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Let us build a healthy society

Well organized preventive and curative health services, good social and economic backgrounds and a clean environment are essential for having a healthy society. While it is important that people should be free from disease and deformity their physical, mental and social well-being are equally important.

In our previous lessons, we learnt how to improve and maintain our health.

Now it is time for us to go further and study what is meant by 'total health' and the factors that influence it. We will also learn about identifying suitable life styles to maintain total health, challenges to current health conditions and ways of overcoming them. This knowledge will help us build a healthy society.

Concept of total health

According to the World Health Organization (WHO),

Total health is not only being free from diseases and disabilities, but also having physical, mental, social and spiritual well-being.

Thus, 'total health' does not merely mean being free from diseases and disabilities.

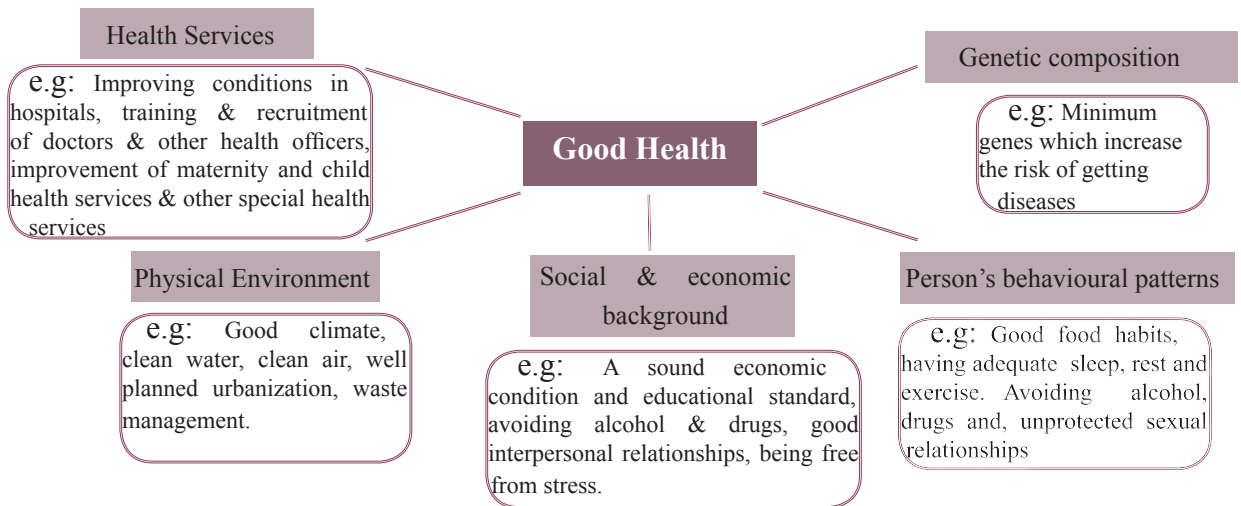
The factors influencing total health.

Total health depends on many factors. By engaging in physical educational activities one can develop all four constituents of total health, namely, physical, mental, social and spiritual well-being. By engaging in exercises and sports one can improve the health as well as the efficiency of various systems in the body. Similarly, engaging in team sports help in the improvement of the mental, social and spiritual aspect, of one's personality.

Although one can change his or her behaviour and certain elements in his/her physical environment, factors such as health services and effects of urbanization depend on the national policies of the local or central government. We have a

responsibility and a duty to change national policies according to the prevailing needs of the society.

Diagram 1.1 - Factors influencing health



Suitable life style to maintain total health

Our behaviour and life style has a great influence on our health. A few important life styles that will help to achieve total health are given below:

1. Good eating habits
2. Active life style and exercise
3. Maintaining an appropriate BMI
4. Adequate sleep and rest
5. Leading a simple life style
6. Stress management
7. Avoiding alcohol, drugs and smoking
8. Following accepted rules and regulations.

Good eating habits, an active life style and exercise help to maintain the BMI within a healthy range. This helps to improve one's physical and mental fitness as well as to reduce one's vulnerability to non-communicable diseases.

1. Good eating habits

Correct proportions of food from the following groups should be included in the diet to get the required nutrients to maintain total health.

- Grains (cereals) and tubers (yams)
- Vegetables
- Fruits
- Fish, meat, eggs and grains
- Milk and other dairy products
- Seeds rich in fat

(Good eating habits are explained in detail in chapter seven.)

2. Active life style and exercise

One can prevent getting non-communicable diseases like cancer, diabetes, high blood pressure, heart disease, stroke and maintain mental and physical fitness by engaging in daily physical exercises. Adults and children should engage in daily physical exercise for 30 and 60 minutes respectively. Walking briskly, running, cycling, swimming or engaging in some sport are few things one can do. Apart from these regular formal exercises, we can get exercise also by walking to nearby places instead of travelling in a vehicle, taking the stairs instead of using the lift or escalator, engaging in day to day house hold activities like cleaning, gardening etc.

Not only during our youth, but at every age one should maintain an active life style and engage in regular exercise. With age it is important to engage in regular exercise and lead an active life style to maintain physical fitness.

3. Maintaining appropriate Body Mass Index (BMI)

We have learnt, in lower grades how to calculate the BMI.

$$\text{Body Mass Index} = \frac{\text{Body weight (Kg)}}{\text{Height (m)} \times \text{Height (m)}}$$

The BMI of a child varies according to the age and gender. BMI values in the 5-19 years age group is interpreted using a chart specific to each sex. BMI of a child should be maintained within the green zone.

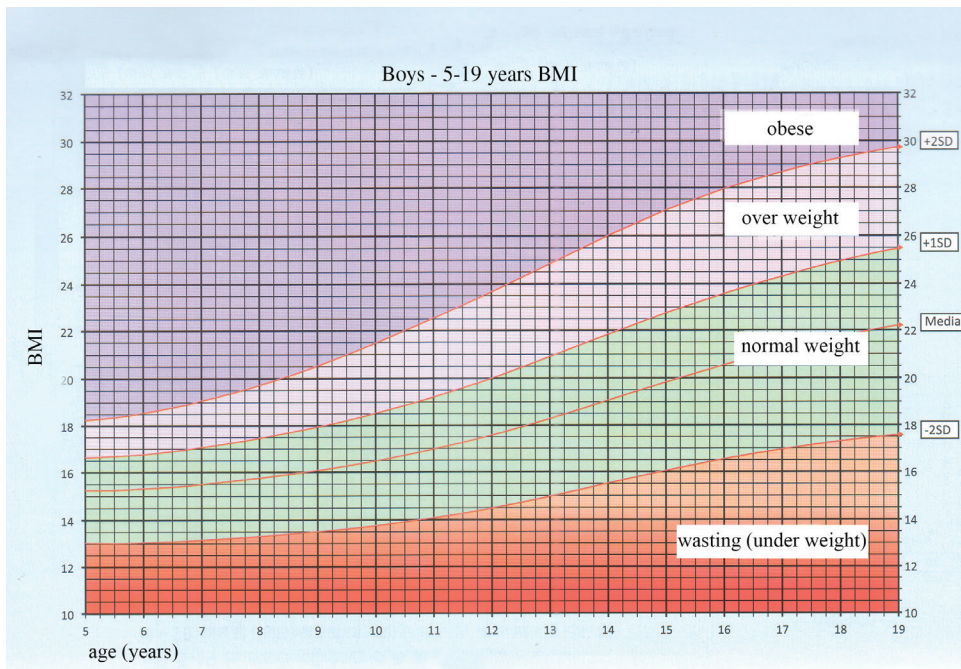


Chart 1.1

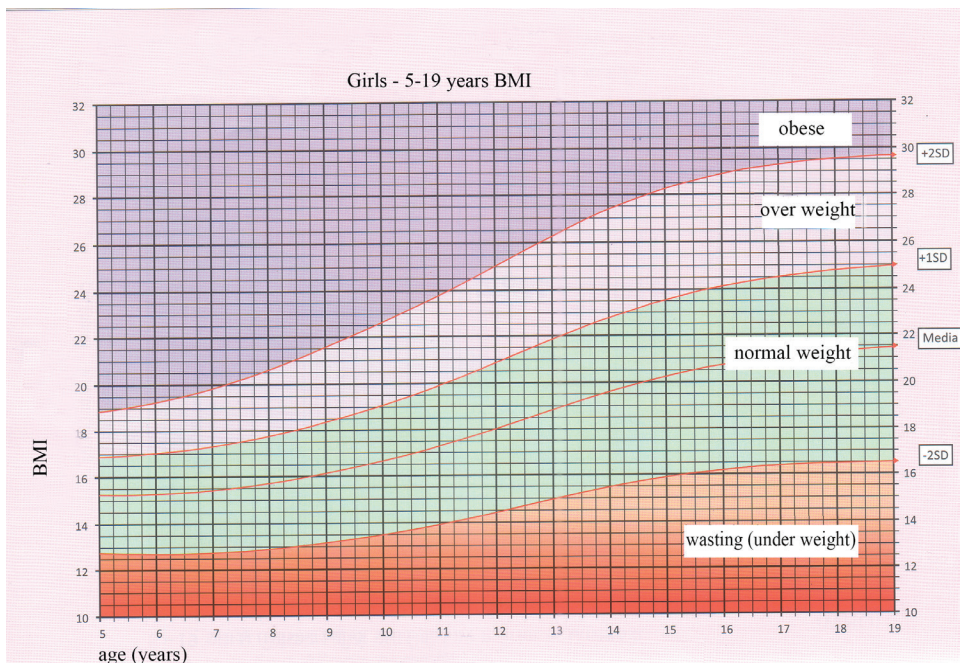


Chart 1.2

Source - WHO

Nutritional status of the individual is determined by the position where the BMI lies as given below.

Below -2SD	- (orange colour)	- wasting
Between -2SD to +1SD	- (green colour)	- normal level
Between +1SD to +2SD	- (light purple colour)	- overweight
Above +2SD	- (dark purple colour)	- obesity

BMI threshold values in adults do not vary with age and gender. The table below gives the ranges of international and asian BMI values for different nutritional status.

Table 1.1

Nutritional status	Asian measurement (kgm^{-2})	International measurement (kgm^{-2})
Wasting	< 18.5	< 18.5
Normal level	18.5 - 22.9	18.5 - 24.9
Overweight	23.0 - 26.9	25.0 - 29.9
Obesity	> 27.0	> 30.0

Being overweight and obese increase the risk of developing diabetes, high blood pressure, strokes, cancer and heart disease. Such individuals should reduce the intake of energy rich food and engage in more daily exercises.



Figure 1.1



Activity

1. Measure your height & weight and calculate your BMI. Plot it on the gender specific graph.
2. According to your position on the BMI chart, decide your nutritional level.

4. Adequate sleep and rest

After a hard day's work sleep is important. Sleep is vital for the body to get the required rest. It is vital for the growth and development of the body. Sleep also helps us to retain what we learnt when awake. An adult needs about 8 hours of sleep daily while children need more. Inadequate sleep leads to poor concentration, sleepiness, irritability and tiredness during day time and reduces efficiency.

5. Simple life style

A simple life is a way of life that has to be decided by one's self. Being content with a modest life and not chasing after luxuries is a very important factor. Another important factor is to reducing belongings to a minimum and managing your requirements with whatever you have. This concept was promoted by Mahatma Ghandi at the beginning of the last century.

6. Stress Management

Stress is how one reacts to a challenge. This differs from person to person. While one may get stressed over an examination another may not. When we encounter a challenging situation, our level of stress increases and this will help us to face the encountered challenge effectively in day to day life. Stress will also improve our efficiency some times. Long term stress could affect our health adversely. It could lead to poor mental and physical states. Looking for reasons for stress, expressing feelings, looking at the problems in different ways, proper time management are some ways that could be adopted to relieve stress. Adopting a simple life style helps to lead a stress free life. (The reasons for stress and ways to overcome them are explained in length in chapter 9.2)

7. Avoiding alcohol, drugs and smoking

Use of alcohol, drugs and tobacco is a great hazard to both physical and mental health. It also hinders social well-being and financial status. Research has shown that about 50% of the income of lower income families is spent on alcohol, drugs and tobacco.

Youth are attracted to abuse illicit substances. This is due to the image that has been portrayed about its use. Companies use attractive advertisements creating a good image for these products through the media. For example, using high profile figures such as athletes at public gatherings like games, incorporating scenes that use cigarettes and alcohol in movies are subtle ways used to promote and build an image of the product. Such advertisements as well as scenes in movies are banned in Sri Lanka for public viewing.

Peer group influence too, plays a major role in starting to use alcohol, drugs and tobacco.

Measures that can be taken to prevent the use of drugs, alcohol and smoking:

- Increasing the price of cigarettes and alcohol
- Limiting the places selling them
- Advertising of alcohol and cigarettes to be banned
- Taking effective legal action on the use and trafficking of illicit drugs
- Conducting awareness programmes for the public on adverse effects of smoking on health and socioeconomic effects
- Change the image that the society has placed on these items
e.g: pictorial depiction of harmful effects of smoking on the cover of the carton
- Cigarettes and alcohol to be sold only to adults

8. Obeying laws

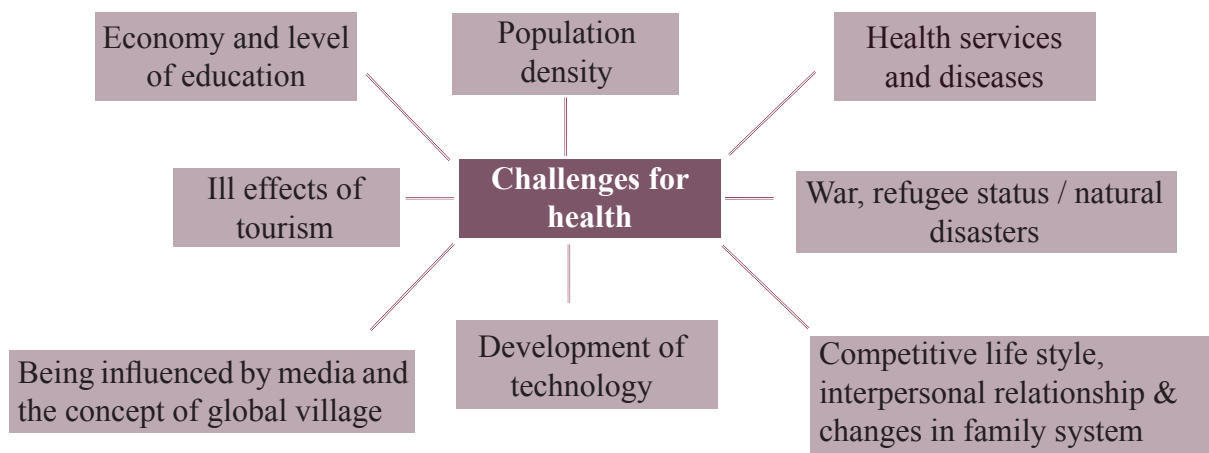
There are laws, rules and regulations introduced to enhance and protect public safety, public health and the general well-being of the public. You must always observe them and resist any temptation to act in breach of them. Respecting such laws, rules and regulations and norms is beneficial to everyone. During adolescence there could be peer pressure to break rules and regulations. For example, using seat belts in a vehicle and wearing helmets are few rules that are taken lightly by youth. Not following these rules could result in major casualties including death. Driving at high speeds and driving under the influence of alcohol are two main reasons for road accidents. Although smoking is prohibited in public places, some break this law and create a health hazard to others as well.

Promiscuous sexual conduct can expose one to the risk of contracting sexually transmitted diseases and unwanted pregnancies. Due to illegal abortions a large number of females get infections, become sub-fertile and even die.

Challenges to maintaining total health

As we have mentioned before an individual's health depends on his or her genes and behaviour, the physical, social and economic factors affecting him or her and the health available services. In this section we will find out how physical, social and economic factors affect our health.

Diagram 1.2 - Challenges to maintaining total health.



Economy and the level of education



Figure 1.2

A country's economic status and the level of education of the public affect the health status of a country. This has a great impact on its economic development. Factors such as income, nutrition, clean drinking water, sanitation, spacious and well ventilated houses and availability of medical facilities are important for health. These factors are determined by the economic status of the individual as well as

the country.

The level of education of the community has a direct impact on health. Sri Lanka is a middle income country but it has a very low infant death rate and high life expectancy rate.

Health services and diseases



Figure 1.3

The other important factor to maintain good health standards in Sri Lanka is the high quality of medical services that are provided free of charge by the government of Sri Lanka through a network of hospitals and M.O.H. offices across the country. The national immunization programme, school health services, maternity clinics and the services provided by public health midwife (P.H.M.) and public health inspector (P.H.I.) have helped to improve the health status of Sri Lankans. The certification of a healthy environment when building a home can be a part of the programme.

