



WORKBOOK RESOURCE BOOK 2007

BTEC First Diploma in Public Services

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Make Your Future Count



BTEC FIRST DIPLOMA IN PUBLIC SERVICES

Workbook Resource Book Outline to Cadets

1. Most of your work for the award is achieved through your Cadet syllabus. In addition you need to pass a project to complete Unit 1 and correctly answer questions contained in the **CVQO BTEC First Diploma in Public Services Cadet Workbook** which you will be given.
2. This Resource Book is for use when completing the Workbook. There is a separate Resource Book for the Unit 1 Project.
3. The Workbook and this Resource Book are divided into the different Units to help you find the correct answers.
4. The Grading Criteria which you must achieve to gain a Pass, Merit or Distinction can be found at the start of each Unit.
5. Once you have completed and signed off the Workbook, your unit will send it to the Cadet Vocational Qualification Organisation (CVQO) for marking. The grades will then be sent back to you via your Unit HQ.

Appeals Procedure

1. You have the right to appeal if you are dissatisfied with your grades.
2. You should put your case in writing to your Unit VQ Officer, who will submit it to CVQO for adjudication by the Director.
3. Your unit will be notified in writing of the result of your appeal.

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YOU MUST COMPLETE THE UNIT 1 PROJECT AND THESE TWO CORE UNITS TO ACHIEVE THE AWARD.

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YOU ALSO HAVE TO COMPLETE THREE OF THE FOUR SPECIALIST UNITS TO ACHIEVE THE AWARD.

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Unit 2 Public Service Skills

The criteria you must meet to achieve a Pass, Merit or Distinction Grade are laid down below.

To achieve a **Merit** you must also complete all the **Pass** criteria.

To achieve a **Distinction** you must also achieve all the **Pass** and **Merit** criteria.

GRADING CRITERIA - PASS

To achieve a PASS grade the evidence must show that you are able to:	You show this by doing the following:
P1 Describe the purpose and importance of teamwork using examples from at least two contrasting public services.	✓ Answer correctly the Workbook Unit 2 Pass level questions. ✓ Pass a Methods of Instruction Course. or ✓ Pass a Leadership Course.
P2 Participate in different team-building activities.	
P3 Describe the effectiveness of various methods of interpersonal communication skills.	
P4 Demonstrate use of interpersonal skills to communicate with personnel in given situations.	
P5 Describe the qualities of a good instructor and how they are used.	



UNIT 2 - Grading Criteria

GRADING CRITERIA - MERIT

To achieve a MERIT grade the evidence must show that you are able to:	You show this by doing the following:
M1 Explain the importance of teamwork in at least two contrasting public services.	✓ Answer correctly the Workbook Unit 2 Pass and Merit level questions. ✓ Achieve an above average grade on your Methods of Instruction Course or Leadership Course.
M2 Analyse the application of interpersonal communication skills in a chosen public service.	
M3 Demonstrate effective instruction skills.	

GRADING CRITERIA - DISTINCTION

To achieve a DISTINCTION grade the evidence must show that you are able to:	You show this by doing the following:
D1 Analyse the importance of teamwork in a specific public service.	✓ Achieve a top grade on your Senior Cadet Instructors' Course, Master Cadet Course, SCC PO Cdt Adv Course, SCC EL3, SCC Marine Cdt Sgt Course, SCC BTEC Outdoor Skills Course, ATC Junior Leaders Course. ✓ Answer correctly the Workbook Unit 2 Pass, Merit and Distinction level questions.
D2 Evaluate the effective use of interpersonal and communication skills in a given public service	

You have to pass **both** the workbook question **and** pass an instructors' course to gain an overall **Pass** in this unit.

To gain a **Merit** you also have to achieve a **merit grade** on the workbook question **and** get an **above average** grade in an **instructors' course**. To gain a **Distinction** you have to get a **distinction grade** on the workbook question **and** gain a **top grade** on your **instructors' course**.

If you complete more than one instructors' course we will take the best result submitted to us.

You must list a number of teamwork qualities to pass the workbook questions. Think what qualities you consider are necessary for a team in the Services to be able to work together efficiently and to also carry out their job. The list below may help you identify four qualities:

- | | | |
|--------------------------|-------------------------|-----------------------|
| • SELF DISCIPLINE | • COMMITMENT | • TRUST |
| • DISCIPLINE | • COMMUNICATIONS | • CO-OPERATION |
| • LEADERSHIP | • LOYALTY | • IDENTITY |

Self Discipline

An individual within a team must be able to put the team's requirements before their own. The individual must have the determination to ensure that the basic skills that have been learnt are not forgotten as otherwise the team will suffer.

Discipline

Discipline is important for both the team and the individuals in the team. It has to be understood by all. The discipline that is taught will help both the individual and team come through difficult periods.

Leadership

A team cannot function without leadership. An individual has to command the team as otherwise mistakes may be made and lives may be lost as the team will lack direction.

Commitment

Each individual in the team must be fully committed to the best interests of the whole team as otherwise the team cannot function correctly. If one individual is not fully committed it could create serious difficulties and even loss of life on operations.

Communications

A team cannot function without communication. Essentially everyone needs to know what is happening. Communication is vital down to the individual, from the individual, between individuals and from the team to a higher level.

Loyalty

The leader of the team must be loyal to the individuals in a team. The leader must be able to support and protect them in a fair manner. Individuals must be loyal to each other and the leader.

Trust

Each individual must trust the ability and integrity of each other and importantly trust the views of the leader even when this may conflict with their own.

Co-operation

Different teams will often have to work together and this applies to individuals within a team. A lack of co-operation will lose the efficiency of a team or teams.

Identity

Each individual must identify with the team and understand all aspects of the team. This identity improves the performance of the team.

To get a **Merit** or **Distinction** you need to say why you think teamwork is important to two public services. To get a **Distinction** you have to evaluate the importance of teamwork skills within your chosen Service.

Unit 3

Uniformed Public Service Fitness

The criteria you must meet to achieve a Pass, Merit or Distinction Grade are laid down below.

To achieve a **Merit** you must also complete all the **Pass** criteria.

To achieve a **Distinction** you must also achieve all the **Pass** and **Merit** criteria.

GRADING CRITERIA - PASS

To achieve a PASS grade the evidence must show that you are able to:	You show this by doing the following:
P1 Produce an annotated diagram describing the major body systems associated with health and fitness.	<p>✓ Pass a cadet fitness proficiency test or the CVQO fitness test or DofE Physical Recreation Section</p> <p>✓ Answer correctly the Workbook Unit 3 Pass level questions.</p>
P2 Describe the purpose and function of each food group	
P3 Explain the components of fitness relating them to a public service fitness test.	
P4 Undertake a fitness test used by one of the public services.	
P5 Describe the factors of health and safety which could affect your own training programme.	
P6 Plan and undertake a training programme to improve your own performance in a public service fitness test.	

GRADING CRITERIA - MERIT

To achieve a MERIT grade the evidence must show that you are able to:	You show this by doing the following:
M1 Explain the short and long-term effects of exercise on the major body systems.	<ul style="list-style-type: none"> ✓ Pass a cadet fitness proficiency test or the CVQO fitness test or DofE Physical Recreation Section ✓ Answer correctly the Workbook Unit 3 Pass and Merit level questions.
M2 Explain the important of good nutrition to health.	
M3 Analyse your own performance in the public fitness test you undertook.	
M4 Explain the methods used when planning a fitness training programme.	

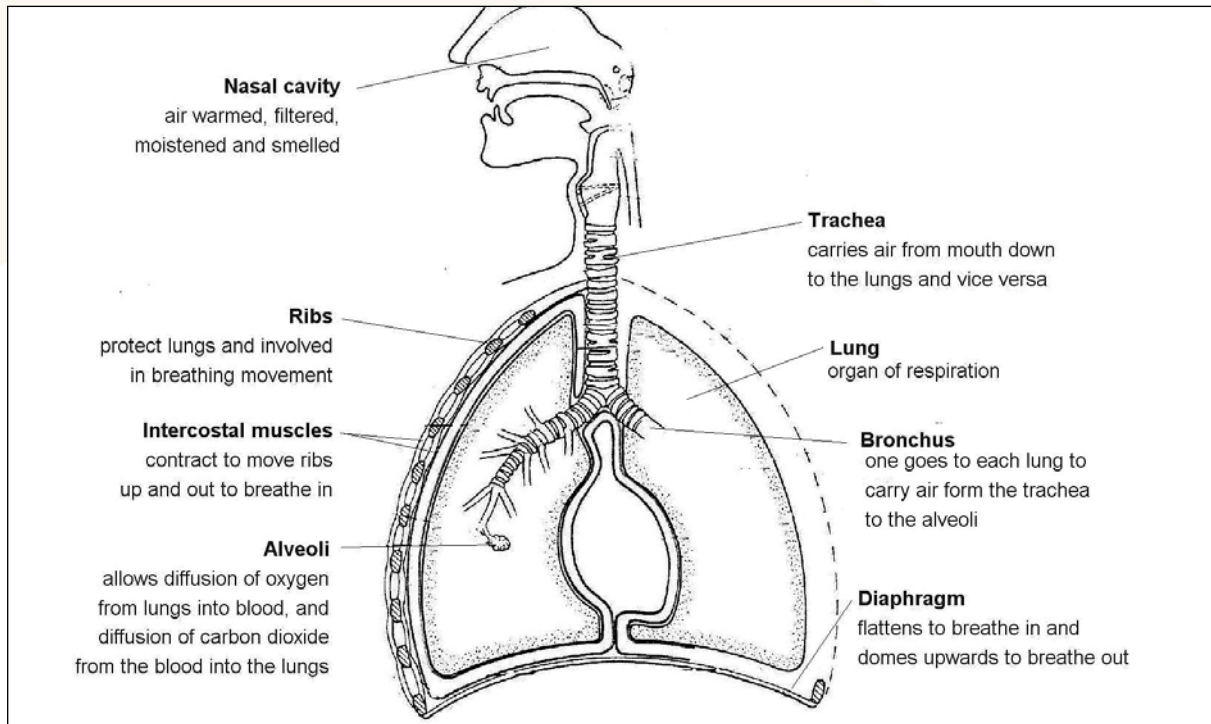
GRADING CRITERIA - DISTINCTION

To achieve a DISTINCTION grade the evidence must show that you are able to:	You show this by doing the following:
D1 Recommend improvements to your own performance in a specific public service fitness test.	<ul style="list-style-type: none"> ✓ Answer correctly the Workbook Unit 3 Pass, Merit and Distinction level questions.
D2 Evaluate own performance on completion of the training programme.	

