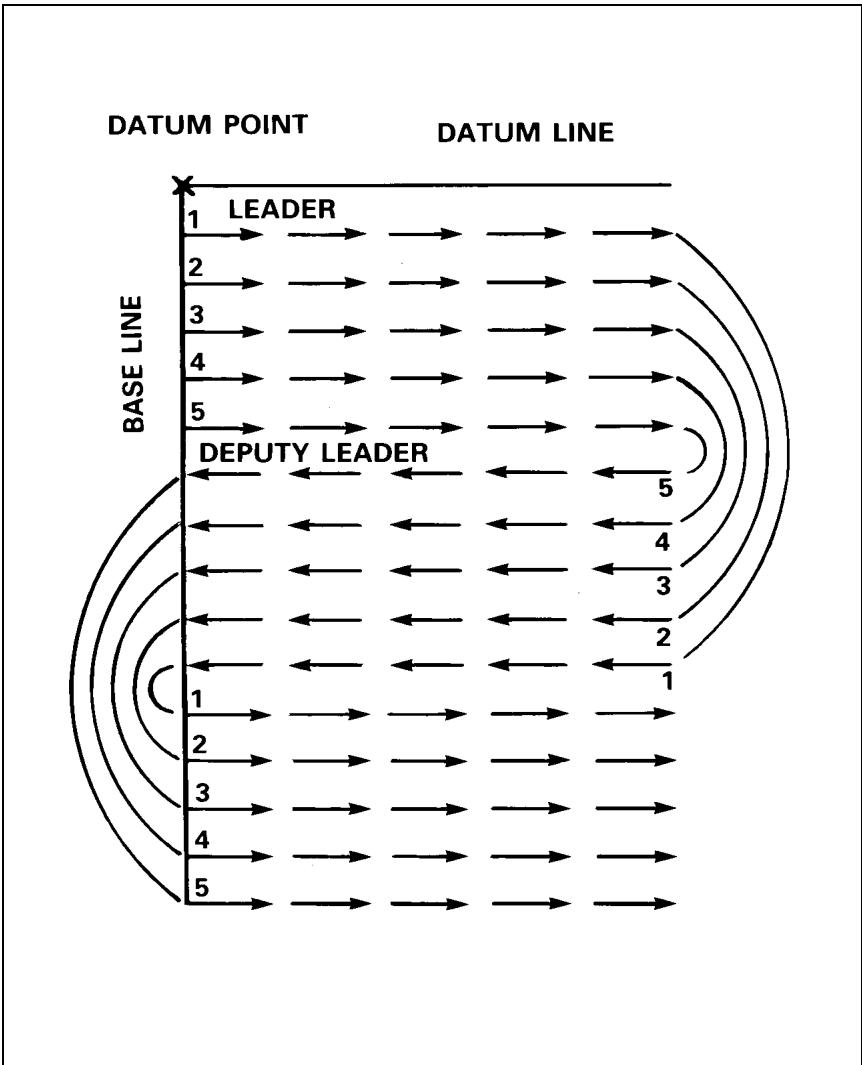


Figure 12-14 Creeping Line Ahead

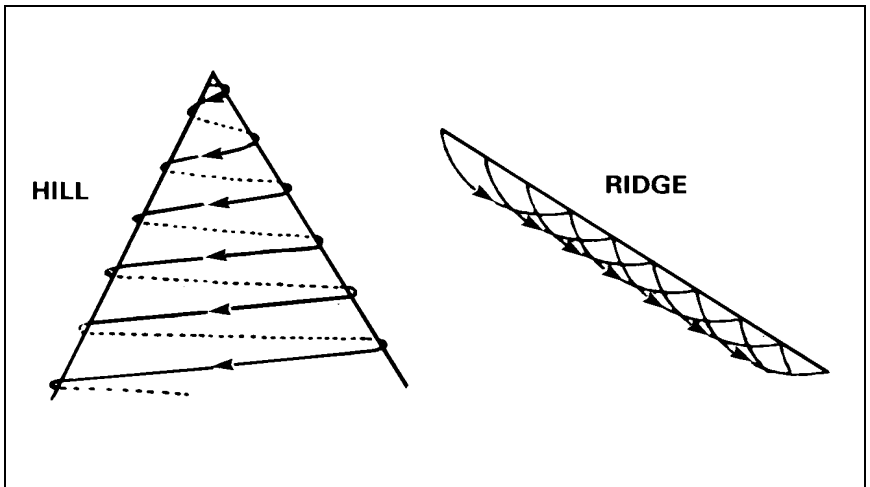


Figure 12-15 Contour Search

FORMATIONS

63. Any search employing more than one cadet will require that a particular formation be used. The most commonly used formations include the following:

- a. **Line Abreast.** The cadets are lined up in a straight line with the leader on the left or right. The searchers will advance in a straight line at all times and will take dressing from the cadet on their left or right, depending on the instructions given by the leader. This is the formation best suited for any type of search where the leader and the search party are experienced and the party is composed of 12 cadets or less.
- b. **V-Formation.** This formation may be used when the search party is large (over 12 cadets) and inexperienced. The leader will be positioned in the centre of the searchers and position the party members on the left and right in an inverted V-formation. In this formation an experienced leader can control a large search party composed of inexperienced cadets more effectively.

- c. **Sloping Line.** This formation may be used with any type of search but it is not recommended unless the leader is experienced and the search party is small and inexperienced. In this formation, the leader will be positioned on either the left or right flank and the searchers will be lined up in a sloping line behind the leader. Members of the search party will be instructed to take their dressing from the cadet ahead.

64. Obviously an area cannot be searched efficiently if the searchers are spaced with some close together and others far apart. In order to keep the party moving together in a line abreast formation, the leader must give explicit instructions regarding dressing, spacing and signals.

SOUND SIGNALS

65. Sound signals are used on all ground searches. Usually a whistle is employed using the suggested whistle signals to control the movement of a search party. Suggested signals include the following:

- a. One whistle blast – all party members stop;
- b. Two whistle blasts – all party members go; and
- c. Three whistle blasts – party members number.

66. Voice control is used to a lesser degree, as words may not be understood when the party is large and/or when spacing between search party members is wide. Voice control is adequate for small parties such as those employed on a track crawl.

SEARCH HINTS

67. The control of a search party is difficult to maintain at the best of times, therefore, it is advantageous to have the most experienced personnel on the flanks and strategically positioned in the formation.

68. A search party must proceed at the speed of the slowest member as it is essential that correct dressing and spacing is maintained at all times, otherwise, control is difficult and full search coverage is not likely.

69. All members of a search party should be briefed to watch for special signs that may be common to the object of the search and what action to take upon this object.