Due to the development of medical science, the health services have improved and infectious disease are under control but bad eating habits and inadequate exercise have led to an increase in obesity. This has resulted in a rapid increase of non-communicable disease such as diabetes, high blood pressure, heart disease and strokes. The elderly population in Sri Lanka is also increasing. Due to these reasons the health service is facing a huge challenge at present.

Internally displaced due to war and natural disasters



Figure 1.4

Many obstacles arise when providing health services in areas affected by war or natural disasters. These situations have a great impact on the mental health and social well-being of those who are internally displaced.

Competitive life style and interpersonal relationship

The present education system and job opportunities are very competitive. Due to this reason people have no time to enjoy life and the leisure time has been reduced, leading to increased stress. Due to lack of time family bonds and inter personal relationships have weakened.

Development of technology

Technological innovations have helped human kind immensely. Innovations in the medical field are of a very high standard. Although technology has made our daily life comfortable and easy, it also has made us lazy. We hardly exert ourselves and as a result, non-communicable diseases are increasing.

Influence of the media and the concept of global village

The media and the internet have a great impact on our behaviour and beliefs. Commercial advertisements may at times have a bad influence on us. Unhealthy food advertisements can have a bad influence on children. Watching television, using computers and spending more time at computer games can adversely affect the mental and physical health of both children and adults.

The media can be used for the betterment of human kind. It can be used to make the public aware of diseases, unhealthy lifestyles and bad practices happening in the society.



Figure 1.5

With the development in the fields of transport, media and the internet the whole world has become a global village. So both good and bad lifestyles spread across the world within a short span of time,

Influence of the tourism industry

Tourism helps to build ties between countries and nations, generates foreign exchange and improves infrastructure. Tourism can also have negative effects such as environmental pollution, increase in adverse situations like prostitution and spread of sexually transmitted diseases, circulation of illicit drugs and damage the culture.



Figure 1.6

Population density

Population density is a measurement of population per unit area of land. Diseases related to respiratory and digestive systems and stress have become common due to the increase in the population density.



Activity

- Make a list of commercial advertisements that have an impact on health which are telecasted over television, broadcasted over radio and published in the newspaper during a period of one week.
- Explain the impact on health through those advertisements.

Actions to be taken to overcome challenges faced in achieving total health

1. Uplifting the educational level of the people
e.g: Making health education compulsory
2. Strengthening both preventive and curative (treatment) sectors of health service.
3. Identifying problems that are arising due to competitive lifestyles, technology, influence of media, concept of global village and take steps to increase public awareness about these and ways of overcoming them.
4. Uplifting the economic status of the people.
5. Identifying effects of increase in population density on health and finding solutions for them.
E.g: Increasing the staff in the health service sector.
Introducing housing projects with adequate sanitary facilities.
6. Organizing awareness programmes, for school children and the community in areas frequented by tourists, on possible health and social problems that would arise in these areas and find solutions and be prepared to face them.
7. Uplifting the welfare of the displaced people.
8. There must be government policy planning focused on maintaining total health.

Summary

Genetic composition, behavioural patterns, social and economic background, physical environment and health services are the main factors that affect our health. Factors that are important to achieve total health are good food habits, active life and regular exercise, maintaining appropriate BMI, adequate sleep and rest, adopting a simple life style, avoiding drugs, alcohol and smoking, reducing stress, abiding by rules, regulations and socially accepted norms. Economic status, level of education, health service, war and displacement, competitive life styles, interpersonal relationships, technology, media, diseases, changes in family bonds, concept of global village and tourism industry are the main challenges to health. We have to overcome these challenges in order to achieve a high standard of health in society.



Exercises;

1. Name five factors which affects a person's health.
2. Write three lifestyles which help to maintain total health.
3. Name four challenges which affect the present health status.
4. Mention one step that can be taken to overcome each of the challenges mentioned above.

Let us maintain fitness for a healthy life

In order to lead a healthy life, it is important to maintain mental, social and physical fitness. Physical fitness is a combination of skills we can improve for maximum and correct performance of physical activities. When we successfully face challenges, live productively and happily it is known as mental fitness. Maintaining a good relationship with the society, contributing to the society and one's self is social fitness.

In previous grades under the section of fitness for a healthy life, we learned about tests to measure physical fitness, programmes to develop physical fitness and about mental fitness.

The first part of this lesson is on important factors for health related fitness and available programmes to develop these factors. The second part will deal with ways of maintaining the psycho-social well being by controlling emotions and relieving stress.

9.1 Health related physical fitness

Physical fitness is a set of attributes or characteristics that people possess or can be achieved which relate to the ability to perform day to day physical activities effectively.

Health related physical fitness is factors that help a person to maintain good health.

Following are the five components of health related physical fitness.

1. Cardio vascular fitness
2. Muscular endurance
3. Muscular strength
4. Flexibility
5. Body composition

The above factors can be further developed by engaging in exercise, training, having a balanced diet and having adequate rest. Let us learn more about these five components.

Cardio vascular fitness

Cardiovascular fitness refers to the ability of your heart, lungs and organs to consume, transport and utilize oxygen. There should be uninterrupted supply of oxygen and nutrition to the tissues to work for long periods as well as to remove the waste. The circulatory, respiratory and excretory systems work jointly for the optimum functioning of the muscles.

The energy required by the body is produced through aerobic metabolism by utilizing oxygen and nutrients.

Developing fitness will help us to do our work without much effort within a short period of time. The performance of those engaged in long distance running, football, walking and swimming will also be better.

Activities helpful in developing cardio vascular fitness

1. Brisk walking
2. Jogging
3. Cycling
4. Swimming
5. Aerobics

When engaging in such exercises it is important that the pulse rate is maintained above the normal rate. It is advisable not to use automated equipment in our daily life where you can exert your self.



Figure 9.1 - Brisk walking

e.g: Walking briskly
Sweeping the compound rhythmically for a long time

Benefits of developing cardio vascular fitness

1. Improves oxygen circulation in the body
2. Able to perform more work with less effort
3. Burning fat and weight reduction
4. Maintains mental well being
5. Improves performance in sports and other physical activities
6. Effective clearance of waste from body

Muscular Endurance

Muscular endurance is the ability of a muscle or a group of muscles to sustain repeated contractions against a resistance for an extended period of time. Developing this fitness has a direct influence on improving the health of a person. This can be improved by engaging in day to day activities, activities that can be performed using one's own body weight and activities that can be done using external resistance.

Exercise that can develop muscular endurance

It is important to engage in these activities for a long duration or do many repetitions.

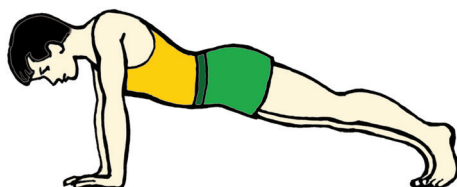


Figure 9.2 - Push - ups

- Activities using body weight
 1. Different types of jumps
 2. Push ups
 3. Dips
 4. Playing football/badminton
 5. Running on the beach
 6. Cycling
 7. Hiking
- Activities/exercises using extra weight and multiple repetitions.

Apart from this, it is important to do daily chores without using automated equipment e.g: drawing water from a well, working in the garden, pounding flour, chopping firewood, etc.

Benefits of developing muscular endurance

1. With less effort we can engage in more demanding work for a long period of time.
2. With less effort we can perform more work.

Muscular strength

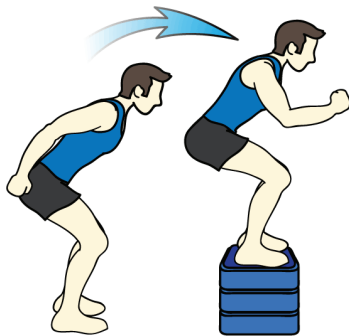
Muscular strength is the ability of a muscle to exert maximal force through a given range of motions at a single given point.

In order to perform day-to-day activities smoothly a strong set of muscles are needed. For example, carrying a weight, pushing a weight.

Similarly developing this strength is important when engaging in sports. Throwing the put shot and weight lifting are examples of some of them.

Activities that help in developing muscular strength

To develop muscular strength one should engage in activities lesser number of times as this will give more resistance.



Jumping exercises



Throwing heavy objects

Figure 9.3

1. Weight lifting activities under supervision of a trainer
2. Engaging in jumping exercises
3. Engaging in push ups
4. Engaging in dips
5. Throwing heavy objects

Along with the above activities engaging in the following activities such as drawing water from a well, pushing a loaded wheel barrow will help to develop muscular strength.

Benefits of developing muscular strength

1. Proper functioning of the blood vessels and muscles.
2. Improvement in the functioning of the muscles.
3. Ability to generate more muscle power.
4. Better functioning of joints and muscles.
5. Improved self-image.
6. Improvement in the co-ordination of movements.
7. Ability to maintain a good posture.
8. Ability to prevent injuries.

Flexibility

Flexibility is the range of motions in a joint or group of joints. For flexible movement of joints, the length of the muscles, state of the ligaments and joints are important.

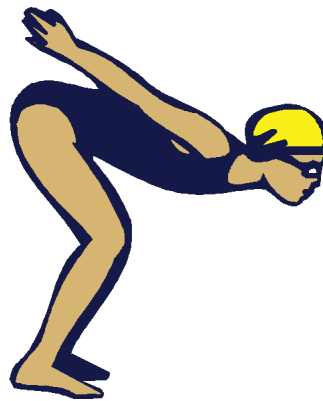
Limitations in flexibility will affect the function of the joints and the efficiency of the person decreases. As a result various joint ailments and injuries could develop.

By engaging in exercises, to suit different joints, one will be able to develop flexibility.

Activities to develop flexibility



Ballet dancing



Swimming

Figure 9.4

1. Stretching exercises
2. Yoga exercises
3. Gymnastics
4. Swimming
5. Ballet dancing

When engaging in the above exercises, and day-to-day activities such as chopping fire wood, drawing water and working in the garden flexibility can be improved.

Benefits of developing flexibility

1. Joints function to the maximum capacity
2. Minimum joint related ailments
3. Helps to maintain balance
4. Helps to improve posture

Body composition

The human body is composed of water, protein, minerals and fat. This is called body composition. Body composition can be divided into two main components.

1. Fat component
2. Fat free component

Fat component includes all the fat in the body. Fat free component is composed of all the non-fatty tissues of the body, including bones, muscles, organs and connective tissues.

The amount of fat in a healthy person is mentioned as a percentage of the body weight. Generally for a male it is between 20% - 25% while for a female it is 30% - 35%. Risk of getting a non-communicable disease is associated with a high level of fat in our body. Therefore it is important to maintain the proper percentage of fat in the body from young age.

Things that can be done to maintain a proper body composition

1. Have a healthy, well-balanced diet.
2. Minimize the intake of salt, sugar and oily food.
3. Engage in aerobic exercises or sports for at least 30 minutes daily.
4. Avoid using alcohol.

5. Get adequate amount of sleep and rest.
6. Whenever possible engage in day-to-day activities with minimum use of equipment
e.g: walking, climbing steps etc.
7. Engaging in day-to-day activities enthusiastically and actively.

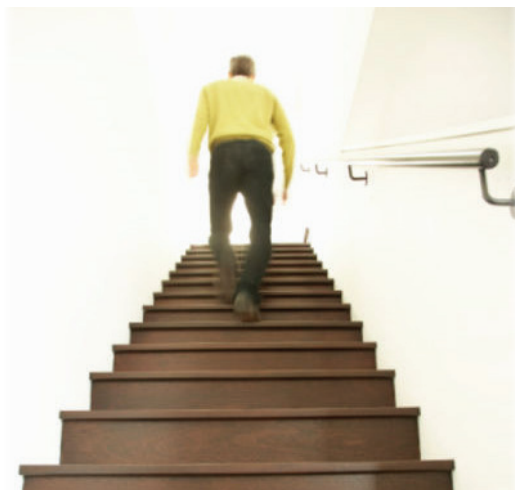


Figure 9.5 - Climbing steps

Benefits of having the correct body composition

1. Be healthy
2. Be efficient
3. Minimize injuries and disabilities
4. Reduce risk of non-communicable diseases
5. Develop a good physical appearance



Activity

Plan an activity, incorporating different types of activities that will help develop muscular endurance.

Do this activity with your friends with help from the health science teacher.

Proper nutrition as well as physical exercise is important to lead a healthy life. We can use the “food pyramid” to learn about healthy food and use the “physical activity pyramid” to develop physical fitness.

Activity pyramid

Through the activity pyramid one can be certain how to maintain a healthy life by taking part in exercises and the time to be spent on the same.



Figure 9.6 - Activity pyramid

9.2 Psycho-social well-being

Psycho-social well-being is the ability to use talents and abilities to cope with stressful situations, work effectively and contribute positively to the society. Maintaining a very good physical and mental state is important. Emotions develop within a person and balancing them is very important for positive mental and physical health. The way we think in a situation, one's personality and behaviour of others affect our emotions.

Psycho-social well-being could be achieved by identifying positive and negative emotions, the reasons for them, the reasons for stress, its features and steps that can be taken to minimize stress.

Control of emotions

While playing a game of cricket with friends, Piyal misses a catch when Kumara the highest scorer was batting. Sunil gets angry over the issue and blames Piyal. Pubudu intervenes and settles the argument between Sunil and Piyal.



Activity

We come across many such situations in our day to day life.

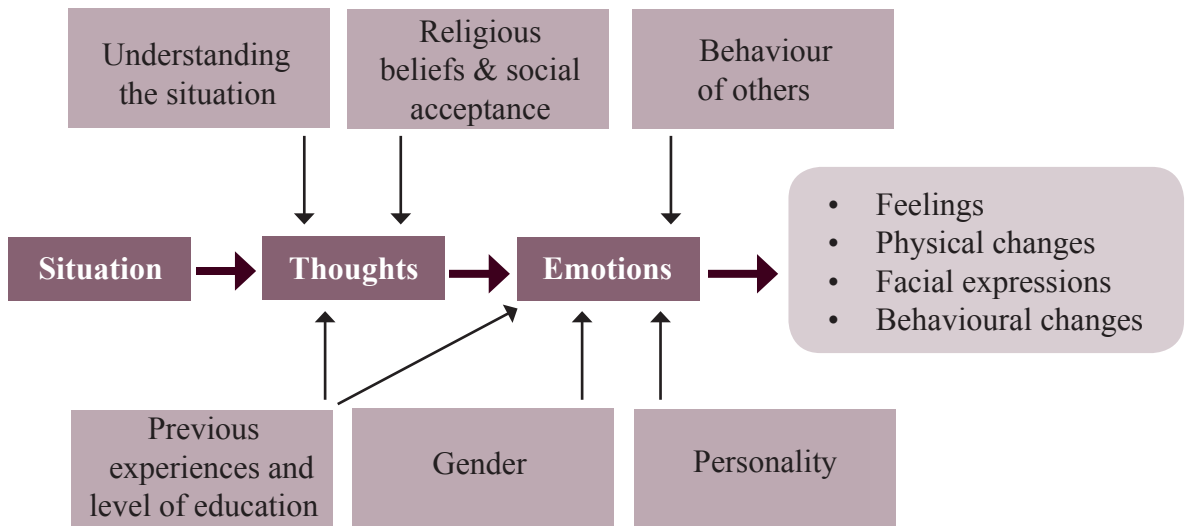
1. What are the emotions shown in the above situation?
2. What are the reasons for such emotions?

Emotion means a strong feeling. It can change our activities externally as well as internally. Emotions could also be identified as thoughts that occur very fast and instantly in the mind of a person.

We have pleasant emotions as well as unpleasant emotions. Happiness, appreciation, exaltation, compassion, and being bountiful are a few pleasant emotions. Anger, fear, disgust, sorrow and jealousy are a few unpleasant emotions.

Factors affecting emotions

Diagram 9.1



According to the above diagram many factors affect emotions. Let us find out reasons for Sunil's anger. The way we look at situations and what we expect in such situations affect our emotions. If Piya had not missed the catch at a crucial point of the game it is possible that Sunil would not have got very angry. Sunil's and Pubudu's different reactions to the situation show how persons with different personalities differently react to the same situation.

There are other reasons that affect emotions. The way males and females express their emotions or feelings are different. Generally males hesitate to express fear or sorrow. In certain cultures, feelings or emotions are not expressed openly. Some emotions and feelings that are expressed may depend on past experience

e.g: Due to a road traffic accident in the past, a person may be reluctant to drive a vehicle.