UNIT 3 - The Major Body Systems

Our '**anatomy**' is the structure of our body. Our '**physiology**' is the functions of our body.

The Respiratory System

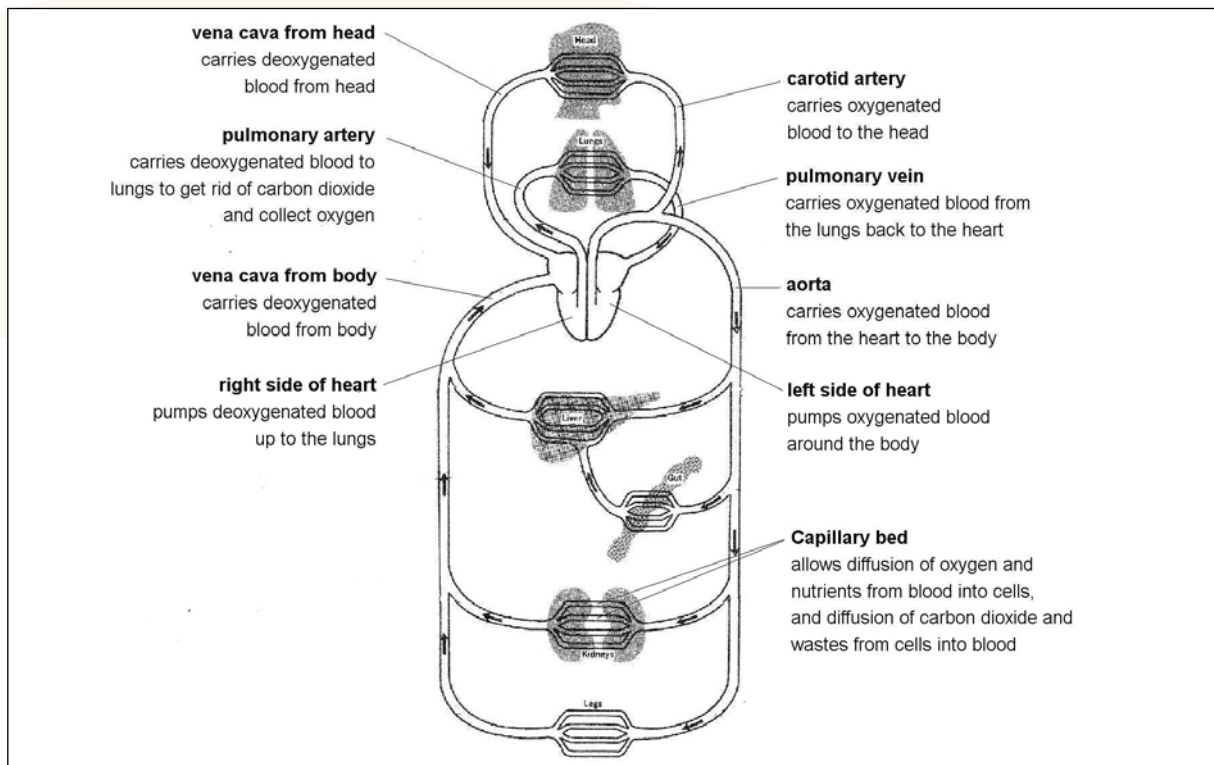


Breathing is the process by which air moves into and out of the lungs. The process involves the ribs and the diaphragm (a muscular sheet lying under the lungs). From the lungs oxygen diffuses into the blood ready to be used by the cells of the body for respiration. Carbon dioxide, the waste gas of respiration, diffuses from the blood into the lungs.

The air passes into our nose or mouth, down the trachea (windpipe). It then passes down the two bronchi (singular - bronchus), which divide into the smaller bronchioles, ending in the alveoli (the air sacs). The alveoli are where the gaseous exchange takes place between the lungs and blood capillaries.

Respiration is the chemical process by which energy is released from food. Aerobic respiration requires oxygen and releases the most energy. Anaerobic respiration occurs without oxygen and releases much less energy. During strenuous exercise, the muscles require more oxygen than can be breathed in. In these situations the muscle cells carry out anaerobic respiration. Lactic acid, a mild poison, builds up in the muscles and causes muscle fatigue. Once the exercise has finished the person still needs to carry on breathing more quickly and deeply than normal, to repay the oxygen debt. The oxygen breathed in after exercise is then used to break down the lactic acid to harmless substances.

The Cardiovascular System



The circulatory system is made up of the heart and blood vessels. These are involved in the transport of blood around the body. The blood is made up of two parts - the plasma and the blood cells. The plasma is 90% water and 10% dissolved substances. The blood cells include the red blood cells (for carrying oxygen around the body), the white blood cells (to fight infection) and the platelets (fragments of cells involved in blood clotting). Oxygen, food, wastes (e.g. carbon dioxide and urea), hormones and heat are transported by the blood all around the body.

There are three types of blood vessels - arteries, veins and capillaries. Arteries carry blood, usually oxygenated, away from the heart. Veins carry blood, usually deoxygenated, back to the heart. Capillaries connect arteries and veins - they have walls only one cell thick and allow the exchange of materials between the blood and the cells.

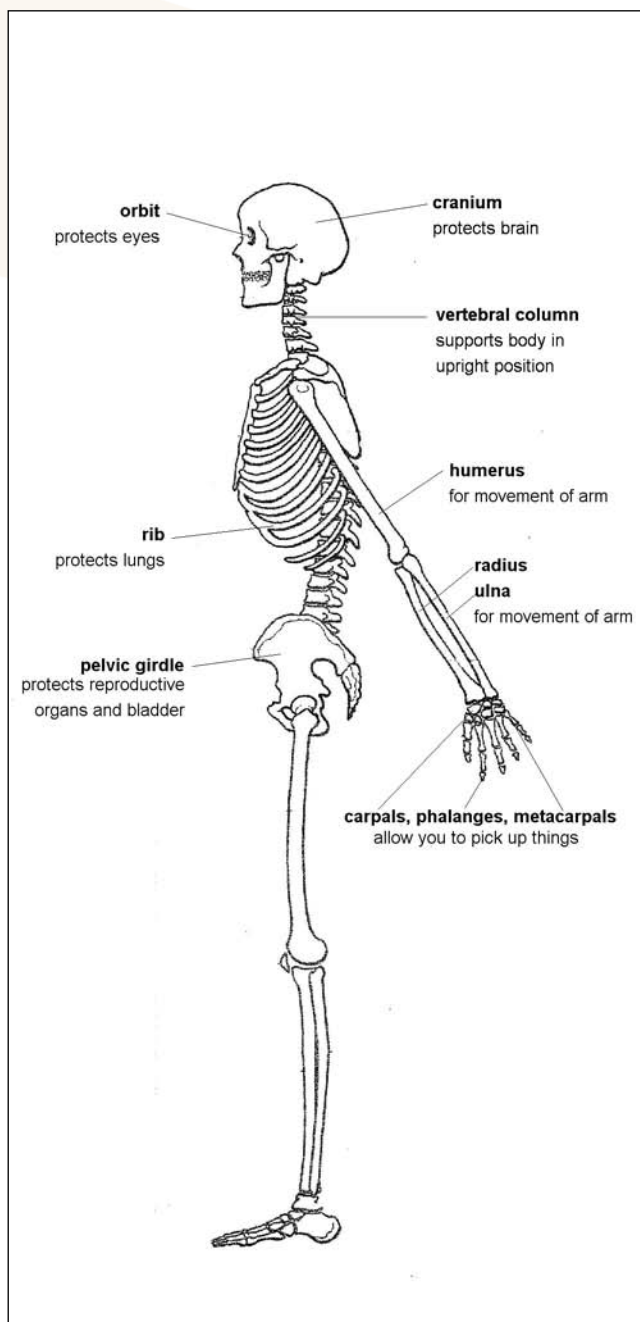
The heart is a muscular pump, found between the lungs, divided into two halves. The left side pumps oxygenated blood around the body. The right hand side pumps deoxygenated blood to the lungs to remove carbon dioxide and collect oxygen. Each side is then divided into two chambers - the atrium and ventricle. The atria are the thin-walled chambers that collect the blood entering the heart. The ventricles are the thick muscular walled chambers that pump the blood out of the heart through the arteries. The left ventricle is thicker than the right as it has to pump blood all the way around the body, not just to the lungs.