Feelings and behaviour of others could affect our emotions. While watching a sports event if a group behaves in an unruly manner it will entice the others to behave in the same manner.

Changes that occur due to emotions

Physical changes such as an increase in the rate of heart beat, increased blood pressure, rapid breathing, increased sweating, dryness of the mouth and lips occur when an individual is subject to emotions like anger and fear. These changes help one to make a decision whether to escape or fight the situation. Characteristic facial expressions can be seen according to different emotions. Think for a while the changes you could see when you are sad, happy or afraid. These changes help others identify your emotions. Emotions can affect our decisions. It could make us take wrong decisions. Emotions can affect our behaviour and situations that create anger can result in one becoming aggressive. Even at times where positive emotions occur, one must not behave in a manner that would harm others.



Activity

Complete the following chart with the help of the teacher.

Results of positive emotions	Results of negative emotions

Stress

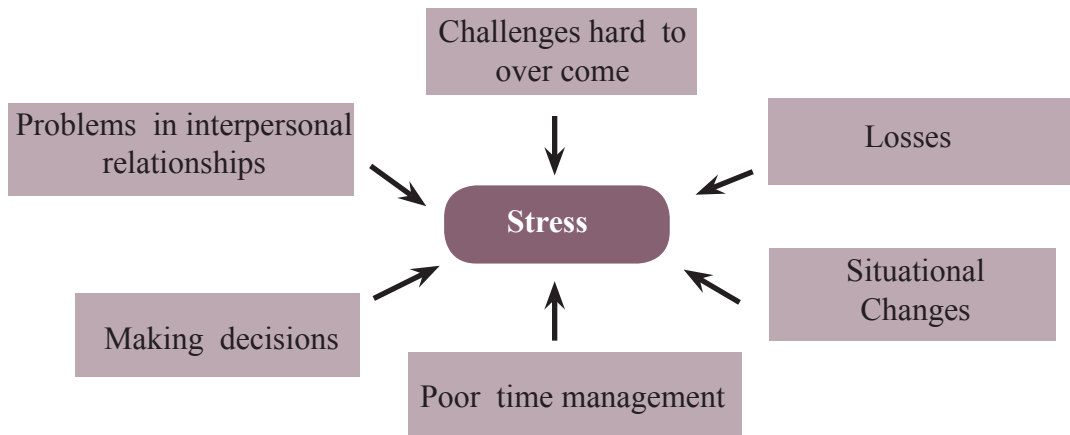
Stress is the pressure or worry caused by a problem and is a mental reaction to a situation involving challenge or danger. A moderate amount of stress helps us to engage in our day-to-day activities effectively. The stress to do well at an examination is a challenge and that stress helps you to study better but excess stress will interfere in our activities.

Stressful situations faced by students

1. Facing exams
2. Entering a new school
3. A close friend leaving school
4. Participating in sports
5. Brawls between parents
6. Separation from parents

Factors or situations affecting stress

Diagram 9.2



1. Problems in interpersonal relationships

A common reason for stress is found to be problems due to interpersonal relationships. Misunderstandings between parents, parents and children, employers and employees or among friends can lead to stressful situations.



2. Losses

Loss of something we enjoyed or loss of a person that we liked very much may lead to development of stress. A very close friend leaving school, parents going overseas, are a few instances that we get separated from loved ones. Similarly loss of money or property also leads to the development of stress. Situations where expectations are not met or self-respect is tarnished, can be considered as losses leading to stress.

3. Situational changes

Many changes take place in our day-to-day life. Achieving recognition through hard work, becoming a games captain or a promotion in the job are a few examples. Achievement of recognition brings happiness, but the effort to maintain it and the responsibility associated with it and the expectations can give us stress. Marriage, becoming parents, starting a job also gives rise to stress. These can be recognized as situational changes that contribute to stress.

4. Making decisions

In our day-to-day life, in different situations we make decisions. Selecting subjects or selecting a new school are some situations we face, where we have more than one choice. As we want to make the best selection, it would lead to development of stress.



5. Challenges that are difficult to achieve

Ambitions that are difficult to achieve or challenges difficult to overcome can also be a reason for stress. These are either expectations created by us or targets laid down by others which we strive to achieve. Facing such challenges successfully help us to have good mental and social well-being.

6. Poor time management

Poor time management is one of the main reasons for people to develop stress. Some students are able to attend to their studies while engaging in house hold activities as well as extra-curricular activities such as sports or music due to good time management.



Bullying

Very often school children are bullied. This can take place targeting a particular student in the class. This can take the form of harassing a student by mocking or joking which would tarnish the individual's self-esteem or stealing his belongings. The person getting bullied can find it intolerable suffer mental and physically. Such incidents occur when one tries to cover up one's own defects/short comings and demonstrate that he/she is better. The victims of bullying could face long term psychological distress. Ragging carried out at certain institutions can also be considered as a form of bullying. If you happen to witness bullying of any kind informing the teacher is our duty and responsibility.

Characteristics of stress

Certain physical changes can occur due to stress. As explained in the section on emotions, palpitation, high blood pressure, sweating, dryness of the lips are some such visible physical changes. These changes are important as they give energy either to face or escape the situation. Undergoing stressful situations for a long

time can lead to the development of the following mental and behavioural changes.

Table 9.1

Physical characteristics	Mental Characteristics	Behavioural changes
Increase in pulse rate	Irritability	Quarrelsome
Increase in blood pressure	Reduced concentration	Less active
Breathing very fast	Forgetfulness	Restless
Sweating	Desolation	Reduced interaction with others

Consequences of long term stress

Long term stress has many adverse effects on health:

- High risk of getting non-communicable diseases, such as diabetes, high blood pressure, heart disease and mental illness
- Depression

Losses and difficult challenges can lead to depression. Feeling sad most of the time, crying, preferring to be alone, reduced activity are some characteristics of depression. Medical advice is very important for this condition.

Managing stress

A few points to manage stress:

1. Identify reasons and implement alternative methods for dealing with stress
2. Express feelings
3. Understand the reality of the problem
4. Proper time management
5. Stress management – face it positively or control it confidently.

1. Identifying reasons and ways of coping with stress

Although some suffer from stress, the clear reasons for their stress are not clearly identified. The first step in the management of stress is to identify the reason for it. Once the problems are identified they should be solved by starting with the easiest ones.

It is important to work to minimize stressful situations e.g: accepting a work load that is possible to manage. Therefore it is important that one accepts work that is within one's capacity.

2. Expressing feelings

During times of stress talking and discussing about them with friends and family will help to reduce the stress. Stress that could develop due to negligence or carelessness of others at work place could also be overcome by discussing with them.

3. Understanding the reality of the problem

Looking at the stressful situation in a positive way, would help to relieve stress. As an example, when you are late to work due to traffic, by blaming the other drivers or tooting the horn results in increased stress. Understanding that you are not able to control the traffic and being calm will help you to reduce your stress. Reducing stressful situations eg. finding ways of avoiding traffic such as leaving before the traffic builds up or using alternative routes is another way of coping.

4. Proper time management

Education and job related stress can be well reduced by proper time management.

Stress could lead to behavioural changes in people. This brings negative effects on the individual as well as on others around you.

Behaviour that could be seen in people due to stress

1. Squabbling with others
2. Smoking
3. Using illicit drugs and alcohol
4. Binge eating or excessive intake of food
5. Postponement of work

Activities that we can indulge in to reduce stress in our daily life



Meditating



Yoga exercise



Engaging in games



Swimming

Figure - 9.8

1. Have adequate sleep and rest
2. Take a 30 minute walk daily, Engage in games such as volleyball, football etc. and in activities such as running and swimming
3. Engage in religious activities, meditation and exercises to develop concentration.
4. Enjoy the natural beauty
e.g: enjoy the scene of setting sun / sun rise
5. Peer group companionship
6. Listen to music
7. Engage in leisure activities
8. Rearing pets

In order to maintain good mental health it is important to be always of good behaviour and not only when faced with stressful situations. This can be achieved through walking, engaging in sports etc. It will improve our physical as well as mental health. Listening to music and engaging in hobbies help to improve mental health and reduce stress. As a result this helps us to face stressful situations successfully.

In stressful situations You can get the help of the counselling unit of your school or "Suwa sariya" of the Ministry of Health Education Bureau.

Suwa seriya - 0710107107 - www.suwasariya.gov.lk



Activity

Think of a stressful situation you faced. Make a small report on your behaviour at that moment

Summary

There are five components of physical fitness. They are cardiovascular fitness, muscular endurance, muscular strength, flexibility and body composition. Improving these five components directly help to lead a healthy life. To improve health related fitness we can engage in many activities such as games, exercises and getting involved in routine household activities. Leading a healthy life should begin in one's childhood. Using the food pyramid and physical activity pyramid, to plan a healthy diet and engage in adequate physical activity respectively, will help people to lead a healthy life.

We have positive as well as negative emotions. These emotions can bring about mental and physical changes in us, and influence our decisions and behaviour. Problems in relationships, situational changes, decision making, challenges, losses and poor time management are reasons for stress. To manage stress successfully, we should identify the reasons for stress, understand the reality, express feelings freely, and have good time management and stress management strategies.



Exercises;

1. Write five components of physical fitness.
2. Mention three benefits of improved cardio vascular fitness.
3. Mention three benefits of improved muscular strength.
4. Mention five activities that can be adopted to improve flexibility.
5. Mention three factors that will influence the development of emotions.
6. Mention five factors that will influence the development of mental stress.
7. Mention four activities that can be adopted to relieve stress.

Let us have nutritious food for healthy living

In order to lead a healthy life, it is important that we consume nutritious food. These nutrients are needed for growth, repair of worn out tissues, protection from illnesses and to provide energy needed for different functions of the body. Nutritional problems arise when we don't get the proper dietary requirements. Therefore food intake plays a major role in leading a healthy life.

In the previous classes we learnt about the nutrients in the diet, preparing a well-balanced diet using the food pyramid, changes in food intake at different stages of life, food spoilage and preservation and different beliefs about food.

Being the future of the country, you can help to minimize the nutritional problems in the society. Improving our knowledge on nutrition, will help to develop good food habits, help to prepare menus to suit different needs. This lesson, will help us learn about common nutritional problems, their effects, and ways to minimize these problems.

The importance of nutritious food

A good physical, mental, social, and spiritual well-being results in a healthy person. If a person has a poor nutrition the following symptoms can occur.

1. Reduced energy
2. Mental unfitness
3. Poor immunity
4. Long term illnesses
5. Poor health

The working capacity of a person with a poor nutritional condition will be lower than a person with a good nutritional condition due to the above reasons. This has a negative effect on the personal life and in general the economy of the country. When children are affected by nutritional problems, it affects their education, capacity to think, growth and personality. It adversely affects the individual, the family and the nation as a whole.

Nutrients in Food

The nutrients in food are divided into two main components, macronutrients and micronutrients.

Macronutrients and micronutrients

Macronutrients

Nutrients in the diet that are required in large amounts are called macronutrients. Carbohydrate, protein and fat are considered as macronutrients.

Micronutrients

Nutrients in the diet that are required in small quantities are called micronutrients. Vitamins and minerals are micronutrients. They are needed to protect the body.

The nutritional problems in Sri Lanka

Malnutrition

Malnutrition occurs due to lack of proper nutrition as well as excessive consumption of nutrients.

There are two types of malnutrition:

1. Undernutrition
2. Overnutrition

1. Undernutrition

The common nutritional problem that developing countries face is undernutrition. Undernutrition results when the required amount of macronutrients are not taken in the diet. Any person of any age can develop undernutrition. However all over the world the main victims are children. The adverse effects of undernutrition, could have long term effects at different stages of life.

Different effects of undernutrition are given below:

1. Stunting (inadequate height for the age) - height being below -2 SD line in height for age chart
2. Wasting (inappropriate weight for the height) - BMI below -2 SD line in BMI for age chart

We have learned about these assessments in detail in chapter one.

The problem of undernutrition arises as a result of lack of required nutrients to the body. This could occur due to the lack of the essential nutrients during a short or over a long period of time e.g: Diseases such as diarrhoea or worm infestations can lead to temporary weight loss leading to wasting.

Harmful effects of undernutrition:

1. Inactivity and being less productive
2. Retarded physical growth
3. prone to diseases
4. Being poor concentration and memory power
5. Learning difficulties
6. Low life expectancy
7. Under nourished females give birth to low birth weight babies and there could be an increase in infant death rates.

2. Overnutrition

Over nutrition has become a major nutritional problem all over the world. Overnutrition results when excess amounts of macronutrients are consumed. Especially excess intake of sugar and fat in our diet is the main reason for overnutrition. The following are two examples of overnutrition.

1. Overweight - weight not proportionate to height. This has the risk of developing obesity (BMI between +1SD to +2SD line in BMI for age chart)
2. Obesity - inappropriately high levels of weight to the height. This is a disease state.(BMI above +2SD line in BMI for age chart)

The BMI is also used to assess an adult's nutritional status. In the first chapter we learnt how to assess the nutritional status of adults using the BMI.

Obesity can lead to the following problems:

1. Prone to non-communicable diseases such as heart disease, diabetes and stroke
2. Diseases related to joints and bones
3. Reduced efficiency at work
4. Social problems
5. Psychological issues



Activity

Make a list of food items that are suitable to be taken and items that should be limited by an overweight or obese person.

Micronutrient Deficiency

Lack of micronutrients in our daily food intake, over a long period results in micro nutritional deficiency. The most common micronutritional deficiencies are given below.

1. Iron deficiency
2. Iodine deficiency
3. Vitamin A deficiency
4. Calcium deficiency
5. Zinc deficiency

Reasons for micro-nutrient deficiencies, symptoms and preventive actions.

Iron deficiency

causes of iron deficiency

- Less intake of iron rich food
- Iron is not absorbed easily
- Incorrect food habits
- Bleeding into the intestines due to worm infestations
- Excessive bleeding during menstruation

Harmful effects of iron deficiency

- Anaemia
- Lethargy
- Low birth weight babies
- Fatigue
- Poor concentration
- Growth retardation

- **Preventive actions that can be taken to reduce iron deficiency**
- Include food rich in iron in the daily diet. Especially animal proteins (meat, eggs, red rice, beans, cashew nuts, peanuts)
- Pregnant mothers should take a well-balanced iron rich diet
- Items such as tea and coffee should not be taken 1-2 hours after the main meal
- Eat food that improves the absorption of iron (Lime with green leaves, fruits after a meal)
- Selecting iron fortified food
- Take the iron tablet given to children at school by the government

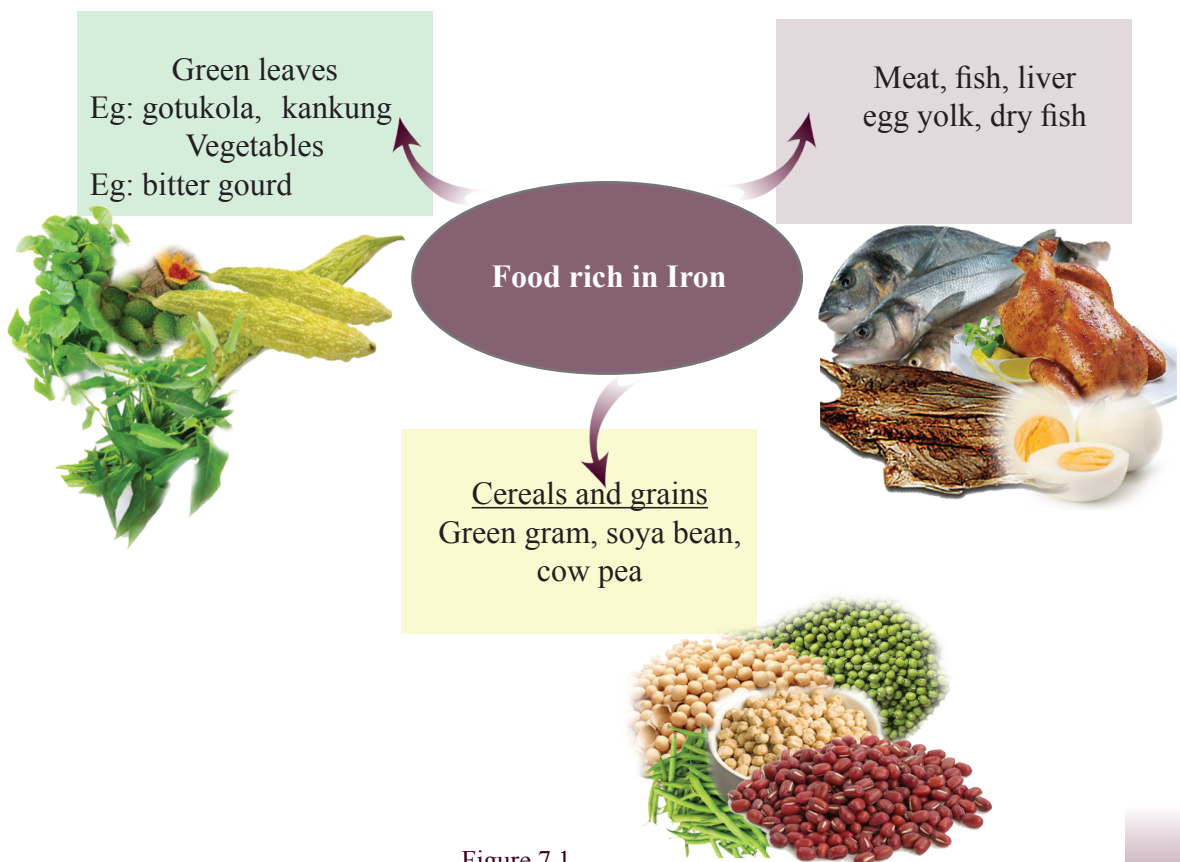


Figure 7.1

Vitamin A Deficiency

causes of Vitamin A deficiency

- Babies not being given breast milk for an adequate period
- Improper food storage
- Improper preparation of food
- Frequent worm infections
- Low intake of food rich in vitamin A

Effects of vitamin A deficiency

- Night blindness
- Bitot's spots in the eye
- Dryness in the eye
- Weakness in sight
- Diseases of the respiratory tract often contracted
- Diarrhoea easily developed

Preventive actions that can be taken to reduce Vitamin A deficiency

- Increase the daily intake of green and yellow coloured vegetables and fruits
- Taking the vitamin A drops orally, which is given through state institutions
- Continue breast feeding up to 2 years of age
- Take steps to provide colostrums in milk during first few days of life of a newborn as it is rich in vitamin A

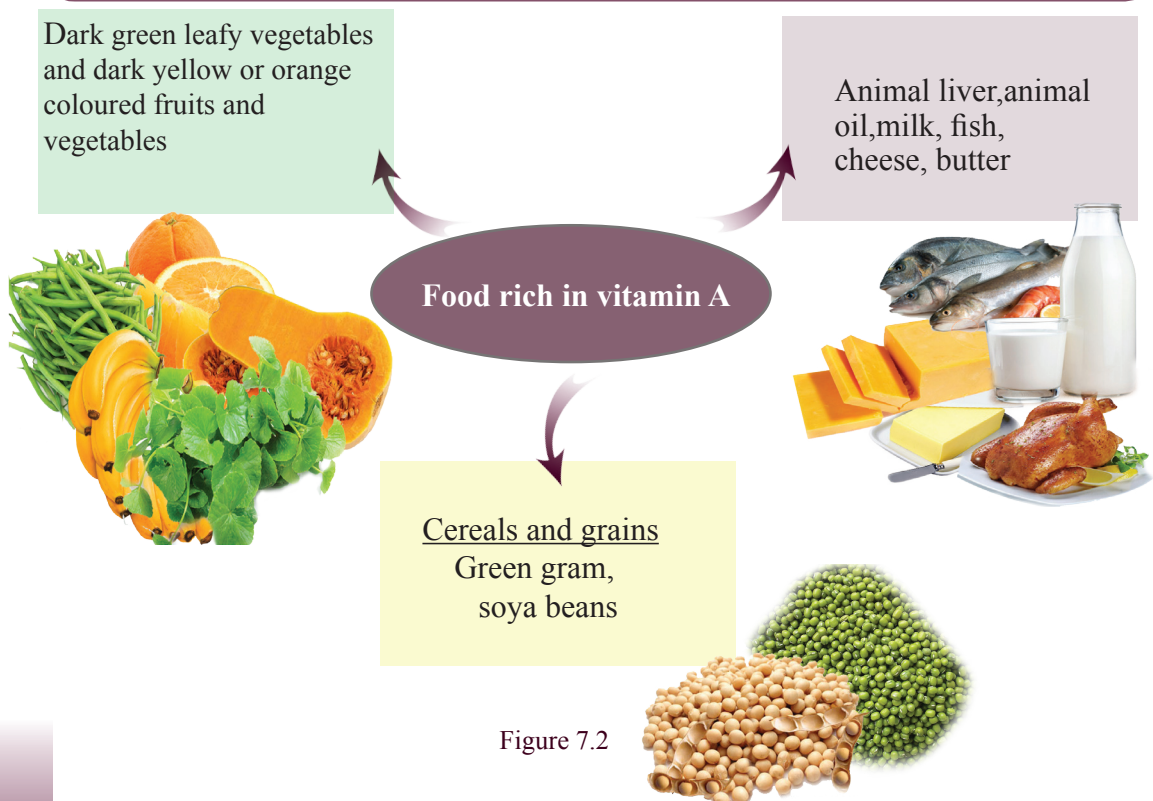


Figure 7.2

Iodine deficiency

Causes of iodine deficiency

- Lack of iodine in the diet
- Sea vegetables not being popular
- Loss of iodine in soil due to erosion in the hill country, vegetables grown there will be deficient in iodine
- Iodized salt kept in warm places and iodine being evaporated (stored near fire place)

Effects on iodine deficiency

- A decrease in thyroxin production
- Prone to develop goiter
- Slowing of mental development
- Poor concentration
- Poor school performance
- Retarded growth, especially height

Preventive actions that can be taken to reduce iodine deficiency

- Use of iodized salt when cooking
- Add fish and sea vegetables to the diet

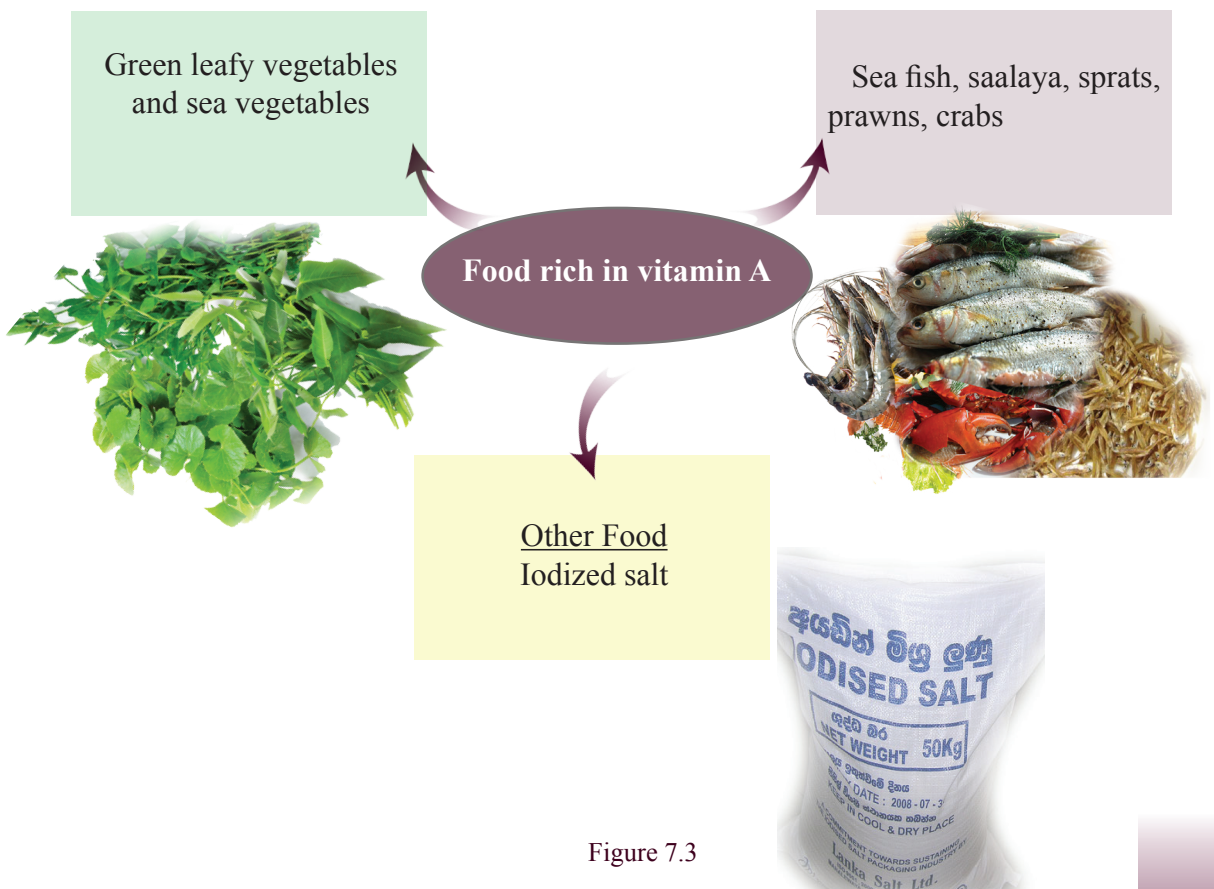


Figure 7.3

Calcium deficiency

Causes of calcium deficiency

- Lack of intake of food rich in calcium
- Consuming food that obstructs the absorption of calcium

Harmful effects of calcium deficiency

- Causes Osteoporosis
- Tooth decay
- Growth retardation

Preventive actions that can be taken to reduce calcium deficiency

- Increase the intake of food rich in calcium
- Increase the intake of food rich in vitamin D
- Consume food that helps to absorb calcium (lactose containing food)



Figure 7.4

Zinc deficiency

Zinc is an important mineral as it strengthen the immune system, helps carbohydrate breakdown and stimulate growth, division and reproduction of cells. Zinc deficiency can lead to frequent infections, delayed or stunted growth etc.

Zinc is found in protien rich foods such as beans, red meat, peanuts and marine foods.

Steps to be taken to prevent nutritional problems.

1. Pregnant mothers to be made aware of the importance of breast feeding during the first few days, to ensure that the baby gets colostrum which is rich in vitamin A.
2. Exclusively breast feeding babies during the first 6 months as it provides all the necessary nutrients for physical and mental development.
3. Having a well-balanced healthy diet.
4. Having meals at regular times and not skipping breakfast.
5. Get used to the habit of taking natural food and reduce the intake of fat, sugar and instant food. Five portions of vegetable and fruits should be included in the daily diet.
6. Being mindful that food advertised does not contain the nutrients it is claimed to have.
7. Engage in daily physical exercise and spend the day actively.
8. Daily intake of water of a healthy person should be 1 ½ to 2 liters. Whenever you feel thirsty drink clean water.
9. Large portions of seasonal food to be consumed during the season (Mango, Rambutan).
10. Consume food to fulfill the daily requirement of calories.

The vicious cycle of nutritional deficiency

The vicious cycle of nutritional deficiency has become a great threat to any developing country. When the mother has undernutrition, naturally the baby born will be underweight. When that child enters teenage years he/she will have poor growth which results in stunting and wasting. As a result of this when a girl enters motherhood she will develop nutritional deficiencies and her baby too will suffer from nutritional deficiencies. This cycle is called the vicious cycle of nutritional deficiency. In order to create a healthy nation this vicious cycle should be broken at some point and the best stage to do this is during the adolescence.

Therefore improving the nutrition of a girl during childhood and adolescence will result in her being healthy during motherhood as well.

So, we can understand an infant's nutritional status has an impact when she becomes an adolescent and will affect the baby she will give birth to one day.

The reasons for poor weight gain during pregnancy

1. Maternal undernutrition
2. Inadequate nutrient intake during pregnancy
3. Illnesses developed during pregnancy (diabetes, anaemia, high blood pressure)
4. Not receiving proper nutrition during childhood and adolescence.

The reasons mentioned above will result in a baby with a low birth weight. If a baby's weight is below 2.5kg, it is considered as a low birth weight.

A baby with a low birth weight will have delays in physical, mental and social development. This situation can be overcome by giving proper care and nutritious food to the child. If this level of care is not provided to the child she will be prone to frequent infections, and will have retarded physical development during childhood and adolescence. The child could become stunted, wasted and her mental development will also be affected resulting in poor school performance. The vicious cycle of nutritional deficiency continues.

Similarly addressing these nutritional issues in the life course of a boy, will help to have a more productive and active healthy nation.

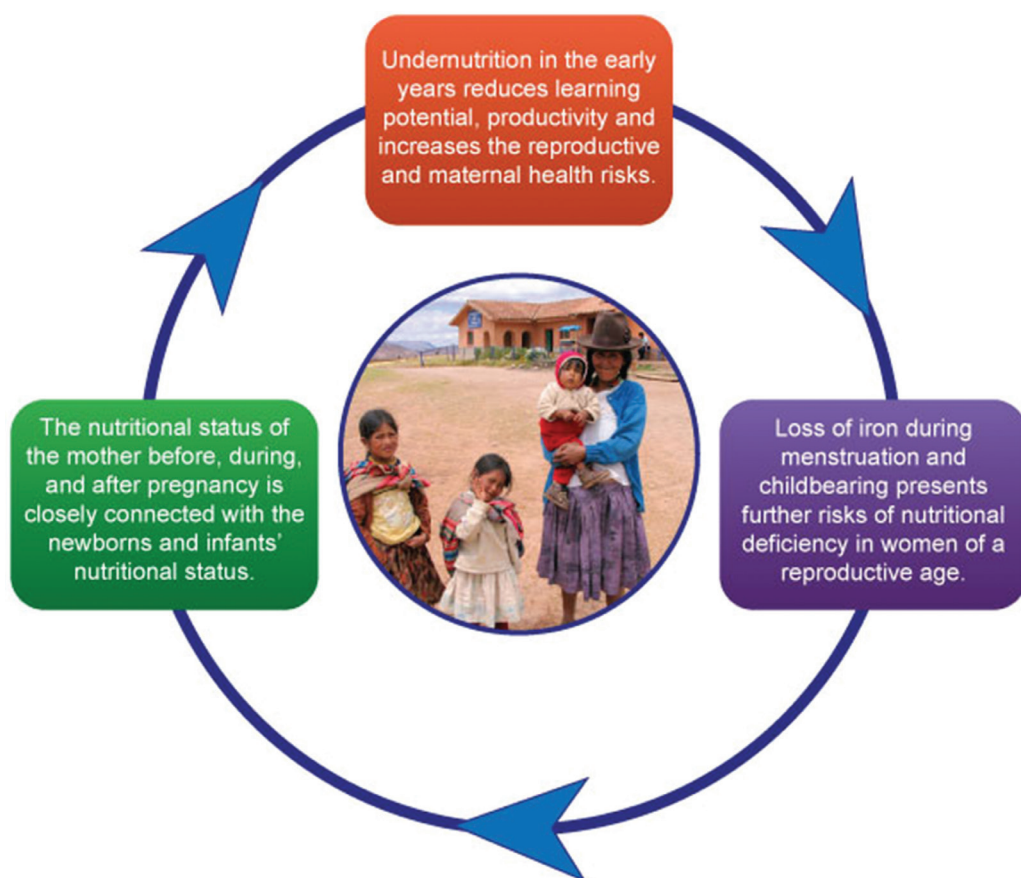


Figure 7.5 -The vicious cycle of nutritional deficiency



Activity

Make a chart showing the interventions that can be done to break the vicious cycle of nutritional deficiency.

Factors affecting nutritional deficiency

1. Food hygiene

“Food hygiene” refers to the cleanliness in the preparation and consumption of food in such manner as to prevent disease and that doesn’t develop any harmful effects to the health of an individual.

There are three factors that affect the safety of the food:

- i. Biological factors - food contaminated with microorganisms
- ii. Chemical factors - food contaminated with other chemicals
- iii. Physical factors - common types of foreign matters - e.g: sand, stones etc.

Food spoilage is the loss of the quality of food due to different factors, such as:

- i. Flies, cockroaches, rats and birds feeding on the food
- ii. During preparation having unclean hands, unclean utensils and improper cooking methods.
- iii. Improper food usage
- iv. Adopting improper storing methods

By using proper methods, food spoilage can be prevented. The following points will help to minimize food spoilage:

- i. Washing hands before touching food
 - ii. Preparing food hygienically
 - iii. Using clean spoons and utensils to serve food
 - iv. Person preparing food to maintain a high level of personal hygiene
 - v. Avoiding food poisoning
- Avoid taking food contaminated by fungi - some fungi produce a poisonous chemical called Aflatoxin
 - Avoid taking potatoes with green coloured skin - when potatoes are exposed to the sun light a poison named solanine develops on it which is harmful to health.
 - Avoid using metal containers to store pickles –Acetic acid in vinegar reacts with the metal (aluminum or iron).