The Muscular-Skeletal System

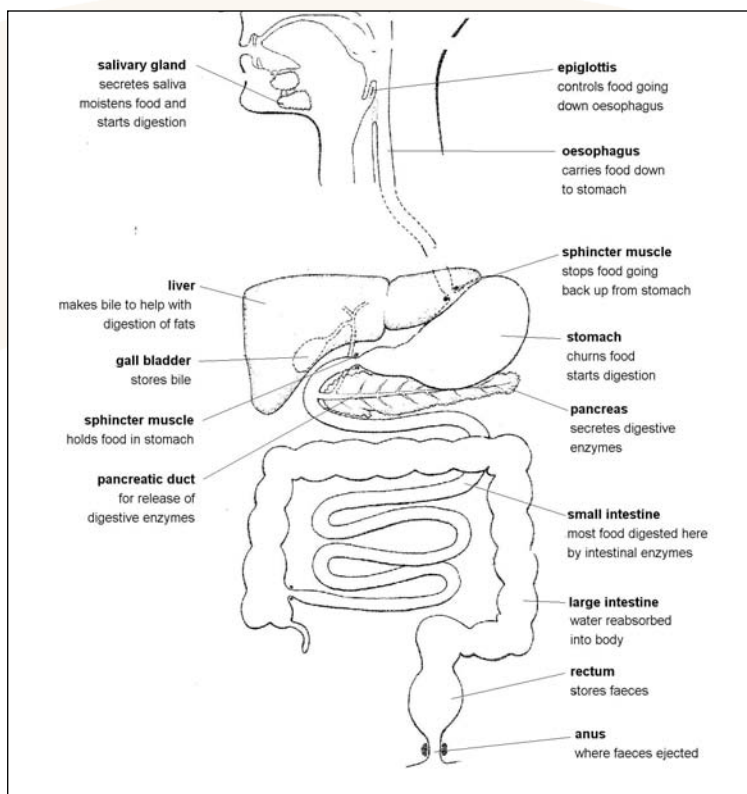
This is involved in movement. The skeleton supports the body and the muscles attached to the skeleton bring about movement. Joints are where bones are linked together. There are two main types - fixed and moveable. The fixed joints have interlocking edges of bones, e.g. the skull. The moveable joints are where bones move against each other. Ball and socket joints allow movement forwards, backwards and sideways, e.g. the shoulder and hip joints. The hinge joints allow movement in one plane only, e.g. the elbow and knee.

The hinge joint is made up of various tissues. The cartilage is a smooth, rubbery protein that reduces friction between the bones as they move. The synovial fluid acts as a lubricant to reduce friction further. The synovial capsule is a tough capsule enclosing the joint which secretes the synovial fluid. The ligaments are elastic fibres holding bones to bones. The tendons are inelastic fibres attaching muscles to bones.

Muscles tend to work in antagonistic pairs - when one contracts the other relaxes. The biceps muscle contracts to bend the arm at the elbow, at the same time the triceps relaxes. To straighten the arm the triceps contracts and the biceps relaxes.



The Digestive System



The digestive system breaks down large, insoluble food molecules into smaller, soluble ones. Food is digested in two ways:

- 1. Mechanical digestion** - teeth chewing and churning by the muscles of the stomach, break food molecules into smaller pieces, increasing the surface area for enzymes to work on.
- 2. Chemical digestion** - digestive enzymes break down large food molecules into small, soluble ones.

The digestive enzymes are secreted by the cells and organs of the digestive system.

There are **three** main types:

Enzyme	What it breaks down	Product of digestion by this enzyme
Proteases	Proteins	Amino acids
Lipases	Fats	Fatty acids and glycerol
Carbohydrases	Carbohydrates	Simple sugars

The small, soluble food molecules resulting from digestion are absorbed into the blood through the wall of the small intestine. The small intestine is specially adapted for absorption of these nutrients:

- It has thousands of villi (singular - villus). These are finger-like projections which increase the surface area of the cavity wall of the small intestine, increasing the rate of absorption.
- There is a good blood supply to carry the nutrients away to be used by the body.
- The walls of the villi are only one cell thick, meaning absorption can easily occur across it.

The nutrients are carried by the blood to the liver. Some of these are then used to build larger molecules - this is known as assimilation. Water is absorbed into the blood in the large intestine. Any waste food that has not been absorbed in the small intestine is egested (removed) from the body, through the anus.

Effects of Fitness Training On The Body

Short Term

Cardio-Vascular System

- Increase in heart rate as the body exercises, to pump more blood to respiring cells.
- Shunting of blood from less important organs for exercise, such as digestive system, to more important areas, such as the muscles, so more important areas receive enough oxygen and nutrients.

Respiratory System

- Increase in rate of breathing to supply more oxygen to respiring cells.
- Deeper breaths to supply more oxygen to respiring cells.

Muscular-Skeletal system

- Increase of blood flow to the muscles to supply required nutrients and oxygen.
- Greater oxygen demand by muscles, due to greater need for energy.

Long Term

Cardio-Vascular System

- Increases the size of the heart due to having to work harder during training
- Resting heart rate decreases due to more blood being pumped per beat, due to larger heart
- Increase in blood supply to muscles, to meet the increase in demand for oxygen and nutrients
- Number of red blood cells increases to carry more oxygen around the body
- Decrease in Blood Pressure due to increase in number and elasticity of blood vessels
- Stronger Heart due to build up of heart muscle
- Decrease in risk of Heart Disease due to: (i) increased strength of heart muscle, (ii) lowered risk furring of arteries from fatty deposits and (iii) reduced risk of blood clots

Respiratory System

- More efficient respiratory system (more air taken in per breath) due to larger lung capacity and strengthened breathing muscles.
- Steady rate of oxygen uptake during exercise is reached more quickly due to more efficient respiratory, muscular and cardio-vascular system

UNIT 3 - The Major Body Systems

Muscular-Skeletal system

- Larger muscles and possibly stronger bones, due to overload from training
- More glycogen and oxygen stored in muscles therefore fatigue less likely
- More enzymes in muscles so improved energy production
- Greater flexibility due to increased movement in exercise
- Reduced risk of osteoporosis in females
- Strengthened ligaments and tendons due to overload from training

Overall

- Decrease in weight due to greater expenditure of energy
- Improved immune system
- Better usage of fat stores
- Improved balance and co-ordination
- Psychological benefits - makes you “feel good”
- Social benefits - exercise is often carried out with other people, so builds up relationships.
- Psychological benefits - makes you “feel good”.
- Social benefits - exercise is often carried out with other people, so builds up relationships.

The Different Types of Nutrients

Name of Nutrient	Functions	Examples of Foods
Simple Carbohydrate	<p>These are easy to digest.</p> <ul style="list-style-type: none"> • Provide a fast source of energy. • Glucose not used is stored as glycogen in our liver and muscles (an easily accessible energy store). • Excess glucose is stored as fat. 	Instant puddings, fruit, sweets, chocolate, cornflakes
Complex Carbohydrate	<p>These take longer to digest than simple carbohydrates.</p> <ul style="list-style-type: none"> • Provide a more sustained source of energy than simple carbohydrates. • Glucose not used is stored as glycogen in our liver and muscles (an easily accessible energy store). • Excess glucose is stored as fat. 	White Bread, granary bread, brown pasta, wholegrain cereal, beans
Fat	<ul style="list-style-type: none"> • A concentrated source of food energy, so good for storage (it contains twice as much energy per g than protein and carbohydrate). However, unlike carbohydrates, does not supply immediate energy. • Surrounds and protects vital body organs (e.g. kidneys). • Insulates the body. • Provides the fat soluble vitamins (A, D, E and K). 	Dairy foods, meat, oily fish, eggs, nuts, avocados
Protein	<ul style="list-style-type: none"> • Growth, repair and maintenance of the body. • Production of hormones and enzymes (including digestive). • Needed for structural components of muscle. • Help produce antibodies to fight infection. • Can be used for energy, but tends to be used after carbohydrate and fat reserves have run out. 	Meat, fish, beans, pulses, tofu, 'Quorn', eggs, nuts
Minerals	<ul style="list-style-type: none"> • Needed for growth. • Involved in the control of body processes (e.g. action of the nerves). • Essential parts of body fluids. 	Dairy, vegetables, cereals, meat, eggs, fish
Vitamins	<ul style="list-style-type: none"> • Only required in small amounts, but most cannot be made by the body so they have to be consumed. • Regulate the maintenance and growth of the body. • Involved in control of chemical reactions in cells. 	Fruit, vegetables and dairy
Water	<ul style="list-style-type: none"> • Temperature regulation. • Body fluids and chemical reactions in the body. • Transport of nutrients around the body. • Lubrication of joints. • Maintains blood volume. • Needed for excretion of wastes. 	Fruit, milk, vegetables
Fibre	<ul style="list-style-type: none"> • Insoluble fibre - maintains a healthy digestive system. • Soluble fibre - slows digestion, absorbs carbohydrates and helps control blood sugar levels. 	Fruit, vegetables, bran

The Impact of Poor Nutrition

If you do not follow the guide lines for a balanced diet and continually eat a poor diet then you are likely to have problems with your health. The following diseases can be caused by a bad diet.

Hypoglycaemia (low blood sugar)

The hormone insulin helps control sugar levels in the blood. Insulin is released when sugar levels rise, such as after a meal. The insulin causes the sugar to be stored in the liver and muscles, ready to be used for energy when required. Hypoglycaemia can occur when too much insulin is released and so the level of sugar in the blood drops too low. Too much insulin can be produced after a large meal with a lot of carbohydrate in it. This is probably most common in overweight people and people who are malnourished (are not eating a balanced diet).

Hypoglycaemia may be treated by changing the diet of the sufferer. More complex, unrefined carbohydrates should be eaten (e.g. brown pasta, granary bread) as these release sugar more slowly than simple carbohydrates. Gentle exercise and weight loss are also recommended.

Diabetes

When not enough insulin is produced, or it does not work on the body's cells properly, then diabetes results. The risk of diabetes is increased by being overweight, not exercising enough and eating the wrong foods. If you eat a lot of refined sugars, (such as sweets, biscuits, cakes, white bread, sugary drinks) then you can increase your risk of diabetes.

Ways to try and reduce the chance of getting diabetes include:

- Trying to lose weight if you are overweight.
- If you smoke, stop.
- Eat a healthy, balanced diet with fibre, complex carbohydrates and not too much fat.
- Exercise regularly.

Obesity

Obesity is having a large amount of fat in the body's fat cells, increasing the risk of related diseases and death. The number of cases of obesity are increasing rapidly, particularly amongst young people.

Obesity can lead to psychological problems (e.g. feeling of inferiority) and also difficulties with breathing, joints, personal hygiene, blood pressure, blood clots and diabetes, amongst other things.

Genetics can increase the risk of obesity, but environment plays the key role through overeating, poor nutrition and lack of regular exercise.

People who are obese need to lose weight if they are to reduce their risk of associated diseases. To do this they need to eat low-fat foods and keep an eye on calories. It is also important to take regular exercise.

High Cholesterol

Cholesterol is a type of body fat, which is necessary to build cells, make hormones and produce energy. However, there are two types - 'good' High Density Lipoprotein (HDL) and 'bad' Low Density Lipoprotein (LDL). If there is too much LDL in the blood it can cause hardening and narrowing of the arteries (atherosclerosis). This can then lead to cardiovascular disease, strokes and heart attacks.

Genetics can increase your risk of high cholesterol, but diet also plays a part. If you are inactive, overweight, drink more than the recommended amount of alcohol, and eat lots of dairy and other animal foods with high saturated fat content, you can increase your chances of suffering from high cholesterol.

Ways of reducing high cholesterol levels:

- Cholesterol-lowering drugs
- Low-fat diet, particularly missing out saturated fats (animal fats)
- 'Plant sterol' foods, such as 'Flora Proactive'
- Regular exercise
- Reduce body weight
- Reduce alcohol consumption

High Blood Pressure

Blood pressure tends to increase as people get older due to the arteries becoming less elastic, so the age of a person is taken into account when deciding whether they have high blood pressure. High blood pressure can lead to atherosclerosis (narrowing of the arteries), strokes, heart attacks, kidney failure and eye damage.

With many cases of high blood pressure the cause is unknown. However, lifestyle can increase the risk of increased blood pressure, such as: obesity, smoking, lack of exercise, eating too much salty food, drinking too much alcohol, eating too many fatty foods.

Ways to reduce the risk of high blood pressure include:

- If you smoke, give up
- If you drink, cut down
- Take up regular exercise
- If overweight, try to lose weight
- Eat a balanced diet
- Reduce your stress levels

UNIT 3 - Nutrition

Heart Disease

Coronary Heart Disease (CHD) occurs when the blood and oxygen supply to the heart is restricted due to atherosclerosis (narrowing of the arteries). The main symptom of CHD is angina - a feeling of tightness or pain in the chest which may reach down the arms. The narrowing of the arteries is caused by a build up of fatty materials on their inner walls. At the same time the blood becomes more likely to clot. If a blood clot gets stuck in the narrowed arteries then blood can no longer get through and cells start to die. If this happens in the wall of the heart then a heart attack will result.

The following factors increase the risk of CHD:

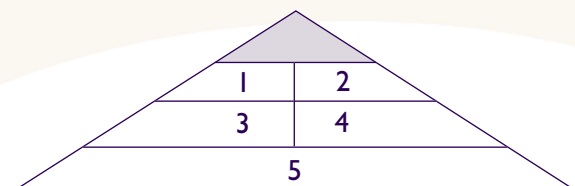
- Old age
- Genes
- Females are more prone after the menopause
- Diabetes
- Being overweight
- Not exercising regularly
- High blood pressure
- Drinking too much alcohol
- Eating too much salt in your diet
- Too much stress
- Eating too many fatty foods, especially saturated fats
- Smoking

SUMMARY

Condition	Possible reason for condition
Hypoglycaemia	Eating large meals containing lots of simple carbohydrates stimulates too much insulin to be released, causing a 'crash' in blood sugar.
Diabetes	Overstressing the pancreas to produce insulin can cause the pancreas to stop working properly. Common causes: being overweight, not exercising enough, eating lots of refined sugars.
Obesity	Large amounts of fat being stored in body cells can be caused by overeating, poor nutrition and lack of exercise.
High Cholesterol	Cholesterol levels building up in the blood can be caused by being overweight, drinking too much alcohol, eating foods high in saturated fat and not exercising enough.
High Blood Pressure	Arteries becoming inelastic and 'furring up' can lead to high blood pressure. This can be caused by obesity, smoking, lack of exercise, eating too much salt, drinking too much alcohol and eating too many fatty foods.
Heart Disease	Blood clots and narrowing of the arteries, possibly due to being overweight, not exercising enough, drinking too much alcohol, eating too much salt, smoking, eating too much fat and being stressed, can cause heart disease.

The Food Group System

The food pyramid has been developed by nutritionists to help people evaluate their own diets. It divides food into five main groups, on the basis of the nutrients each provides. By eating the recommended amounts of food from each group a person will be able to provide all the nutrients their body needs and also improve their sporting ability.



- 1 Milk, yoghurt and cheese
- 2 Meat, poultry, fish, dry beans, eggs & nuts
- 3 Vegetables
- 4 Fruit
- 5 Bread, cereal, rice and pasta

Food Group	Major Nutrients Supplied	Recommended Number of Servings per day
Milk, yoghurt and cheese	Provides calcium. Also contains vitamin A, vitamin B2 (riboflavin) and protein.	2 - 3
Meat, poultry, fish, dry beans, eggs and nuts	Good source of protein. Also contain vitamin B1 (thiamine), vitamin B2 (riboflavin), niacin, iron and zinc.	2 - 3
Vegetables	Provides vitamins and minerals that complement other food sources. Good sources of vitamin C (e.g. tomatoes and broccoli) and vitamin A (e.g. carrots, broccoli, spinach).	3 - 5
Fruit	Good source of many vitamins and minerals. Citrus fruits, melon and strawberries are good sources of vitamin C. Apricots are a good source of vitamin A.	3 - 5
Bread, cereal, rice and pasta	Contributes complex carbohydrates (starch and fibre) and significant amounts of protein, iron and B vitamins.	6 - 11

Foods that occupy the smallest area at the top of the pyramid, such as margarine, butter, sweets and jams, should be used sparingly. They do provide energy and **some** nutrients, but energy should be obtained from more nutritious foods.

To meet their increased energy needs, most athletes require the higher levels of servings listed, especially from the bread, cereal, rice and pasta group and the vegetable group. Foods in these two groups contain a lot of starch which is an excellent source of food energy.

UNIT 3 - Nutrition

In **no** instance should you eat less than the minimum number of servings for any food group. The minimum servings are needed to supply a base level of essential nutrients and kJ required for good health.

SUMMARY

The food pyramid should:

- Help you select a variety of nutritious foods.
- Emphasise the starchy foods like bread, pastas, cereals and vegetables you need to build up glycogen stores.
- Guide your selection of a lower fat diet.
- Offer you a variety of foods within each food group so that meals can be built up around the foods you particularly like.

Recommended Nutrient Intake (RNI)

The RNI is the amount of a nutrient sufficient for nearly everyone (about 97% of the population), even those with high needs. This level is thought to be higher than most people need.

The following table shows the dietary recommendations for some of the major food substances:

Energy and Nutrients	Recommendations
Energy	RNIs: Males 15 - 18 years = 11,510 kJ Males 19 - 50 years = 10,600 kJ Female 15 - 18 years = 8,830 kJ Female 19 - 50 years = 8,100 kJ
Protein	RNIs: Males 15 - 18 years = 55.2 g Males 19 - 50 years = 55.5 g Female 15 - 18 years = 45.4 g Female 19 - 50 years = 45.0 g
Total fat	No more than 35% of food energy
Saturated fat	No more than 11% of food energy
Carbohydrates	50% of food energy
Fibre	12 - 24 g for adults
Vitamins and minerals	Each has its own dietary recommendation

Types of Diet

Vegetarian

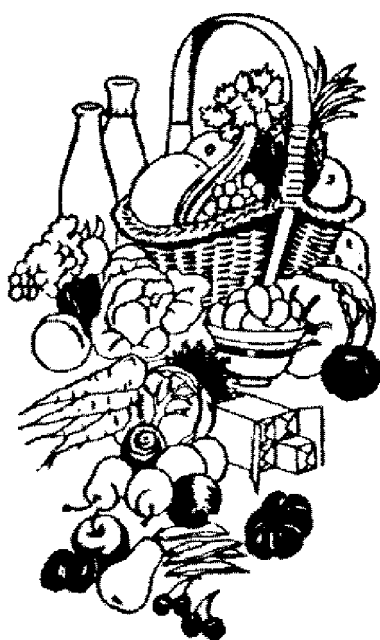
This type of diet does not include animal flesh (e.g. beef, chicken, fish) but does include their products, such as eggs and milk. The diet mainly consists of vegetables, fruits, beans, nuts, dairy and seeds. As long as the vegetarian person balances their protein intake carefully then this is a healthy diet. Vegetarians tend to have lower blood pressure and body weight than meat eaters and have a reduced risk of atherosclerosis, obesity, high cholesterol, cancer and heart disease.

The high levels of fibre and low amounts of fat also keep the digestive tract healthy. There are also, of course, high levels of vitamins and minerals in a vegetarian diet - a healthy boost for the body. A potential problem, however is the reduced iron and vitamin B12 (which are found mainly in meats), so tablet forms may have to be taken.

Vegan

This is the strict form of vegetarianism, when no animal products at all are eaten. The diet consists of fruits, vegetables, beans, nuts and seeds. This diet should not be followed by children unless it is carefully monitored by parents to make sure they get all the nutrients needed for growth and development.

Vegans often have a lower than average body weight and low cholesterol level. There is a lower risk of high blood pressure, obesity, heart disease and some cancers. The high fibre is also beneficial to the digestive system. However, deficiencies in some nutrients can be a problem - including vitamin B12, iron, calcium, vitamin D, zinc and some essential amino acids (that make up protein).