- Avoid reusing oil for deep frying - as it results in producing unfavourable chemicals.
- Do not use expired food, food with no labels or torn labels, food in cans with altered shapes (indented or puffed up tins.)
- Do not consume food with an altered taste or smell.

2. Age

Our nutritional needs change with the stages in life. The nutrition in the first 1000 days of a baby's life, is very important in determining the entire future health of the individual. Breast milk is a complete food for the infant, as it is very rich in nutrients and other factors important for the growth, brain development and protection from infections. Due to nutritional deficiencies a girl faces during adolescence, there will be a tendency for her to give birth to a low birth weight baby. As we grow older we do less physical activities, so our diet should contain lesser amount of energy providing food. As we grow old, the micronutrients such as vitamin B₁₂, vitamin C, riboflavin, folic acid, calcium and iron in our body become less. It is important to add more of these micronutrients in the daily diet. Engaging in exercise is very important as it helps to make our bones stronger. As we grow older increase the intake of food rich in fiber (fruits and vegetables) and decrease the intake of food rich in sugar and fat. Maintain a proper body weight in relation to the height (have a correct BMI value).

3. Health condition

Our food habits should be changed according to diseases we may get. For example an anaemic patient's diet should contain food rich in iron and food that potentiate the absorption of iron. When you are infested with worms in the intestine, although a nutritious diet is taken, most of it would not be available for absorption by the person as worms use it. This causes nutritional deficiencies. In order to maintain a high level of nutrition the diseases should be controlled.

It is very important that all three main meals are taken every day. Skipping breakfast (specially school going children) leads to undernutrition. Breakfast is very important because other wise you have to be on an empty stomach for a long time. Skipping breakfast leads to poor concentration in education.

Fresh fruits and vegetables will help to increase the immunity in the body.

Trans fatty acids are rich in deep fried food, and could be harmful to the body.

The amount of food we take should vary according to the amount of physical activity or work that we engage in.

4. Environment

A person's food habits change according to the environment they live in. The quantity of food changes according to the climate they live in. People who live in cold countries need more food in order to produce heat to keep the body warm.

5. Misconceptions about food and nutritional problems

There are many wrong beliefs among individual people as well as communities about selection and preparation of food. Lack of knowledge about nutrition and being gullible to food advertisements directly contribute to many nutritional problems seen in the community today.

Some misbeliefs related to nutrition are given below:

- i. 'Cool' and 'heaty' food is bad for the health.
- ii. Expensive food items carry more nutritional values.
- iii. Soft drinks quench the thirst faster than water.
- iv. Milk is considered as a complete food.
- v. Believing that digestion is affected during illness therefore reducing the intake of food.

Some of the other factors that contribute to nutritional deficiencies are financial situation of individuals, scarcity of food, market forces and lack of knowledge about the nutritional value of different foods.

Students' contribution to minimize nutritional problems.

Students can minimize their nutritional problems by knowing their nutritional status, taking steps to improve the nutritional status, having proper food habits, not getting misled by advertisements and choosing the correct food. Given below are some ways that can help directly to improve their nutrition:

1. Development of knowledge related to nutrition

2. Getting used to indigenous food

Developing the competencies relevant to nutrition

1. Varied food habits can be seen in different communities and areas in Sri Lanka. People have different beliefs on food preparation, consumption, and usage. Advertisements misguide the public to purchase certain food making them believe that they are of high nutritional value. Therefore, as students it is your duty to interpret these advertisements wisely and also possess a knowledge about the nutritional value of food and to select a well-balanced diet. Students should pay attention to the amount of food that need to be consumed (not less or more) and thereby maintaining an appropriate BMI
2. It is very important to take a balanced, healthy diet and to take three main meals a day. Paying attention to the food pyramid when selecting the amount of food from each group as necessary per day is important (this was studied in the previous classes). The knowledge on “Food plate” that you studied in earlier classes can also be used when selecting different food types for a meal.
3. Children should be aware of the school policies related to nutrition. The food available at the school canteen should be good for health and students should select the most suitable and healthy food. Canteen owners must be made aware of healthy food.
4. Encourage the selection of healthy food for school functions.

Preparing the home garden relative to consumption of food



Figure 7.6

In the past home cultivation of fruits and vegetables was popular in Sri Lanka. Vegetables, fruits, spices, medicinal and flowering plants were a common sight in every house. At present due to the nonavailability of sufficient space, the habit of using artificial food, and lack of time, the concept of home cultivation is slowly but steadily fading away from us. However, there are many advantages of growing vegetables and fruits in your own garden. Some benefits are:

1. Fruits and vegetables would be free of poisonous chemicals and be rich in nutrients.
2. Can prepare a well-balanced diet easily.
3. Get used to the habit of recycling organic waste material.
4. Adds beauty to your surrounding.
5. Spend leisure time productively.
6. Gardening provides the opportunity for physical activity and happiness.
7. Economic benefits (saves money).

Although inadequate space is an obstruction to home cultivation, the Agriculture Department of Sri Lanka has introduced many alternative methods for home gardening. Considering the individuals, nutritional needs, availability of space and time, different methods have been introduced.

1. Growing crops
 - Leafy vegetables in pots and drains
 - Crops like chillies and tomatoes in pots
 - Timber wood trees for the boundary
2. Organic manure
 - Compost bins in urban areas and compost pits in other areas
3. Implementing a bio gas unit
4. Collecting rain water and using for gardening.
5. Animal farming



growing crops



bio gas unit



rain water tank



animal farming



compost bit

Figure 7.7

Activity

Draw a sketch of your home garden, showing how you could effectively use it for cultivation.

Getting used to indigenous food

Consuming natural food takes a special place in local food habits. Since local food items can be obtained freshly, their nutrient values would also be high.

Home gardening helps to add local food to your diet and also to go organic. Harmful chemicals will not get mixed in your food. It is economical too. One way to cut down your risk of ingesting unwanted chemicals from food is to have your food from your own garden which would be fresh food.

Garlic, pandan leaves (rampe), karapincha, tamarind, coriander, vinegar are a few natural flavours that we could add to our daily cooking rather than getting used to artificial flavours. Natural flavours add taste to the food, gives a nice appearance and improve the appetite. Spices have medicinal values and a profound effect on general health.

Some natural colours that can be used when preparing food.

Eg; Red	-	beet root
Blue	-	blue katarolu
Green	-	melon skin, “kehipiththan”
Yellow	-	mango and orange
White	-	cucumber



Figure 7.8

Milk and dairy products are available locally. Milk is considered as a high energy yielding local product. The five products of the cow (“pasgorasa”) is made of cow’s milk, and it is a combination of five items such as milk, ghee, butter (wendaru), whey (moru) and curd. These products are nutritious and good for the health.



Figure 7.9



Activity

Prepare a report on whether the school canteen functions according to the rules giving effect to the school canteen policy.

Food related culture of Sri Lanka

From ancient times, the staple food in Sri Lanka has been rice. There are different kinds of rice such as ‘Suwandel’, ‘Elsahal’, ‘Heeneti’ etc. Apart from rice, grains and grain based products are taking a major place in our diet. Kurakkan and meneri are a few of these. Grains carry a high nutritional value.

Our main meals should be balanced and wholesome. For example we can include hathmaluwa (curry made with seven vegetables), mung kiribath, mixed green leaves etc. To have a well-balanced diet many vegetables and green leaves are added.

Steps could be taken to avoid food wastage. There are many ways to preserve food in Sri Lanka such as making dry fish, jadi, drying jack seeds etc.



Figure 7.10

Sri Lanka has always been a home to a multi ethnic and multi cultural society. There are certain foods popular among certain communities. Pittu, thosai, wade are traditional food items of the Tamil community while watalppan and biriyani traditional foods of the Muslims.



Figure 7.11

During different festive seasons of different communities their traditional foods become popular. During the Sinhala and Tamil new year period the traditional milk rice and sweet meats are prepared. During the Thai Pongal festival the Hindus cook their customary pongal rice.



Figure 7.12

There are certain types of food prepared on special occasions. Milk rice is a traditional food item of Sri Lanka made to celebrate special occasions such as wedding ceremonies, birthdays etc. At different stages of life we come across situations that are important in our life and on each such occasion the food that is prepared and served has a special significance. For example the meal which is partaken by the kith and kin of the dead, is known as “mala batha”, which is a simple meal of rice served with curries cooked with dry fish and pumpkin. This type of food traditionally comes from generation to generation, with or without the knowledge of nutritional value.

Preparations of food according to the needs of different individuals.

Children

Babies are exclusively breastfed for the first 6 months of life. During this period it is strictly advised not to give formula milk and if needed to do so, to be done only on medical advice. Once the baby completes six months, complementary food is started. While the child is being given complementary food, breast feeding is continued till two years of age. Complementary food at the beginning is given in the form of semi solid food as the baby has not developed teeth. Gradually with teething the food can be made more solid and by one year the baby can be introduced to family food.

As children grow up fast and their physical activities also increase, their need for

energy becomes high. So their diet should be rich in carbohydrates and proteins. They take only a small quantity of food at a time so it should be sufficiently nutritional. To increase their appetite it is good to make different types of dishes (include various types of food to have variety).

Adolescent

During adolescence a rapid change in growth occurs. They need increased amounts of energy and proteins. Foods with plenty of calcium and iron are particularly important at this age to support bone and muscle growth. At this age if the necessary nutritional needs are met, bones and organs grow well and one can reach the maximum height which can be achieved due to genes. By paying special attention to their diet at this age, one can avoid future ailments such as osteoporosis.

But unfortunately many do not consider the importance of nutrition at this age. They consume excess amounts of fatty food, fizzy-drinks, sweets and junk food, which have become a norm in their diets. Instead they should consume more fresh fruits and vegetables in their daily diets. It is important to make different types of dishes to improve the palatability.

In the modern society we can see girls controlling their diet, to prevent excess weight gain. As a result they become very thin and this is not favourable. The growth a girl receives at this stage of her life is very important for her in the future. During this age if girls are not provided with proper nutrition, it will affect the health of the next generation as well. A girl who with a proper growth during adolescence will be able to produce a healthy baby with a good birth weight.

Pregnant Mothers

During pregnancy, a female needs more nutrients for the growing baby as well as to develop various tissues of her body. Therefore a higher level of carbohydrate, fat and protein are essential for the body. A sufficient amount of micronutrients (iron, iodine, vitamin A) and minerals (calcium, phosphorous) are essential to the body as it helps in the growth of the body and brain. Taking folic acid from the beginning is very vital. Taking proper medical advice is important before using any drugs. Some pregnant mothers experience a loss of appetite, specially during the early months of pregnancy. They should take extra precautions to add nutritious food to their diet. As a solution to this, a pregnant mother has to take food in small quantities at regular intervals.

Lactating Mothers

All the nutritional needs of the first six months of a baby are provided by breast milk. Therefore a lactating (breast feeding) mother needs more calories daily. Lactating mothers should take an extra meal other than the normal diet. Iron and calcium intake should be high during this period. More sprats, milk, fruits and vegetables should be added. Lactating mothers should take extra fluids too.

Patients

Patients need a diet rich in nutrients as it is essential for the repair of damaged tissues as well as for the immunity system to fight against infections. It is important to take a normal diet even when you are sick, as it does not affect digestion of food. It is suitable to get advice from a doctor or a nutritionist about the dietary requirements of certain persons. Patients who have problems related to food digestion, are always advised to start a diet with liquid, gradually move on to semisolids and solids.

Vegetarians

A well planned vegetarian diet should meet all nutritional requirements in order to avoid nutritional deficiencies. It is important to make sure that your body is getting enough protein. Grains and vegetables that are rich in proteins should be consumed more. Green gram, dhal and soya beans are some food that can be included. Red-rice, mushrooms should also be included with cereals. Since iron and calcium are poor in vegetables, it is highly recommended to increase the intake of green leaves (nivithi, mukunuwenna) green gram and food rich in vitamin C which will increase the absorption of those nutrients.

Animal proteins are high in quality and help children to have the high quantities required due to the rapid growth of their body. It is important to add meat in your diet until quantisation 18 years of age as the body is growing. Due to some reason if you are a vegetarian it is important to pay attention to include mixture of grains and cereals in your diet to improve the composition of essential amino acids.

Vitamin B₁₂, is provided only through animal food. Therefore it is advisable for vegetarians to take such nutrients as vitamin supplements based on medical advice.

Sportsmen

An athlete's diet varies depending on age, sex, metabolic level and the type of sport they engage in. A suitable diet should be taken before they start their sport event, in between and at the end. Although plenty of food stuffs are available in the market today, it is always better to take medical advice on the diet. It is recommended to increase the intake of food during the sports season and at the same time to reduce intake during off season.

Taking a complete diet alone does not improve a physical competencies. The necessary training is also very important.



Activity

Prescribe suitable diet for a lactating mother and a diabetic patient.

Summary.

Malnutrition related to macronutrients and micronutrients are common in Sri Lanka. These nutritional deficiencies affect an individual's well being as well as the economy of a country. Malnutrition and its related complications can be prevented by identifying the factors that cause nutritional deficiencies and implementing awareness programmes. The attitude and the knowledge of students towards and about this aspect is very important when considering their contribution towards solving this problem. Getting fresh fruits and vegetables from your own garden and getting used to the habit of eating will help to minimize many nutritional problems. Preparing the family menu according to the needs of the family members and ignoring food related myths and beliefs will help build a healthy nutritional status.



Exercises;

1. Name two common micronutrient deficiencies that can be seen in Sri Lanka.
2. Name four factors that contribute towards nutritional deficiencies.
3. Write three unfavourable effects of undernutrition.
4. Write four steps that can be taken to minimize iron deficiency.
5. Write three things you can do at home to preserve food.

Let us maintain a healthy body.

There are different systems in our body to perform different tasks. The digestive, respiratory, circulatory and the excretory systems help the internal functions of the body. The nervous system, specially the brain, controls the functions of the other systems. It also transmits messages about the environment around us through sensory organs. The nervous system helps in our movements by coordinating the functions of the muscular skeletal systems. Skeletal system also protects the important organs including brain, lungs and the heart. The endocrine glands produce hormones that control growth, functions of the reproductive system and metabolism of the body. The reproductive system helps to reproduce a new life.

In the previous grades we learnt about the sensory organs and the functions of some of the systems mentioned above.

In this chapter we will learn about the digestive, respiratory, circulatory, excretory and the reproductive systems. Diseases related to these systems and the precautions we can take to prevent them will be studied in detail.

Digestive system

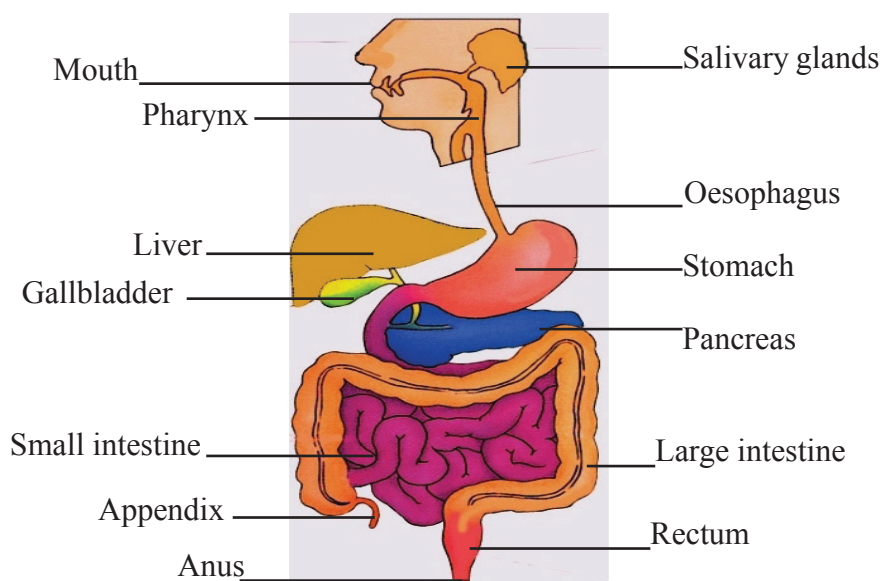


Figure 8.1 - Digestive system

Digestion of Food

Digestion of food is the process in which food is broken into smaller particles both physically and chemically and absorbed. The digestive system consists of the mouth, oesophagus, pharynx, stomach, small intestines, large intestines, rectum and anus. Apart from these, the salivary glands, liver, gallbladder and pancreas which are called supportive organs, also help in digestion.