The Principles of Health & Fitness

The World Health Organisation (WHO) defines health as ‘**a state of complete physical, mental and social well-being** which is more than just the **absence of disease**’. Health may be good or poor. Good health is often linked to happiness and a fulfilling life. Someone who is in good health feels good physically and has a positive outlook on life, is **well adjusted** in society and is capable of undertaking daily mental and physical tasks without too many problems. People need good health to grow, develop their potential and to play a full and active part in society. To enjoy good health a person needs proper shelter, nutrition, sleep, rest and exercise. Good hygiene reduces risk of infections. Medical and dental care ensures health can be monitored and problems treated.

Fitness is the physical condition of the body. One definition of physical fitness is ‘**the ability of the body to meet the day to day demands of the environment**’. There are generally two recognised types of fitness:

1. **Health related fitness** - this reflects an individual’s ability to fight infection and takes into consideration the strength of their muscles and skeleton. It also involves the absence of conditions such as obesity and high blood pressure.
2. **Performance related fitness** - this is more related to the fitness needed to complete specific tasks, e.g. mountain climbing, sprinting, swimming etc.

All fitness can be improved by training and the type of training determines the overall fitness effect.



SUMMARY

1. A healthy person is in a state of physical, mental and social well-being, as well as being free from disease.
2. For good health a person needs good shelter, nutrition, sleep, rest and exercise.
3. A fit person can fight infection and their body can cope with the demands of the environment.

The Main Components of Fitness

Health Related Fitness

The following components of fitness are important for the body to work efficiently:

- **Cardiovascular endurance** - the ability to supply nutrients and oxygen to the muscles.
- **Muscular strength** - the ability to exert an external force or lift a heavy weight.
- **Muscular endurance** - the ability of the muscles to exert themselves repeatedly.
- **Flexibility** - having a wide range of movement at the joints.
- **Body composition** - the relative percentage of fat, muscle, bone and other tissues in the body.
- **Ability to cope with stress** - this is becoming increasingly important in modern life.

Skills Related Fitness

The following components are important when a person plays sport:

- **Agility** - the ability to rapidly and accurately change the direction of the movement of the body.
- **Balance** - the ability to maintain equilibrium when standing or moving.
- **Coordination** - the ability to use the senses and parts of the body to perform motor tasks accurately and smoothly.
- **Power** - the ability to transfer energy into force.
- **Reaction time** - the ability to respond quickly to a stimulus.
- **Speed** - the ability to perform a movement quickly.



SUMMARY

1. Health related fitness is a combination of cardiovascular endurance, muscular strength and endurance, flexibility, body composition and ability to cope with stress.
2. Skill related fitness is a combination of agility, balance, coordination, power, reaction time and speed.

The Effect of Lifestyle on Health and Fitness

Your lifestyle obviously has a great affect on your health and fitness. We have already investigated how diet affects health and fitness. Now we will look at some other things that affect it.

Stress and relaxation

A low level of stress can be good for you - it keeps you sharp and 'on your toes', but if that stress level rises it can have a real impact on your health. Stress can lead to psychological problems, depression, skin problems, weight problems, high blood pressure, heart attacks, strokes and seizures, amongst other things. It is important to put time aside to relax and do something you really enjoy to get you away from the cause of the stress.

Relationships

Relationships are very important to people. We are sociable creatures and need companionship and support. When relationships are going well we can feel on top of the world, but if we are having problems with relationships (friends, parents, partners) they can make us feel very down. Again, relationships can have an affect on weight, how we feel mentally, how much we exercise, our stress levels and how we react to situations.

Drugs

Drugs cover a wide range of substances. Some drugs are necessary to combat diseases such as heart tablets, hayfever tablets, inhalers etc. If used incorrectly, however, drugs can cause all sorts of problems. If you take more than the dosage recommended then it can have a really detrimental effect on health, even leading to death.

Recreational drugs seem to be causing more problems than ever. Recreational drugs include anything from cigarettes and alcohol right through to heroin and cocaine. Drugs alter the way the mind works and how you feel. They are easy to become addicted to and they can take over your life. They can make you feel really good for short periods of time, but then comes the crash, when you feel you need to take more. They can make you act dangerously and they affect how your body works. They are also expensive so trying to find the money for the habit becomes more and more difficult, often leading to crime. Drugs can have an extreme effect on your health leading to psychological problems, malnutrition, skin problems, heart problems, digestive problems, cancer and death.

Alcohol

Alcohol is a legal drug in our society. Our bodies naturally produce an enzyme that breaks down alcohol and, if recommended weekly limits are not exceeded, alcohol does not usually lead to health problems. It is even thought that alcohol can have beneficial effects such as reducing stress levels and a glass of red wine a day is thought to help reduce cholesterol.



Alcohol (continued)

The problem arises when excess alcohol is consumed. This can lead to abnormal behaviour such as depression and aggression (sometimes leading to domestic violence). It can also increase the risk of cancers (e.g. bowel, liver, mouth), heart problems, narrowing of the arteries, increased cholesterol and blood pressure, weight problems, liver and kidney problems, killing of brain cells, nervous problems and digestive disorders.

Smoking

Smoking is often in the news as it has major detrimental effects on health. Smoking, even if just done occasionally, can lead to all sorts of health and fitness problems. That is why so many 'no smoking' areas have appeared in public. Smoking can lead to lung, throat and mouth cancer, bronchitis, emphysema (holes in the lungs), heart problems, blood clots, strokes, gangrene and many more diseases.

Sleep

Sleep is an essential part of our lives. When we sleep our body rests and recovers from the day. If we suffer from lack of sleep it can affect how we feel mentally, our appearance (such as the glow of our skin and hair) and our coordination, amongst other things. The time of day we sleep also affects us as our body is tuned into the pattern of the earth and sun so our best sleep is usually between 10pm and 5am. Most people need about 7 hours of sleep a day, some people need less and some a bit more. Babies and small children usually need at least 12 hours a day as their bodies and minds are developing so rapidly they need more time to recover.

Fad Diets

There seem to be so many 'fad' diets around these days, such as the 'low carb diet', the 'grapefruit diet', the 'Dr Atkins diet', the 'high carb, low fat diet' etc. Basically, as a rule, any diet that is followed for more than a few weeks that encourages you to stray from the advised balanced diet as laid down in the 'food pyramid' or the 'RNI's' will have detrimental affects on your health and fitness. For example, too much protein can put a stress on your liver and cause toxins to build up in your body. Low fat foods often have more sugar or sweeteners added for the flavour. A diet low in carbohydrates will make you feel lethargic and less alert. Diets where you just eat one type of food will leave you lacking in nutrients. If you want to lose weight it is better to eat a healthy, balanced diet, cut down slightly on the amounts you eat and increase your exercise level.

Housing

Housing can affect your health and fitness. If a person does not have secure, long term, living accommodation then it makes them feel insecure and less positive about themselves. Damp can lead to respiratory problems. Personal hygiene is also difficult to maintain if the facilities are not available for washing the body, clothes, bedding etc. Nutrition can also be a problem if kitchen facilities are limited.



Reasons for Fitness Tests

1. **Assess current levels** - of fitness, to say where you are at, at any given time.
2. **Monitor progression** - to see what affect your training is having on your various body systems.
3. **Set goals** - knowing where you are at helps you set future achievable goals.
4. **Motivation** - all tests lead to motivation.
5. **Feedback from training programme** - makes sure the programme is working, if it is not, you can analyse why it is not working.
6. **Benchmark after returning from injury** - you can monitor your progress after injury and set realistic goals.
7. **Use of repeat tests to establish gains** - frequent tests monitor your progression.
8. **Annual fitness checks** - make sure you are not losing fitness in certain areas from year to year.

Repeat Fitness Tests

There are **two** categories of Fitness Test in the Services. One is the test taken as part of the **Selection Process** which is designed to make sure that the candidate has a suitable physical fitness level for Service Training. The other is the **Repeat Fitness** Test which is to ensure that personnel remain at the minimum health and fitness level for their role.



Royal Navy Repeat Fitness Test

Once accepted for the Royal Navy all candidates are required to meet the following fitness standards:

Aerobic Fitness run 1.5 miles

Age	Maximum acceptable times	
	Men	Women
Under 25	11 min 13 sec	13 min 15 sec
Under 30	11 min 38 sec	13 min 50 sec
Under 35	12 min 05 sec	14 min 20 sec
Under 40	12 min 34 sec	15 min 09 sec



Royal Marines Biannual Repeat Fitness Test

Once accepted for the Royal Marines all candidates are required to meet the following fitness standards:

Age	Pull ups	Sit ups	Squad run 2.41 km	Free run 2.41 km
29 and under	5	50	15 mins	11.5 mins
30 - 34	4	40	15 mins	12 mins
35- 39	3	35	15 mins	13 mins
40 - 44	Not req'd	Not req'd	15 mins	14 mins
45 - 49	Not req'd	Not req'd	15 mins	15 mins



Army Annual Repeat Fitness Tests/Assessments

Once posted to an Army Unit all personnel under the age of 50 yrs old are required to pass 3 annual fitness tests:

Basic Combat Fitness Test (BCFT)

A 12.8km march (including 4.8km off road) in 1 hour 55 mins in combats and full equipment.

Advanced Combat Fitness Test (ACFT)

Part 1: 800m speed march completed in 7 minutes and 30 seconds, followed immediately by a best effort 2.4km speed march completed in 15 minutes. Dress - Boots, Combats, Webbing, Helmet and Rifle/LSW, 20kg load.

Part 2: Immediately on completion of Part 1 personnel perform a minimum of 3 “Representative Military Tasks” (RMTs), selected by the Unit from a list of 10.

Basic Personal Fitness Assessment (BPFA)

The assessment comprises of 3 separate activities in the following order:

1. Press-ups - best effort in 2 mins
2. Sit ups - best effort in 2 mins
3. Aerobic fitness run “Bleep Test” - 800m as warm up in 5 mins, 2.4km in best time

UNIT 3 - Fitness Tests



Royal Air Force Repeat Fitness Tests

Once accepted for the Royal Air Force all candidates are required to meet the following fitness standards:

All RAF personnel take a fitness test every year. This consists of a multi-stage shuttle run over a 20 metre course, timed according to age and gender. It is followed by a specified number of press-ups and sit ups to be completed inside one minute.

Gender	Age	Shuttle Run	Press-Ups	Sit Ups
Male	17- 24	9	13	35
Male	25 - 29	8	12	31
Female	17 - 24	6	10	25
Female	25 - 29	5	9	22

Developing a Fitness Training Programme

F.I.T.T. (Frequency, Intensity, Types, Time)

Frequency - this is the number of times you train. As your performance improves then you should increase frequency of training. However, there should always be

Intensity - You should be training at a high enough level to bring about changes in your body systems so you need to decide how strenuous your training will be. You need to think about your percentage work rate (e.g. sprint = 100% work rate).

Types of training methods. Examples include:

Continuous training - this is for building up endurance and stressing the aerobic respiratory system. Training sessions last 0.5 - 2 hrs, at low intensity, using lots of muscles. Great distances can be covered without lactic build up. Examples include swimming, jogging, running, cycling, aerobics. Long sessions can lead to injury and be monotonous.

Fartlek - a different type of continuous exercise.

It is still continuous, so stresses the aerobic energy system, but the intensity of the run is altered. Sessions last for approx. 45 minutes. An example of a *Fartlek* session is: 10 min jog, (3 mins sustained fast running, 60 secs jog) x 6, this would be suitable for middle-distance runners.

Interval training - most widely used for swimming, athletics and cycling.

It is to work both the aerobic and anaerobic energy systems. Intensity is varied depending on which system needs to be trained the most (aerobic - lower intensity, or anaerobic - higher intensity). For working the anaerobic system it is best to use intensive work intervals that last 30 seconds to two minutes.

The body must be trained to cope with the discomfort and fatigue arising from high levels of lactic acid in the muscles and blood. This is achieved by using active recovery periods (e.g. jogging) which remove some, but not all, of the lactic acid therefore the concentration is slightly higher at the start of each work interval. The length of the rest periods are usually about twice as long as the work period (1:2 work-to-rest ratio). The work period is usually repeated at least three times.

For working the aerobic system the work periods should last at least two minutes, the work-to-rest ratio should be 1:1 or less and the number of repetitions should vary from 3 - 5 reps, to 8 - 12 reps, depending on the duration of the work intervals and the athletes fitness level. If work periods are about two minutes, inactive recovery should be used. If the duration of the work periods are four to six minutes long active recovery should be used.

Circuit training - ideal for general fitness.

There are normally 8 - 10 stations, each working different parts of the body and building up muscular strength, endurance and cardiovascular fitness. Stations are arranged to make sure that consecutive stations do not put stress on the same part of the body. Stations can include free weights, abdominal exercises, pull ups, press ups, burpees, star jumps, shuttle runs etc. Time spent on each station normally lasts 0.5 - 1 minute, followed by a rest period, so is ideal for working with partners. Work and rest time can be altered to control overload and progression.

Resistance training - this is for working on muscular strength.

Training should be carried out 2 - 3 times per week over a period of 12 weeks.

Resistance training can be carried out using own body weight (e.g. chin ups, push ups), free-weights (e.g. arm curls, bench press, heel raise, squat) or by using activity pullies (used a lot by swimmers and throwers), plyometrics (jumping on and off boxes, bounding, hopping).

Time - how long will you work for? Increasing the duration of training is another way to cause overload. Time of sessions should be increased as cardio-respiratory and muscular endurance increases.

UNIT 3 - Fitness Training

Programme Design

Application

S.P.O.R.T.	
Sport Specific	Different sports make different demands on you so gear your training towards a particular sport, e.g. rugby.
Progressive	Do not make the programme too difficult to start with, build it up gradually. Even though you plan to overload, the overload has to be progressive.
Overload	Increasing work rates and increasing loads makes the body respond to these demands by improving its performance, so plan the sessions to become harder.
Relevant	The type of training has to be relevant to your event/sport you are training for.
Time	The two things that determine the length of your training session are: a) The type of event you are training for (e.g. shot putting places excessive strains on the body) b) Mental pressure - if the event is difficult to perform or dangerous then the training sessions need to be shorter.

S.M.A.R.T.	
Specific	To the event you are training for.
Measureable	Measure progress, such as recovery rate.
Achievable	Make sure you can achieve your goals, or you may lose motivation.
Relevant	Training methods are relevant to the area you want to improve.
Time	Stick to the time you planned and make sure you increase time as your body adapts.
S.M.A.R.T.E.R.	
Enhance Performance	Your training should enhance your performance in your event.
Raise Standards	You should continually raise standards, as your body systems improve.

Health and Safety

Equipment	You need to make sure the equipment chosen is correct for that activity (e.g. not trainers for football). You need to check your equipment fits correctly and is secure (e.g. make sure gum shields are made to fit your own mouth). You need to check your own equipment and the general equipment (e.g. gym equipment is safe).
Facilities	These need to be checked properly too to make sure they are safe (e.g. the gym floor is not wet - no leak in the roof).
Weather	Look at the weather forecast - do not go up mountains if the weather is due to break. Take care in ice and snow. Make sure you stay hydrated in hot weather and cover up.
Environment	If out running be careful not to run by yourself, especially in the dark. Let people know where you are going. Check the ground conditions - it may affect your choice of equipment. Games may have to be cancelled or abandoned if the conditions become dangerous.
Illness	You should not train if you are ill, especially if you feel ill below your head (throat and below) as this can lead to complications, such as strain on your heart.
Injury	Try to avoid these through using correct equipment, wearing sensible clothing and footwear and concentrating. If you do suffer an injury, treat it as soon as possible and see a doctor if necessary. Apply R.I.C.E. - Rest, Ice, Compression, Elevation. See a sport therapist or physiotherapist if necessary.
Clothing	For thermoregulation, wear appropriate clothes. Make sure foot wear is safe and laces are done up. Wear visibility jackets if training in the dark. Remove jewellery.
Warm-ups	Needed to prepare your body for the activity. This reduces the risk of injury to muscles and tendons. The warm-up session should be specific to the activity you are about to do, but should include activities to increase the heart rate slowly - increasing the flow of blood to the muscles, flexibility exercises to gently stretch the muscles and activities specifically relevant to your training.
Cool down	This allows the body to start its recovery process by starting to remove the build up of lactic acid and stretching will help the muscles return to their original state.

UNIT 3 - Fitness Training

Fitness Training

WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1	10 press ups, rest 20 secs (x4), 10 sit ups, 20 secs rest (x3), run 1.5 miles - circuit & continuous training for aerobic work, endurance, strength	Run 35 mins - continuous training for aerobic work, endurance & muscular strength	10 press ups, rest 20 secs (x4), 10 sit ups, 20 secs rest (x3), grid work to avoid obstacles & other people - circuit and flexibility training for aerobic work, endurance, strength & agility	Cycle 45 mins - continuous training for aerobic work & muscular strength	Rest day	Game of sport (rugby / hockey / football) - includes anaerobic & aerobic work, endurance, speed, flexibility, strength & agility	Swim 35 mins - continuous training for aerobic work & muscular strength
2	10 press ups, rest 20 secs (x4), 15 sit ups, 20 secs rest (x3), run 2 miles - circuit & continuous training for aerobic work, endurance, strength	Run 40 mins - continuous training for aerobic work, endurance & muscular strength	10 press ups, rest 20 secs (x4), 15 sit ups, 20 secs rest (x3), grid work to avoid obstacles & other people - circuit & flexibility training for aerobic work, endurance, strength & agility	Cycle 45 mins - continuous training for aerobic work & muscular strength	Rest day	Game of sport (rugby / hockey / football) - includes anaerobic & aerobic work, endurance, speed, flexibility, strength & agility	Swim 45 mins - continuous training for aerobic work & muscular strength

Fitness Training

WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
3	10 press ups, rest 20 secs (x5), 20 sit ups, 20 secs rest (x3), run 2 miles - circuit & endurance training for aerobic work, endurance, strength	Timed 4 mile run - continuous training for aerobic work, endurance, speed & muscular strength	10 press ups, rest 20 secs (x5), 20 sit ups, 20 secs rest (x3), run 2 miles - circuit & endurance training for aerobic work, endurance, strength	Cycle 50 mins, including hills - continuous training for aerobic work, anaerobic work & muscular strength	Rest day	Game of sport (rugby / hockey / football) - includes anaerobic & aerobic work, endurance, speed, flexibility, strength & agility	Swim 45 mins - continuous training for aerobic work & muscular strength
4	Circuit training (upper body) - circuit training for strength & anaerobic work	Run 40 mins, including hills - continuous training for aerobic work, anaerobic work & muscular strength	10 press ups, rest 15 secs (x5), 20 sit ups, 20 secs rest (x3), run 2.5 miles - circuit & endurance training for aerobic work, endurance, strength	Cycle 60 mins, including hills - continuous training for aerobic work, anaerobic work and muscular strength	Rest day	Game of sport (rugby / hockey / football) - includes anaerobic & aerobic work, endurance, speed, flexibility, strength & agility	Swim 45 mins - continuous training for aerobic work & muscular strength

UNIT 3 - Fitness Training

Fitness Training - An Example

WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
5	10 press ups, rest 15 secs (x5), 20 sit ups, 20 secs rest (x3), grid work to avoid obstacles and other people - circuit and flexibility training for aerobic work, endurance, strength and agility	Cycle 60 mins, including hills - continuous training for aerobic work, anaerobic work and muscular strength	10 press ups, rest 15 secs (x5) 20 sit ups, 20 secs rest (x3), run 3 miles - circuit and endurance training for aerobic work, endurance, strength	3 sets of 3 repetitions of 120 metre runs (40 metres at 100%, 40 metres at 90%, 40 metres at 100%), 5 minute rests between repetitions, 10 minute rest between each set - interval training for anaerobic work, speed & strength	Rest day	Game of sport (rugby / hockey / football) - includes anaerobic and aerobic work, endurance, speed, flexibility, strength and agility	Swim 45 mins - continuous training for aerobic work and muscular strength
6	Press ups, sit ups, weights, pull ups, burpees, sprints (as many as possible of each in 2 minutes with 1 minute rest between each stand) - circuit training for endurance, agility & strength	3 mile run, including hills - continuous training for aerobic work, endurance and strength	45 minute swim - continuous training for aerobic work and muscular strength	Sprint bleep test to test aerobic and anaerobic work, speed, strength and endurance. Push up and sit up bleep tests for endurance, strength and testing	Rest day	Game of sport (rugby / hockey / football) - includes anaerobic and aerobic work, endurance, speed, flexibility, strength and agility	Rest day

Testing Components of Fitness

Muscular Strength

1. *Grip Strength* - use a hand grip dynamometer to measure grip strength. Record the maximum grip rating from three attempts for the dominant hand.