Mouth

The digestion of food begins in the mouth. Food is broken into smaller particles and mixed with saliva. Teeth and the salivary glands help in this process.

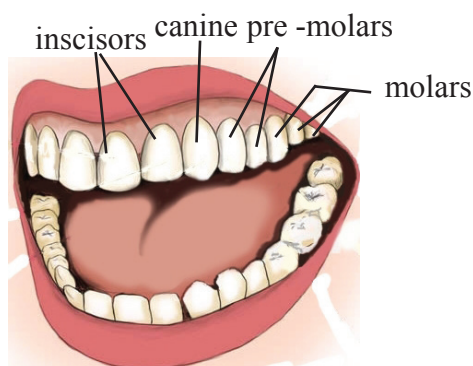


Figure 8.2 - Arrangement of teeth

Teeth

Babies get their milk teeth between 6 to 9 months of age and will continue upto 3 years. There are 20 milk teeth with 10 on each jaw. The milk teeth fall between 6 -12 years and are replaced by 28 permanent teeth. The eruption of the last four molar teeth can be delayed until 25 years of age. There are 32 permanent teeth.

A tooth consists of two parts. The crown of tooth is the part that is seen outside the gum and is covered by enamel. This consists of calcium and it is very strong. The root is the part embedded in the gum. It contains nerves and blood vessels.

Salivary glands

A human being has three pairs of salivary glands. Saliva is important as it helps to swallow the food. The ptyalin enzyme in saliva, helps to digest the carbohydrate of the food in the mouth.

Pharynx

The nasal cavity and the oral cavity open into the pharynx. The larynx and oesophagus are connected to the pharynx.

Stomach

The Stomach is a J shaped organ. The upper end is connected to the oesophagus while the other end is connected to the small intestine. The glands in the inner walls of the stomach secrete mucous, pepsinogen enzymes and hydrochloric acid.

The food we eat travels down from the oesophagus into the stomach and is temporally stored there. During this time the food gets mixed with gastric juices and the digestion of protein starts in the stomach. The absorption of water, certain medicines and alcohol take place in the stomach. After two to six hours the food enters the small intestine.

Small Intestine

The small intestine consists of three sections. They are the duodenum, jejunum and the ileum.

The first part of the small intestine is the C shaped duodenum. The presence of villi in the inner walls of the small intestines increase the surface area and it helps to increase efficiency of absorption. The inner walls of small intestines have glands that secrete mucous. Digestion of carbohydrates, proteins and fat is by the enzymes that are secreted in the small intestine. Due to peristaltic movements the food gets mixed with these juices and is pushed down.

The digestion of protein and fat is completed with the help of pancreatic and intestinal fluid and it is absorbed inside the small intestine. The bile produced by the liver helps to absorb the fat. Apart from this, water and minerals are also absorbed in the small intestine.

Large Intestine

Large intestine is about 1.5 meters in length. Although secretion of mucous takes place in the glands of the large intestine, no digestive enzymes are secreted in this section. Villi are not present in the walls of the large intestine. Any unabsorbed food from the small intestines enters the large intestines with water and minerals.

No significant digestion takes place in the large intestine but absorption of water and minerals take place. The unabsorbed material form faeces and is transmitted through the rectum out of the body.

The appendix is located near the junction of the small intestine and the large intestine, as a small pouch.

Diseases related to the digestive system

1. Gastritis

Gastritis is an inflammation of the lining of the stomach. Gastritis can be caused by excessive consumption of alcohol, stress, use of certain medications specially pain killers, smoking, bacterial infections and erratic feeding habits.

2. Cancer in the digestive system

Cancer is common in the digestive system. oesophagus, liver, stomach, pancreas, large intestine and rectum are common sites where cancer could occur.

You can reduce the risk of developing oral cancer by avoiding smoking, alcohol and chewing betel. Using insecticides and harmful flavours increases the risk of cancer. Arecanuts and tobacco are considered as major risk factors for developing oral cancer. If patches, small growths or ulcers appear in the mouth, seek immediate medical advice.

Lack of intake of food rich in fibre (fruits and vegetables) and improper motions lead to cancers in the large intestines. Smoking and consuming alcohol mainly increase the risk of cancers in the digestive system. When one has difficulty in swallowing food, loss of appetite or passing blood with stools, it is advisable to consult a doctor immediately.

3. Cirrhosis

Cirrhosis is a chronic disease of the liver occurring due to germs and chemicals. It is commonly associated with the consumption of alcohol.

4. Appendicitis - inflammation of the appendix

5. Communicable diseases - diarrhoea, typhoid, jaundice.

6. Piles (Haemorrhoids)

Steps to avoid digestive system related diseases

1. Brushing the teeth twice daily (after meals).
2. Avoiding smoking, alcohol and chewing betel.
3. Taking natural fiber containing food.
4. Reducing intake of foods made out of refined flour, containing a lot of spices, taking food on time and managing stress.
5. Avoiding consumption of food with artificial flavours, chemicals or insecticides
6. Drinking adequate amounts of clean water.
7. Having regular bowel motions, at least once a day.
8. Maintaining good hygiene from the time of preparation till consumption of food.
9. If you feel any changes in the functioning of the digestive system, consult a doctor immediately.

Excretory system

The system that removes waste materials from the body, is the excretory system. Kidney filters waste materials and excretes it as urine. Apart from this the lungs and the skin also perform excretory functions.

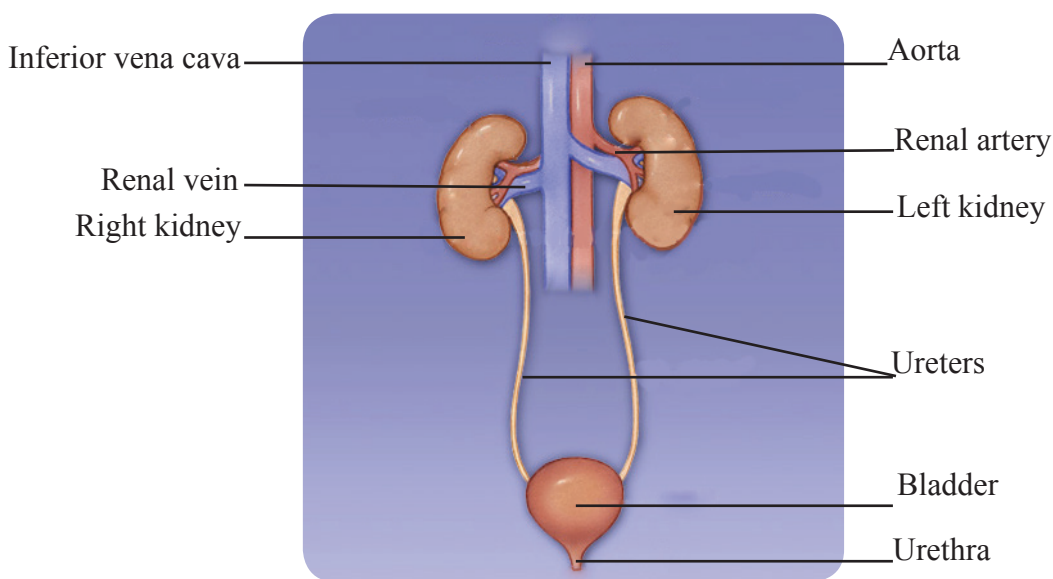


Figure 8.3 - Excretory system

Kidneys

The kidney is a bean shaped organ, red - brown in colour. It is located in the abdominal cavity behind the intestines.

Functions of the kidneys

The main function of the kidney is to remove waste from the body and maintain the balance of fluid and minerals. Apart from this, there are many other functions too.

1. Removing waste products from the body and keeping the internal environment clean.
2. Releasing hormones which help to produce red blood cells.
3. Producing vitamin D.
4. Helping to control blood pressure.

Nephron

The nephron is the functional unit of the kidneys. There are about one million nephrons in the cortex of each kidney. The waste in the blood filter into the nephron. This filtered waste is then passed through nephron tubule and urine is formed. Urine is then passed through the urethra into the bladder. Bladder is an inflated, flexible bag and urine is temporarily stored to pass at regular intervals. Contraction of the walls of the bladder helps to pass urine.

Diseases related to the excretory system

1. Stones in the kidney and bladder

Stones can be formed in the kidney and passed into the ureters, giving rise to severe pain. This pain travels along the back to the lower front of the abdomen. About 60% of these stones pass naturally with the urine. Shock wave method called Lithotripsy is the most frequently used procedure to crush bigger kidney stones thus enabling them to pass in urine. Sometimes surgery is done to remove large stones.

2. Renal Failure

Malfunctioning of the kidneys to perform its functions is known as renal failure. Fatiguability, vomiting, loss of weight, high blood pressure, loss of appetite and swelling of body are some of the complications of renal failure. Diabetes, high blood pressure dehydration, smoking etc. are some reasons for renal failure. Renal failure has become a major health issue in the recent past in some parts of Sri Lanka. The chemicals in the environment can be considered as one reason and there may be multiple reasons. Either kidney transplant or dialysis has to be done on patients with renal failures.

There can be acute renal failure due to some other diseases in the body such as snake bites, hyper dynamic circulation or leptospirosis. In most instances acute renal failure is curable.

3. Cancer in the kidney & bladder (renal carcinoma & bladder carcinoma).

4. Urinary tract infection.

Steps to avoid diseases related to the excretory system

1. Drink an adequate amount of clean water.
2. Avoid taking medication without the doctor's advice (specially pain killers).
3. Delay introducing salt to a baby's food (at least till one year) and also control the amount of salt added to food even afterwards.
4. Control diabetes and blood pressure.
5. Whenever the need arises to pass urine, do it without controlling it.
6. Prevent chemicals from being introduced to the environment, specially to water and minimize the usage of agrochemicals.
7. If there are no suitable water sources, use protective filters.

Respiratory system

Oxygen is important for the production of energy inside cells. During this process carbon dioxide is produced. The respiratory system is involved in the process of transporting and exchanging oxygen and carbon dioxide.

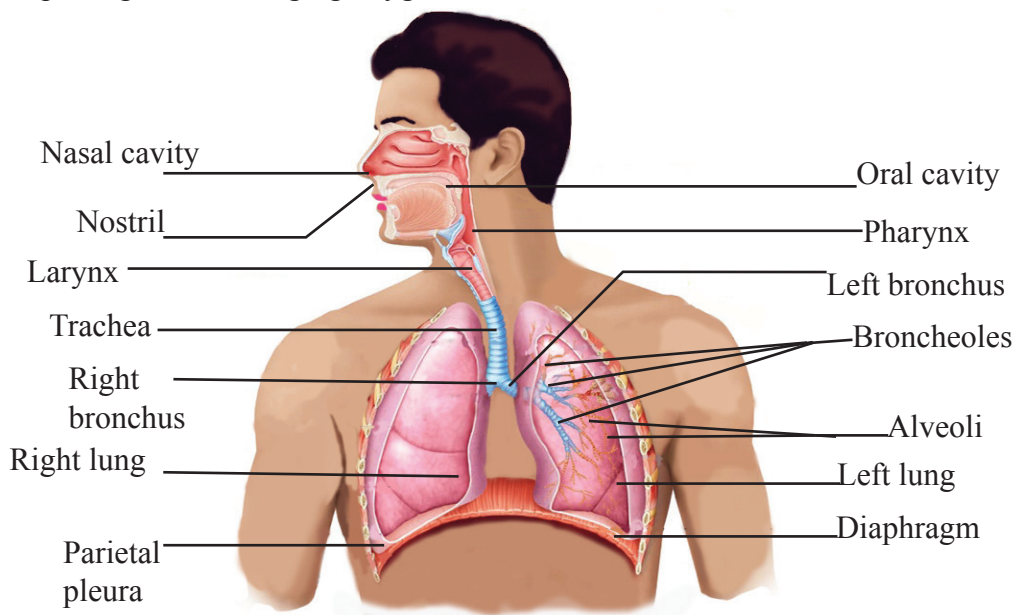


Figure 8.4 - Respiratory system

Nose

The nasal cavity is covered with a mucous membrane. There are mucous secreting glands and some hair cells called cilia.

The cilia around the nostrils and the mucous membrane help to trap foreign particles in the air that enter the nose. Inside the nose the temperature of the air is increased and moisture is added.

What are the reasons for sneezing and getting a burning sensation, when you inhale chilli powder?

Pharynx

The air enters the trachea / wind pipe through the pharynx and larynx. The pharynx is a tube like structure that connects the nasal and oral cavities. The trachea and the oesophagus begin here. Larynx (voice box) is at the opening of the trachea. This part of the body also aids in the production of sound through the vocal cords. When we swallow food, the epiglottis closes the upper end of the larynx and prevents food from entering the trachea. The cough reflex is a natural defense mechanism to emit food that enters the trachea.

Trachea

The trachea begins just under the larynx and runs down inside the chest in front of the oesophagus. The trachea then divides into two smaller tubes called bronchi. They are right bronchus and left bronchus. This gets further divided into smaller and smaller branches called bronchioles and eventually ends in air sacs called alveoli.

Lungs

The chest contains two lungs, as the left and the right. They are protected by the rib cage. The bronchioles and alveoli are inside the lungs. Apart from this the lung consists of the blood vessels which transport blood to and from the lungs, the lymph glands and nerves

The process of inhalation and exhalation

When you inhale the diaphragm and intercostal muscles (these are muscles between your ribs) contract and expand the chest cavity. This expansion lowers the pressure within the chest cavity than the atmospheric pressure. Air then flows through the air ways to the lungs. When you exhale, the diaphragm and intercostal muscles relax

and the chest cavity gets smaller. The decrease in volume of the cavity increases the pressure in the chest cavity than the atmospheric pressure and air flows out of the lungs.

Exchange of air in the lungs

Exchange of oxygen and carbon dioxide takes place inside the alveoli. The walls of the alveoli are extremely thin. The alveoli are covered with capillaries. The oxygen concentration is higher within each alveoli than the capillaries, so oxygen enters the capillaries from the alveoli. The concentration of carbon dioxide is high in the capillary, so carbon dioxide enters the alveoli from the capillaries.

Diseases related to the respiratory system

1. Common cold & inflammation of larynx

This is caused by bacteria and virus. The common cold is spread by infected air droplets or by direct contact with infected droplets while sneezing, coughing or breathing. The common cold usually, settles with a person's own immunity and it doesn't need treatment.

2. Bronchitis and Pneumonia

They are diseases in the lower part of the respiratory system. These inflammations are caused by bacterial and viral infections. It is important to take medical treatment for these conditions.

3. Tuberculosis

This is caused by a bacteria. Tuberculosis typically affects the lungs but it can affect other organs and systems of the body. By getting the BCG vaccination at birth, the dangerous forms of tuberculosis can be prevented. Taking a course of drugs continuously, will help cure this disease completely. Therefore it is important to take prescribed drugs continuously as instructed by your physician.

4. Bronchial Asthma

Asthma is a lung disease that causes inflammation and the narrowing of the airways. It obstructs the process of inhalation and exhalation. Cough and difficulty in breathing are some common symptoms. Generally asthma is caused during childhood and disappears as one grows older. Episodes can get precipitated by the common cold, dust and environmental pollutants. Asthma can be controlled by getting proper treatment.

5. Catarrh (Allergic Rhinitis)

This is a disease in the respiratory tract due to an allergy mainly affecting the upper inner side of the nose. Some reasons for this are cool drinks, dust inside the house, cobwebs, mosquito coils (some), cigarette smoke and cold air.

6. Cancer in the lungs

This is a very serious form of cancer. Smoking is the main reason for lung cancer. Smoke released when plastic and polythene are burnt, from vehicles, house hold smoke from fire wood and passive smoking also increase the risk of lung cancer.

Steps to avoid diseases related to the respiratory system

1. People with such infections should avoid crowded places, when sneezing and coughing should cover the nose and the mouth to prevent infecting others.
2. Avoid smoking.
3. Avoid taking foods that are allergic (food causing allergy to an individual may not cause an allergy to another).
4. Inhale clean air and avoid environmental pollution.
5. Use a mask when you are in a polluted environment or when suffering from any diseases.
e.g: A policeman on duty on a dusty road.
6. Take medical advice when you are suffering from cough for a long period or if you feel you are losing weight.

Circulatory system.