Dynamometer reading (kg)		
Male	Female	Rating
> 56	>36	Excellent
51-56	31-36	Good
45-50	25-30	Average
39-44	19-24	Fair
<39	<19	Poor

2. *Vertical jump* (to test vertical leg power) - 0cm is where the fingertips touch when both arms are held overhead at full body stretch with feet flat on the floor. Flex the knees and jump from both feet as high as possible. Record the maximum height reached with the fingertips from three attempts.

Height jumped in cm (male)	Height jumped in cm (female)	Rating
>65	>58	Excellent
50 - 65	47-58	Good
40 - 49	36-46	Average
30 - 39	26-35	Fair
<30	<26	Poor

Muscular Endurance

1. *Sit ups* (to test abdominal muscular strength, endurance and power) - lie down on a mat with knees flexed at 90°. Anchor feet. Sit up so elbows touch knees - record how many can be done in 30 seconds.

No. sit ups in 30 secs (male)	No. sit ups in 30 secs (female)	Rating
>30	>25	Excellent
26-30	21-25	Good
20-25	15-20	Average
17-19	9-14	Fair
<16	<8	Poor

UNIT 3 - Fitness Training

2. *Chin ups* (to test arm and shoulder muscular strength and endurance) - hang from a chin bar with palms facing away from body. Pull upwards so chin level with bar. Record how many can be done, making sure arms return to straight position between each chin up.

No. chin ups (male)	No. chin ups (female)	Rating
>30	>25	Excellent
26-30	21-25	Good
20-25	15-20	Average
17-19	9-14	Fair
<16	<8	Poor

Cardiovascular Endurance

- 1 *Bleep Test* (as well as cardiovascular endurance, this also tests muscular strength, muscular endurance, agility, power and speed) - There are 23 levels and each level lasts about 1 minute. Each level is made up of 20 m shuttle runs; the starting speed is 8.5km/hr and increases by 0.5km/hr at each level. There is a pre-recorded tape. One bleep indicates the end of a single shuttle and three bleeps indicates the moving up of a level. Run one 20m stretch for each bleep. Keep running for as long as possible in time with the tape. As soon as it is not possible to keep up with the tape, withdraw from the test. Record the level reached and the number of shuttles completed for that particular level. Look up the VO₂ Max result from the following data.

Level	Shuttle	VO ₂ Max
4	2	26.8
4	4	27.6
4	6	28.3
4	9	29.5
5	2	30.2
5	4	31.0
5	6	31.8
5	9	32.9
6	2	33.6
6	4	34.3
6	6	35.0
6	8	35.7
6	10	36.4
7	2	37.1
7	4	37.8
7	6	38.5
7	8	39.2
7	10	39.9

Cardiovascular Endurance (continued)

Level	Shuttle	VO2 Max
8	2	40.5
8	4	41.1
8	6	41.8
8	8	42.4
8	11	43.3
9	2	43.8
9	4	44.5
9	6	45.2
9	8	45.8
9	11	46.8
10	2	47.4
10	4	48.0
10	6	48.7
10	8	49.3
10	11	50.2
11	2	50.8
11	4	51.4
11	6	51.9
11	8	52.5
11	10	53.1
11	12	53.7
12	2	54.3
12	4	54.8
12	6	55.4
12	8	56.0
12	10	56.5
12	12	57.1
13	2	57.6
13	4	58.2
13	6	58.7
13	8	59.3
13	10	59.8
13	13	60.6
14	2	61.1
14	4	61.7
15	2	64.6
15	4	65.1

UNIT 3 - Fitness Training

VO2 Max (male)	VO2 Max (female)	Rating
>57	>49	Excellent
52-56	44-48	Good
44-51	35-43	Average
39-43	29-34	Fair
<38	<28	Poor

Speed

1. *30 metre sprint* - mark out a 30m straight line. Using a flying start, sprint as hard as possible. Record time taken to cover the 30m.

Time in seconds (male)	Time in seconds (female)	Rating
<4.0	<4.5	Excellent
4.2-4.0	4.6-4.5	Good
4.4-4.3	4.8-4.7	Average
4.6-4.5	5.0-4.9	Fair
>4.6	>5.0	Poor

Flexibility

1. *Sit and Reach* (tests flexibility of hips) - sit on the floor, legs stretched out in front, straight. Keep toes pointing upwards. Toes are where 0cm is. Reach forward and measure how far beyond the toes it is possible to stretch. Measure in cm and record.

Distance in cm (male)	Distance in cm (female)	Rating
>14	>15	Excellent
11-13	12-14	Good
7-10	7-11	Average
4-6	4-6	Fair
<3	<3	Poor

Body Fat Composition

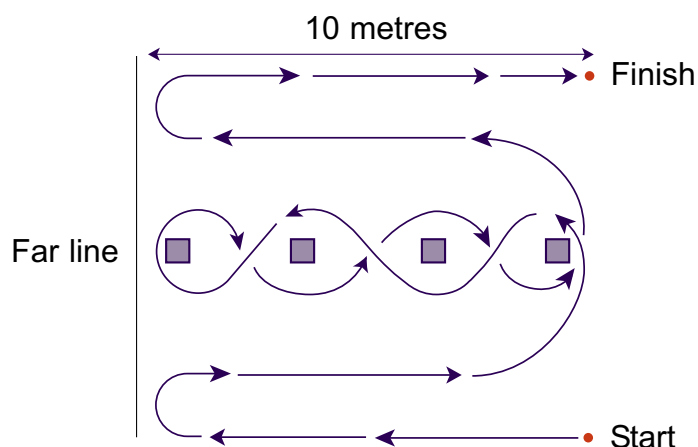
1. *Bioelectrical impedance* (body fat analysis machines) - follow the instructions for the particular model. It usually requires you to hold your arms out straight in front of you with your hands on sensors and stay still while the machine measures the percentage body fat.

% body fat (male)	% body fat (female)	Rating
<13	<18	Excellent
18-13	23-18	Good
22-19	29-24	Average
26-23	34-30	Fair
>26	>34	Poor

Agility

1. *The Illinois Agility Run* (testing speed and agility) - set out a course as shown below. Lie in a prone position, head on the start line, hands beside your shoulders. On 'go' run the course as fast as possible. Record the time taken to complete the course.

Time in seconds (male)	Time in seconds (female)	Rating
<15.2	<17.0	Excellent
16.1-15.2	17.9-17.0	Good
18.1-16.2	21.7-18.0	Average
18.3-18.2	23.0-21.8	Fair
>18.3	>23.0	Poor



Unit 6

Adventurous Activities and Teamwork For The Public Services

The criteria you must meet to achieve a Pass, Merit or Distinction Grade are laid down below.

To achieve a **Merit** you must also complete all the **Pass** criteria.

To achieve a **Distinction** you must also achieve all the **Pass** and **Merit** criteria.

GRADING CRITERIA - PASS

To achieve a PASS grade the evidence must show that you are able to:	You show this by doing the following:
P1 Take part in two outdoor pursuits and teamwork recording their participation.	<p>✓ Achieve 2x Logged AT Activities</p> <p>✓ Answer correctly the Workbook Unit 6 Pass level questions.</p>
P2 Describe the additional potential benefits of participating in an outdoor pursuit residential	
P3 Outline youth and community projects including their use of outdoor activities.	
P4 Explain the links one project has with the uniformed public services and explain the purposes of those links.	
P5 Explain how individuals and teams can benefit from projects and/or activities.	
P6 Explain how the uniformed public services can be involved in outdoor activities.	

GRADING CRITERIA - MERIT

To achieve a MERIT grade the evidence must show that you are able to:	You show this by doing the following:
M1 Analyse the benefits and the skills that could be developed from participating in outdoor pursuits and teamwork.	<ul style="list-style-type: none"> ✓ Develop your AT standards ✓ Answer correctly the Workbook Unit 6 Pass and Merit level questions.
M2 Compare youth and community projects that include the use of adventurous activities and teamwork.	

GRADING CRITERIA - DISTINCTION

To achieve a DISTINCTION grade the evidence must show that you are able to:	You show this by doing the following:
D1 Evaluate the benefits and potential for individual skills development for uniformed public service work.	<ul style="list-style-type: none"> ✓ Continue to develop your AT standards. ✓ Answer correctly the Workbook Unit 6 Pass, Merit and Distinction level questions.
D2 Evaluate youth and community projects that include the use of outdoor pursuits and teamwork.	

Definition of Adventurous Training in the Services

Adventurous Training in the services is defined as:

“Challenging outdoor training for Service personnel in specified adventurous activities, involving controlled exposure to risk, to develop leadership, teamwork, physical fitness, moral and physical courage, among other personal attributes and skills vital to operational capability”.

Benefits to Individuals

There are many benefits that are gained by participating in outdoor activities. They will vary to the individual. However let's look at some of these benefits.

Confidence

Individuals gain in confidence as they are learning something new that can also be dangerous. They learn to overcome dangers in a safe manner.

Trust

In order to succeed individuals must rely on and trust each other.

Unselfishness

Individuals must learn to put others before themselves.

Physical Ability

Fitness levels have to improve to be successful. This helps the success of the activity as normally an individual requires an above average physical robustness. Physical ability enhances mental agility.

Initiative

Individuals will have to make quick decisions based on their own judgement to overcome problems.

Challenge

To survive in conflict, service personnel must be used to operating in the face of physical & psychological adversity. Adventurous Training gives them a challenge so they can recognise and control their natural fear and learn how to cope with challenging situations.

Discipline

Individuals have to have the discipline to learn new skills in a different environment that may be alien to them. This will be a mixture of self and team discipline.

Learning

An individual will learn new skills that may help in a normal environment.

Determination

An individual will learn that to succeed one needs to be determined.

Enjoyment

An individual can get a great deal of satisfaction and enjoyment from succeeding on a challenge that looked impossible when first being attempted. This enjoyment will enhance learning skills.

Compassion

Individuals must understand the strengths and weaknesses of others in their team and take this into consideration.

Teamwork

Adventurous Training is an ideal way to develop team skills. Individuals learn to trust their fellow team members to do their job under pressure.

Mental Agility

An individual will have to cope in dealing with different situations quickly and efficiently.

From your own experiences you will have to look at these benefits and see what can be gained from specific activities.

Recognised Service Adventurous Training activities

The following are the nine Adventurous Training activities recognised by the Services:

Offshore Sailing	Sub-Aqua Diving	Canoeing
Caving	Mountaineering	Skiing
Freefall Parachuting	Gliding	Hang Gliding/Paragliding

Unit 8

Land Navigation By Map and Compass

The criteria you must meet to achieve a Pass, Merit or Distinction Grade are laid down below.

To achieve a **Merit** you must also complete all the **Pass** criteria.

To achieve a **Distinction** you must also achieve all the **Pass** and **Merit** criteria.

GRADING CRITERIA - PASS

To achieve a PASS grade the evidence must show that you are able to:	You show this by doing the following:
P1 Explain the importance of Ordnance Survey maps and road atlases to uniformed public service work identifying conventional signs	<p>✓ Achieve a Pass in relevant map and compass syllabus.</p> <p>✓ Pass Basic First Aid ("Casaid", DofE Expedition Section Syllabus or CVQO First Aid Test).</p>
P2 Explain the main features, use and care of a lightweight compass, demonstrating its use for taking bearings from both map and ground.	
P3 Explain and demonstrate the use of magnetic bearings and variation and ways of determining direction without a compass.	
P4 Produce a route card with a minimum of three legs and an emergency escape route included.	
P5 Explain safety considerations required or planning and undertaking a route, using route cards.	
P6 Describe the actions to be taken to minimise the effects of land navigation on the countryside as protected by laws, regulations and agreements.	
P7 Explain the safety issues to be taken into consideration.	
P8 Describe the medical conditions that could occur during an activity and how to deal with them.	

GRADING CRITERIA - MERIT

To achieve a MERIT grade the evidence must show that you are able to:	You show this by doing the following:
M1 Produce a route card with distances, bearings, degrees and/or mils accurately recorded.	✓ Pass relevant map and compass syllabus.
M2 Describe how your route could ensure minimum impact on the environment and take into account the Countryside Code and safety issues.	or ✓ Complete DofE Expedition Section.
M3 Explain the symptoms of and how you would treat, two potential medical conditions that may be encountered whilst navigating.	or ✓ Participate in other such activities e.g. SCC Outdoor Skills, Ten Tors, Rocky Mountain, Whitehorse.

GRADING CRITERIA - DISTINCTION

To achieve a DISTINCTION grade the evidence must show that you are able to:	You show this by doing the following:
D1 Analyse the impacts on the countryside of activities during route taken and the safety issues involved.	✓ Pass DofE Silver/Gold Expedition Section. or ✓ Participate in other such activities eg. SCC Outdoor Skills, Ten Tors, Rocky Mountain, Whitehorse.

THERE ARE NO WORKBOOK QUESTIONS IN UNIT 8



Unit 13

Expedition Skills

The criteria you must meet to achieve a Pass, Merit or Distinction Grade are laid down below.

To achieve a **Merit** you must also complete all the **Pass** criteria.

To achieve a **Distinction** you must also achieve all the **Pass** and **Merit** criteria.

GRADING CRITERIA - PASS

To achieve a PASS grade the evidence must show that you are able to:	You show this by doing the following:
P1 Describe the benefits of expeditions to the public services.	<ul style="list-style-type: none"> ✓ Complete a 36 hour expedition. ✓ Answer correctly the Workbook Unit 13 Pass level questions.
P2 Describe the equipment needed for a multi-day expedition including personal and group safety.	
P3 Contribute to the planning and preparation required for a multi-day expedition.	
P4 Use camp craft and navigational skills during the expedition.	
P5 Define the responsibilities of the individual when in the countryside.	
P6 Participate in a multi-day expedition, identifying own roles and responsibilities.	

GRADING CRITERIA - MERIT

To achieve a MERIT grade the evidence must show that you are able to:	You show this by doing the following:
M1 Analyse the benefits of expeditions to the public services.	<ul style="list-style-type: none"> ✓ Complete a DofE Bronze/Silver/Gold Expedition Section or other similar activities. ✓ Answer correctly the Workbook Unit 13 Merit level questions.
M2 Explain the purpose and function of equipment needed for a multi-day expedition.	
M3 Explain the process of planning and the preparation required when planning an expedition.	
M4 Describe individual performance and that of group members, identify weaknesses and areas for improvement.	

GRADING CRITERIA - DISTINCTION

To achieve a DISTINCTION grade the evidence must show that you are able to:	You show this by doing the following:
D1 Evaluate the benefits of expeditions to the individuals and the public services.	<ul style="list-style-type: none"> ✓ Complete a DofE Silver/Gold Expedition Section or other similar activities. ✓ Answer correctly the Workbook Unit 13 Distinction level questions
D2 Justify choice of equipment for a multi-day expedition.	
D3 Evaluate the expedition process from conception to completion, making recommendations and justifying decisions made.	

Benefits of Expeditions

Expeditions are, by their very nature, an adventurous activity and when conducted by service personnel, will contain a high level of challenge to the team and to individuals.

For those taking part, an expedition will call for some or all of the qualities of: **fitness, self-reliance, physical and moral courage, initiative, powers of endurance and interdependence.** These are in addition to the benefits already detailed in Unit 6, Adventurous Activities and Teamwork for the Public Services. A well planned expedition will be designed to both test and develop these qualities.

Individuals will benefit from this development as their military service will require these qualities in their every day role and especially in operational situations.

The Services will benefit from having better trained and prepared personnel. The benefit of this training over normal military training being that it can be conducted in almost any countryside both at home and overseas.

Relationship between Expeditions and Military Operations

There are clear comparisons between expeditions and military operations. The self reliance required on an expedition includes a number of skills such as camping, feeding, water conservation, hygiene, etc., all of which are of tremendous value during operations whether on land, at sea or involved in air operations.

Powers of endurance used in an expedition can be directly related in a number of areas: load carrying with rucksack, covering ground on foot, extended periods of discomfort, sleep loss, enduring extremes of weather and many others.

Some qualities and skills are obvious, such as map reading and others not so such as the planning and organisation skills that are used.

Unit 14

Fundamentals of Nautical Studies

The criteria you must meet to achieve a Pass, Merit or Distinction Grade are laid down below.

To achieve a **Merit**, you must also complete all the **Pass** criteria.

To achieve a **Distinction** you must also achieve all the **Pass** and **Merit** criteria.

GRADING CRITERIA - PASS

To achieve a PASS grade the evidence must show that you are able to:	You show this by doing the following:
P1 Use a range of types of charts identifying conventional symbols.	<p>✓ Pass relevant syllabus</p>
P2 Plot position by latitude and longitude measuring distance between two points on a named chart by minutes of latitude showing the true bearing between two named points.	
P3 Apply the main rules of the road applicable to vessels in sight under way and making way.	
P4 List the sources of weather information available for those undertaking a coastal cruise.	
P5 Prepare a powered or sailing vessel for sailing and coming alongside.	
P6 Use sailing skills in a vessel under power or sail whilst under close supervision with an instructor on board.	
P7 List the emergency services available to assist vessels in distress at sea.	

GRADING CRITERIA - MERIT

To achieve a MERIT grade the evidence must show that you are able to:	You show this by doing the following:
M1 Plot Dead Reckoning (DR) using a named chart explaining the difference between true and magnetic bearings.	✓ Pass relevant syllabus or ✓ RYA Level 2 (Sail or Power)
M2 Analyse a given inshore weather forecast and predict its effect on a vessel undertaking a short passage.	
M3 Use sailing skills in a vessel under power or sail under the supervision of an instructor who may or may not be on board the vessel.	
M4 Explain the methods which could be used to summon assistance in the event of an emergency at sea and explain their use.	

GRADING CRITERIA - DISTINCTION

To achieve a DISTINCTION grade the evidence must show that you are able to:	You show this by doing the following:
D1 Produce a simple passage plan including alternative harbours taking into account tidal and weather information.	✓ Pass relevant syllabus or ✓ RYA Day Skipper - Practical or ✓ RYA Day Skipper - Shore Based plus RYA Level 2 (Sail or Power)

THERE ARE NO WORKBOOK QUESTIONS IN UNIT 14



Cadet Vocational Qualification Organisation

3 ARCHIPELAGO,
LYON WAY, FRIMLEY,
CAMBERLEY, SURREY GU16 7ER
Tel: 01276 601701

www.cvqo.org

Acknowledgments

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