Circulatory system consists of the heart and the blood vessels. Systemic circulation means the part of the circulatory system in which the blood leaves the heart from left ventricle to different organs of the body cells and re-enters the right atrium. Pulmonary circulation is the portion of the cardiovascular system which carries blood from the right ventricle of the heart, to the lungs and returns to the left atrium.

Heart

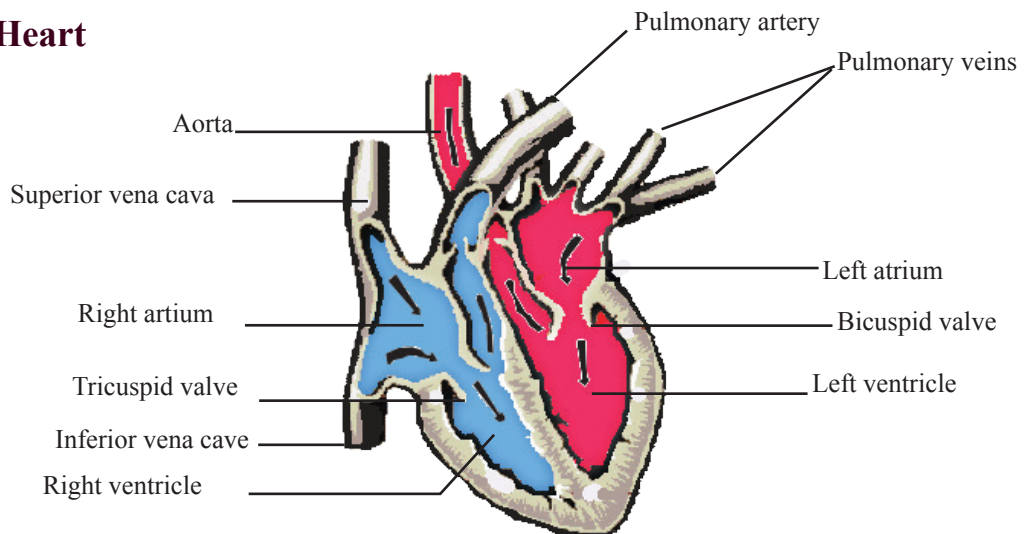


Figure 8.5 - Cross section of the heart

The heart is a muscular organ. It is made up of four chambers. They are right atrium, right ventricle, left atrium and left ventricle. The atria are in the upper part of the heart while the ventricles are in the lower part of the heart. The tricuspid valve is between the right atrium and the right ventricle. The bicuspid valve or mitral valve is between the left atrium and the left ventricle. When the ventricles contract these valves prevent the blood entering the respective atria. There are Semilunar valves located at the beginning of the aorta and left ventricle as well as the pulmonary artery and right ventricle. These Semilunar valves prevent the blood entering the heart when ventricles relax.

The two large veins that carry blood from the body to the heart are superior vena cava and the inferior vena cava. Both these veins open into the right atrium. The blood travels to the right ventricle and through the pulmonary arteries to the lungs. The pulmonary veins which carry blood rich in oxygen from the lungs enters the left atrium. Aorta starts from the left ventricle. Aorta carries oxygen rich blood to the rest of the body.

The function of the heart & blood circulation

When the left and the right atria contract the blood enters the left and right ventricles respectively. Contraction of the left and right ventricles send the blood through the semilunar valves to the aorta and the pulmonary artery respectively. At the time of ventricular contraction, the atria relax and expand leading to the filling of blood.

The superior vena cava and inferior vena cava, carry blood that has a low concentration of oxygen and a higher concentration of carbon dioxide to the right atria. When the right atrium contracts, this blood enters the right ventricle and when right ventricle contracts, the blood travels through the pulmonary artery to the lungs. The blood receives oxygen and passes out carbon dioxide through the lungs and travels through the pulmonary veins to the left atria. When the left atrium contracts, this blood enters the left ventricle and then the left ventricle contracts, the blood enters the aorta through the semilunar valve.

Aorta carries this blood to the rest of the body. The aorta is divided into many branches and supplies blood to all the organs in the body. These branches further divide until it forms the smallest blood vessel called capillaries. Exchange of oxygen, carbon dioxide, minerals, nutrients and waste take place through the walls of the capillaries. The capillaries connect together and form veins which unite with more and more veins ultimately forming the superior and inferior vena cava. Both of these main veins carry blood from the organs to the right atrium of the heart.

Tissue fluid occupies the space between capillaries and the cells of organs. Tissue fluid consists of substances which are diffused from the blood in the capillaries to extra cellular space. The substance that does not enter the veins, but remain in the tissue fluid will be collected by the lymphatic system and delivered to the blood later at a different point. The digested fat is also absorbed in to the body through the lymphatics and this milky substance is called chyle.

The primary function of the lymphatic system is to protect the body from the microorganisms. This is done by the white blood cells found inside the lymph nodules. When there is an infection or a wound, the lymph nodules in that region get swollen and become active.

e.g: Lymph nodes in the neck enlarge when there is an infection in the throat, swelling of lymph glands in the arm pit when there is a wound in the hand.

Diseases related with the circulatory system

1. Angina (Reduced blood supply to the heart)

The heart is an organ which will have a lifelong function. The necessary oxygen and the energy for the heart muscles is supplied by the coronary arteries. In the inner walls of the coronary arteries, plaque of fat gets deposited causing narrowing and stiffening of the coronary arteries. This results in reduced blood flow to the heart muscles and reduced supply of oxygen to the heart muscles. People who suffer

from this condition will find it hard to walk, run, carry heavy things, or engage in daily activities as the blood supply to the heart is reduced. They get chest pain and feel tired even during small exertion.

2. Myocardial infarction (Heart Attacks)

Due to the deposition of fat plaque inside the coronary arteries, blood vessels get narrowed. At these places, blood clots can settle and completely obstruct the flow of blood to the heart muscles. As the oxygen supply is cut off the heart muscle supplied by that coronary artery will die. This is known as a heart attack and it can result in death.

3.Stroke (paralysis)

Similar to a heart attack, the blood flow to the brain can get obstructed due to deposition of fat plaque or a blood clot inside blood vessels and can result in a stroke. The blood supply to the brain can also get interrupted by a rupture of an artery. The patient may suddenly lose the ability to speak or one side of the body becomes paralysed. High levels of cholesterol in the blood leads to early development of fat plaque and are deposited inside the blood vessels causing obstruction to the flow.

4. Hypertension

Blood is supplied through arteries to every part of the body. Blood circulation takes place through the contraction of the heart and as a result of this, the walls of the blood vessels will create a resistance. The artery of a person, who has high blood pressure, is thick. Therefore the flexibility of the arteries are less. So the walls of the arteries will begin to create more resistance with time. Therefore the heart has to make a bigger effort to circulate the blood. The kidneys, heart, brain can get damaged due to high blood pressure. The risk of getting a stroke, heart attack and kidney failure is more when a person is having hypertension. Maintaining a proper BMI, avoiding smoking and consuming alcohol, reducing the intake of salt and being free from stress helps to bring down or even prevent getting high blood pressure.

Steps to prevent diseases related to the circulatory system

1. Engaging in adequate exercises.
2. Maintaining an active life style.
3. Avoid smoking.
4. Avoid consuming alcohol.
5. Getting used to healthy food habits.
(Avoid taking excess amounts of food, too many sweets, salt and fatty food)
6. Controlling obesity and diabetes.



Activity

What are the changes we can do in our day to day life, in order to avoid heart attacks and strokes?

Reproductive system

The main function of the reproductive system is to produce offspring. The male and female reproductive systems differ from each other. The male as well as female reproductive systems produce gametes. The female gamete is called ovum and the male gamete is known as sperm. The reproductive system is not active during childhood. During puberty the secondary sexual features appear and through the reproductive system hormones and mature gametes begin to be produced.

Femal Reproductive system

Functions of the female reproductive system

Ovary - produce ova and hormones

Fallopian tube - transporting ova from the ovaries, and the fertilized ova to the womb

Womb/ uterus - providing nutrients and protection to the growing embryo and fetus till it is born

Vagina - Sexual intercourse and deposition of sperms, the baby is born through the vagina.

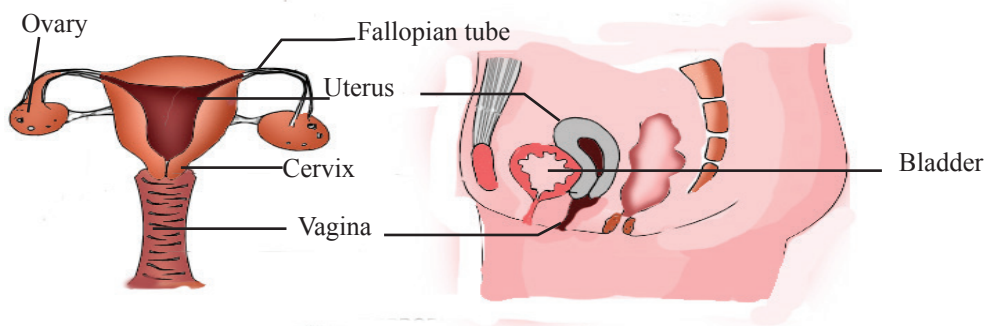


Figure 8.6 - Female reproductive system

The female reproductive system consists of a pair of ovaries, a pair of fallopian tubes, the womb, the vagina and external sex organs.

Ovaries

Female gamete cells or ova are produced by the ovaries. At birth (of a girl) ovaries contain millions of immature gamete cells. During puberty, the matured ova begin to be released from the ovaries. In every menstrual cycle, generally every 28 days, a mature ovum is released by the ovaries.

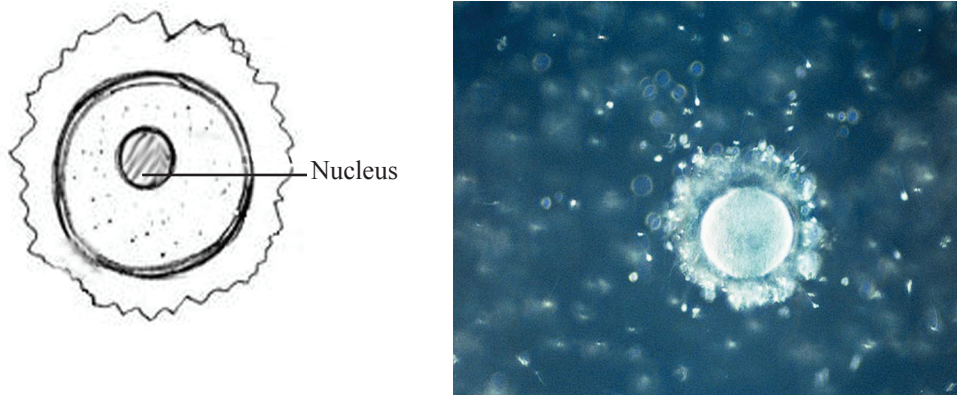


Figure 8.7 - Cross section of an ovum

The other main function of the ovaries is to produce oestrogen and progesterone hormones.

Fallopian tubes (uterine tubes)

The fallopian tubes are located closer to the ovaries and it is about 10 cm in length. It is a narrow tube connecting the ovaries to the uterus. The fallopian tube takes the shape of a funnel and it partly covers the ovaries. Ova, which are released from the ovaries, are carried to the uterus through the fallopian tubes.

Womb/uterus

The uterus is a hollow muscular organ. When an ovum fertilizes with a sperm, it's transported along the fallopian tube to the uterus and gets deposited there. Gradually the uterus expands during pregnancy with the growth of the fetus. The uterus provides nutrients and protection until the fetus is born.

Vagina

The vagina is a muscular canal. During intercourse the sperms are deposited in the vagina and they pass through the vagina along the fallopian tube and fertilization of ova takes place in the fallopian tube. During child birth the baby passes through the vagina.

Menstrual Cycle and the female reproductive Hormones

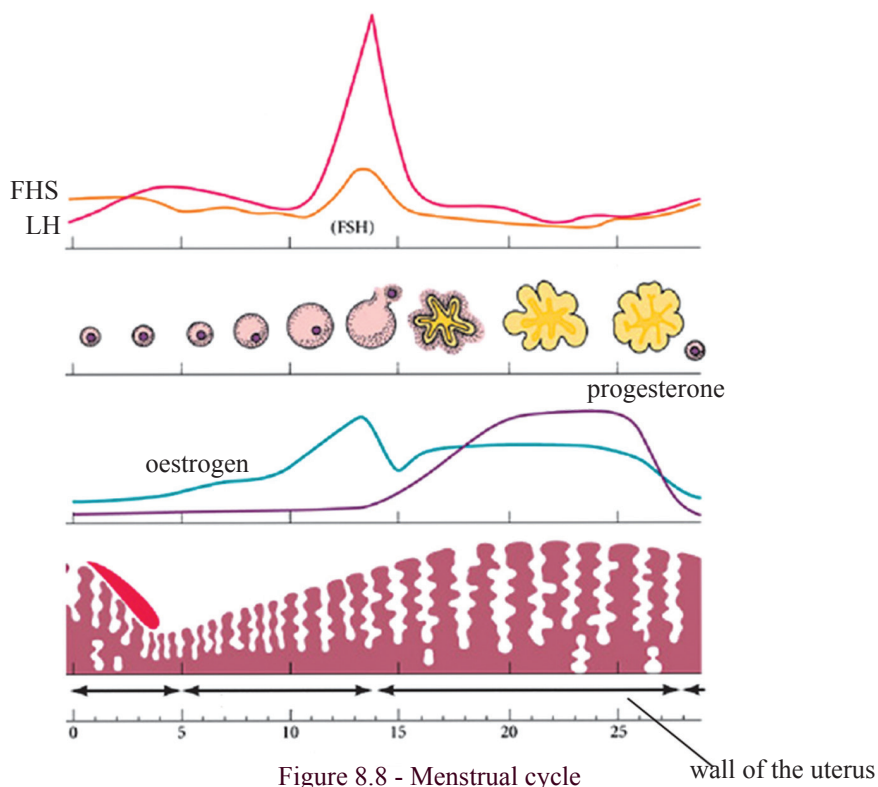


Figure 8.8 - Menstrual cycle

During the first week of the menstrual cycle, under the influence of secreted oestrogen hormone, the inner walls of the uterus becomes thick while the blood vessels grow strong. By the 14th day of the cycle the matured ova appear on the surface of the ovaries. Between 14-28 days of the cycle secretion of oestrogen and progesterone hormones increase and further strengthens the formations of inner walls of the uterus. These changes in the walls of the uterus provides a conducive environment for the growing embryo if fertilization of the ovum takes place. If fertilization does not take place, by about the 24th day the oestrogen and progesterone hormone level will decrease. As a result the inner wall of the uterus begins to shed. These broken tissues along with blood travels out of the uterus through the vagina. This is called menstruation. This flow lasts for about 3- 4 days. The menstrual cycle begins with the appearance of the secondary features (at puberty) and ends between the ages of 45 – 50 years of age and is called menopause.

Apart from producing oestrogen and progesterone hormones from the ovaries, the secretion of hormone FSH and LH by the pituitary gland, have an influence on maturation and release of ova and the secretion of hormones by the ovaries.

Male reproductive System

Male reproductive System consists of the following parts.

1. Testes
2. Ductus deferens
3. Seminal vesicle
4. Ejaculatory duct
5. Prostate gland
6. Penis
7. Epididymis

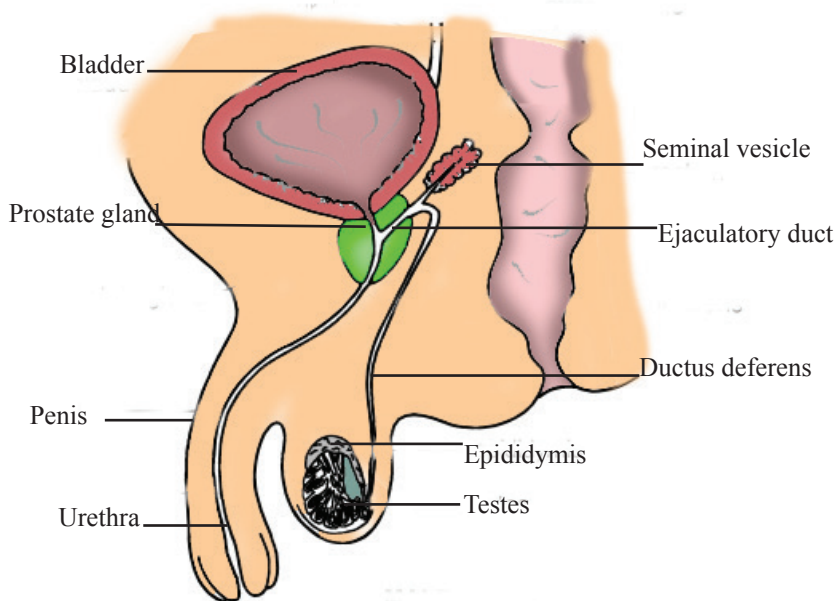


Figure 8.9 - Cross section of male reproductive System.

Testes

The testes are suspended outside the body in a sac, called the scrotum. The testes are on the outside because the temperature of the testicles must be lower than the rest of the body for the optimal production of sperm. The testes contain many seminiferous tubules. They are the sites of sperm production. The male reproductive hormone called testosterone is produced by a different group of cells within the testes.

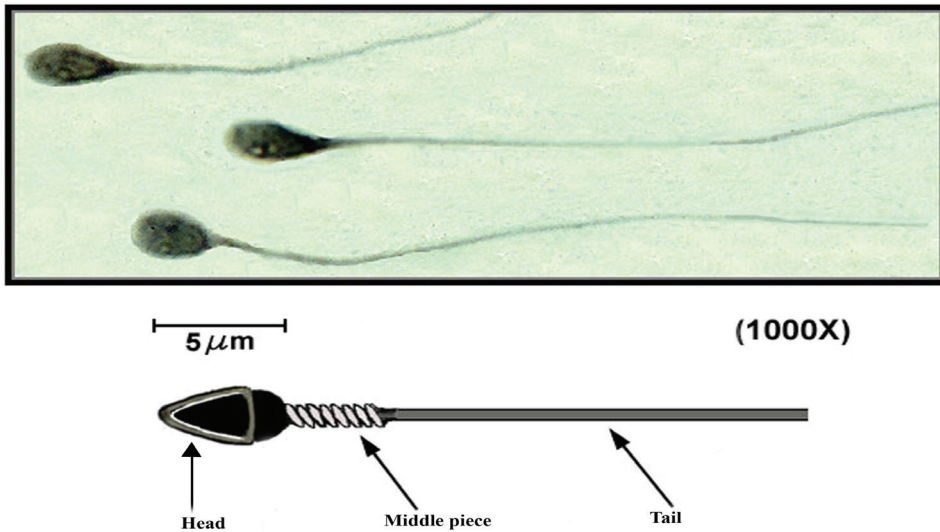


Figure 8.10 - Human sperm

Ductus deferens

The ductus deferens is a muscular tube. It enters the pelvic cavity. The latter part of ductus deferens unites with the duct of a seminal vesicle and forms the ejaculatory duct. This passes through the prostate glands and opens into the urethra.

Seminal vesicles

Seminal vesicles are about 5cm in length. It is situated below the bladder but outside of it. It unites with ductus deferens and forms the ejaculatory duct. Secretions of the seminal vesicles are added to seminal fluid.

Prostate gland

This is situated below the bladder, around the urinary tract. The secretions of the prostate glands are added to the seminal fluid.

Seminal fluid is formed by the secretions of the seminal vesicles and the prostate gland.

Diseases related to the reproductive system

1. Sexually transmitted diseases

Sexually transmitted diseases are transmitted from one individual to another through sexual intercourse. They are syphilis, gonorrhoea, herpes and AIDS.

Disease	Agent	symptoms
Syphilis	Bacteria - <i>Treponema pallidum</i>	At the primary stage blisters and wounds appear on the genitalia and later it spreads to other areas.
Gonorrhoea	Bacteria - <i>Neisseria gonorrhoeae</i>	Burning sensation while passing urine, passing pus from the urinary track and from the vagina
Herpes	Virus - <i>Herpes Simplex</i>	Fever, rash, in the genitalia, swelling of lymph glands
AIDS Acquired Immune Deficiency Syndrome	HIV virus Transmitted through sexual intercourse and blood transfusion, From infected pregnant mother to new born child, Using unsterilized medical equipments e.g: syringes	Due to reduced immunity in the body they are prone to develop other diseases

2. Cancer in the female reproductive System

Cancer can occur in the ovaries, womb and the cervix. In order to identify cervical cancer at an early stage, it is advised that every woman above the age of 35 under go a PAP smear test.

3. Diseases in the male reproductive system.

Due to the inflammation of the prostate glands at old age there will be difficulty in passing urine. Cancers may affect the prostate glands too.

Steps to prevent reproductive system related diseases

1. Have sexual relationships with one trustful partner. Use protective methods while engaging in sexual intercourse.
2. Be concerned about your personal hygiene and keep external genitalia clean.
3. If you notice any wounds or secretion around the external genitalia, consult a doctor immediately.



For extra knowledge

Subfertility

There can be many reasons why a couple is unable to produce a baby. This can be due to a disease state in both or one person.

Reasons for male subfertility

Inadequate number of sperms, poor state of health of the sperms are some reasons for subfertility. If the number of sperms in semen (Sperm count) is low or if the movement of the sperm is abnormal, fertilization does not take place. Tests will help to identify this condition. Conditions in the male contributes to about 30-40% of sub-fertility in couples.

Reasons for female subfertility

Irregular ovulation contributes to about 20% of subfertility. Another 20% is due to damages or blocks to the fallopian tube. Diseases in the womb also contribute to subfertility. In some instances a cause for subfertility is never found. Different methods of treatment are being used to treat subfertility. Irregular menstrual cycle in obese females may cause delay in getting pregnant.

Summary

The digestive, respiratory, circulatory and the excretory systems contribute to the functioning of the human body. The reproductive system contributes to the purpose of producing a new life. The systems are structured in such a way as to function optimally. Each of the systems could get affected by specific diseases that could interfere with its functioning. Preventing these diseases and maintaining the optimum function of these systems will enable one to lead a healthy life.



Exercises;

1. Write five actions we can take to avoid diseases in the digestive system.
2. Mention two major diseases that affect the excretory system.
3. Write two diseases that affect the respiratory system and write one action that could be taken to prevent each of them.
4. Write five positive actions we could follow to avoid heart attacks.
5. Write four methods how AIDS can be transmitted.

Let us adhere to rules, regulations and ethics in sports

In the past, people engaged in sports as a form of recreation and means of displaying their physical strength. The early Olympic Games were held with a view of developing a healthy body and mind, upgrading social ethics and creating a law abiding society.

The political and socio-economic changes that took place in various countries in the world influenced the field of sports as well. Along with the socio-economic developments that took place, the needs of the participants in sports changed. Consequently most sports developed into a highly organized state to cater to the needs and demands of the society. In order to address issues related to each sport, governing bodies at national and international levels were established and rules and regulations were formulated.

In the previous grades you learnt about the origin of rules and regulations, ethics and social values in sports. In this chapter, you will gain knowledge on what is meant by rules and regulations in sports, the need for such rules and regulations, evolution of the Olympic Games, doping in sports and the roles of different parties in organizing sporting events at school level.

Rules and regulations in sports

Rules and regulations of sports are the guidelines created, accepted and imposed by the national and international sport governing bodies. It is to facilitate the conduct and development of sports. This will also enable the respective governing bodies to take disciplinary action against those who violate rules and regulations and will also be revised depending on the needs.

It is interesting to know that there are games with no set rules and regulations. These games are played adhering to an unwritten set of rules and regulations which have passed down from generation to generation.

The need for rules and regulations in sports

The reason for rules and regulations in sports can be listed as follows:

1. to maintain ethics in sports
2. to maintain enthusiasm in sports

3. to maintain the dignity of sports
4. to develop personal values
5. to regulate games and minimize accidents
6. to protect the rights of the participants
7. to resolve problems related to sports.



Figure 6.1

1. Maintaining ethics of sports

You must have noticed that the participants of a sporting event always respect each other. When participants in sports follow rules and regulations, they also get used to maintaining social ethics. At the start and finish of a sports competition, the participants should exchange greetings and greet the judges and the audience. For instance, when a competition or a game is over, the members of the opposing teams, regardless of who the winners are, shake hands, hug one another and also show their gratitude to the judges and the audience as well.

At Berlin Olympics in 1936, Jesse Owens of United States of America and Luz Long of Germany had tied in the men's long jump marking at 7.87 m by the end of the fourth round. Then Luz Long instructed Jesse Owens on ways of improving the running approach. Finally Jesse Owens won the first place making a final jump of 8.06 m. The two athletes then walked around the playground together amidst the cheers of about 80,000 strong group of spectators.



Jesse Owens



Luz Long

Figure 6.2

2. Maintaining enthusiasm in sports



Figure 6.3

Rules and regulations are very important in maintaining enthusiasm in sports. If sports events are held without abiding by rules and regulations, it will be hard to conduct a fair competition. By acting according to rules, regulations and standards of sports, justice will be served to every participant. When every participant adheres to the same set of rules, each participant gets an equal opportunity to take part in the game keeping up the same spirit from the beginning to the end. When there is adherence to rules and regulations, even the audience will develop confidence in the game. Thus, rules and regulations pave the way for the participants to engage in the game, fans to watch it from the beginning to the end with enthusiasm and accept victory and defeat unquestionably.

3. Maintaining dignity in sports



Figure 6.4

Rules and regulations are also important in maintaining dignity in sports. When the same set of rules is applied to all participants, justice is served to every one. Therefore, participants abide by the rules and regulations establishing fair play, award victory to the most deserving, and maintain the dignity of the sport.

4. Developing personal values



Figure 6.5

Any sporting event helps its participants to develop personal values such as the ability to accept victory and defeat equally, engage in play adhering to rules and regulations and respect for each other.

For instance, the test match played between Sri Lanka and New Zealand in Galle in 2012, the wicket keeper of the New Zealand team made an appeal for a catch against Mahela Jayawardane when Mahela was on 91 runs. Mahela left the field without waiting for the umpire to give his decision. It is because he possessed high personal values. The very incident earned Mahela the special award named ICC Spirit of Cricket at ICC Awards 2014.

5. Regulating sports to minimize accidents



Figure 6.6 - Head gear for Boxers

While participating in sporting events, the participants meet with various accidents. These accidents could happen due to several reasons such as the manner in which the game is played, the type of equipment used etc. Therefore, standards have been defined through rules with regard to the use of equipment and participants cannot use equipment as they wish. Rules define the manner in which the participants should play the game.

For example in cricket, a fast bowler cannot bowl a full toss above waist (this delivery is called a Beamer) and in boxing, boxers should wear headgear and mouth guards.

6. Protecting the rights of participants

Rules and regulations safeguard the rights of the participants in sporting events guaranteeing their right to participate, serve justice to every participant and ensure their safety. Rules and regulations have also barred competitors from achieving victory by unfair means and game fixing for other motives.

7. Resolving problems related to sports

In any sport, participants could face various problems and issues with regard to the manner in which the game is played. Such issues may affect the successful conduct of the sport. Therefore rules and regulations have been spelt out on how disputes should be resolved. This paves way for the successful continuation of the sport.

8. Providing entertainment

When playing, participants gain pleasure if the same rules are applied to every participant irrespective of their talents or positions. Every participant will be satisfied with the outcome of the game and be happy.

9. Fair play

At the opening ceremony of the Olympic Games, one athlete as a representative of the competitors and one judge representing the officials take the Olympic Oath. The Olympic Oath is taken for two purposes, namely, rules and regulations of sport are adhered to and ethics are followed by all participants.

The following values of sports are guaranteed through fair play:

- good attitudes towards sports
- ethics of sports
- prevention of misconduct, doping, violent acts and exploitation in sports
- refraining from causing physical or mental suffering to others.



Figure 6.7

One with great sportsmanship always believes that participation in sports is more important than victory. An example that can be cited is the match between Pakistan and West Indies in the ICC Cricket World Cup tournament in 2011. Pakistan had to get four runs to win in the last delivery. The West Indian bowler was running to deliver the last ball, the Pakistani batsman at the bowlers end had walked forward past the crease. At this point, the bowler could have easily run out the Pakistani player and won the match instead he stopped there, held the ball close to the wicket and warned him not to move forward. In the last delivery Pakistan scored the required four runs and won the match. Despite the victory of the Pakistanis, all the spectators and commentators honoured and showed great respect to the West Indian

bowler who displayed great sportsmanship. What is evident from this example is that such players always expect victory through fair play only.

These facts make it clear that there should be rules and regulations in sports. Apart from allowing the smooth functioning of the game, it helps identify true sports heroes, protect the spectators and judges, make accurate judgements and prevent fraudulent practices. Sporting rules and regulations contribute a lot in the personal development of the participants and have a great influence on social well-being.

Evolution of the Olympics.



Figure 6.8

When we speak of sports we are always reminded of the word ‘Olympics’. It is because the Olympics is an international sports competition in which almost all the countries of the world take part. Winning an Olympic event is considered a great honour. Sport is considered to be something dignified, but there have been occasions where sports has caused agitation and damaged its own dignity, match fixing and doping being examples. It is important for you to learn how the Olympic Games evolved over time to its present status.

- The first recorded Olympic Games were held in Olympia, Greece, in 776 B.C. The competitions were held in a beautiful plain close to the city of Pisa on the Alpians in Athens.
- There are many legends describing the origin of the Olympics, one of which says that Hercules, son of Zeus, the King of Gods, started the Olympics in memory of Zeus.
- Another legend says that Prince Pelopas who fought against King Onamous to marry the king's daughter defeated the king and started holding Olympic Games to celebrate his victory.
- The winners at Olympic Games were awarded a wreath of olive leaves and honoured with great respect that is accorded to heroes.

- In its early years women were not allowed to take part in the Olympic Games.
- After the Romans had invaded Greece in 146 A.D, the Olympic Games came under Roman influence. Consequently, games in which men used animals, were added. Emperor Theodosius, who was dissatisfied with the violent nature of those games, banned Olympic Games in 394 A.D.
- In 1896 A.D, a Frenchman Pierre de Coubertin started the modern Olympic Games.
- The objective of holding the Olympic Games was to promote world peace and strengthen relationships between nations through the games.
- Several organizations were created to work for the development of sports and to maintain its dignity; International Olympic Committee is the foremost among them.



For extra knowledge

List of countries hosting Olympic Games since 1896

Table 6.1

Year	Country	City
1896	Greece	Athens
1900	France	Paris
1904	America	St. Louis
1908	United kingdom	London
1912	Sweden	Stockholm
1916	Games were not held because of World War I	
1920	Belgium	Antwerp
1924	France	Paris
1928	Netherlands	Amsterdam
1932	America	Los Angeles
1936	Germany	Berlin
1940	Games were not held because of World War II	
1944	Games were not held because of World War II	
1948	United kingdom	London
1952	Finland	Helsinki
1956	Australia	Melbourne
1960	Italy	Rome

1964	Japan	Tokyo
1968	Mexico	Mexico City
1972	Germany	Munich
1976	Canada	Montreal
1980	Russia	Moscow
1984	America	Los Angeles
1988	Korea	Seoul
1992	Spain	Barcelona
1996	America	Atlanta
2000	Australia	Sydney
2004	Greece	Athens
2008	China	Beijing
2012	United kingdom	London

By studying this grid, you can learn the years, the countries and the cities in which Olympic Games were held from 1896 to date.

Countries proposed to host the next Olympic Games are as follows:

Year	Proposed country	City
2016	Brazil	Rio de Janeiro
2020	Japan	Tokyo



Activity

Make a list of the events that are included in the Olympic Games at present.

Sports and doping

Modern-day sporting events have become highly competitive since the participants engage in sports as professionals. As a result, participants always try to boost their performance to achieve victory. There has been an increasing trend in doping incidents in sports. However the victories they achieve through the use of performance - enhancing drugs are temporary and such harmful drugs can pose a direct threat to their sporting career.

these harmful drugs cause physical damage to the users in the long run. Competitor's urine and blood samples are tested to verify if such drugs have been used.

Consequences of doping in sports

- Performance-enhancing drugs can cause severe damage to physical health in the long run and even cause death.
- Athletes / players who are found to have taken performance enhancing drugs can be banned from participating in sports.
- The victories of such athletes / players can be annulled and they can be stripped of their medals.
- Doping in sports brings disgrace on the individual players as well as the country they represent.



Activity

Prepare a list of the participants in Olympic Games who have represented Sri Lanka. List their achievements, the names of the medalists and the medals they have won.

Sports events and health and physical education programs held at school level

1. Inter-house sports meet
2. Physical fitness programmes
3. Programmes on sports and physical education
4. Sports / physical education day
5. Appraisal of athletes / players (award of colours)
6. Health week
7. Mosquito control "shramadhane"
8. oral health workshops
9. Workshops to create awareness about non- communicable diseases
10. World tuberculosis day

1. Inter-house sports meet

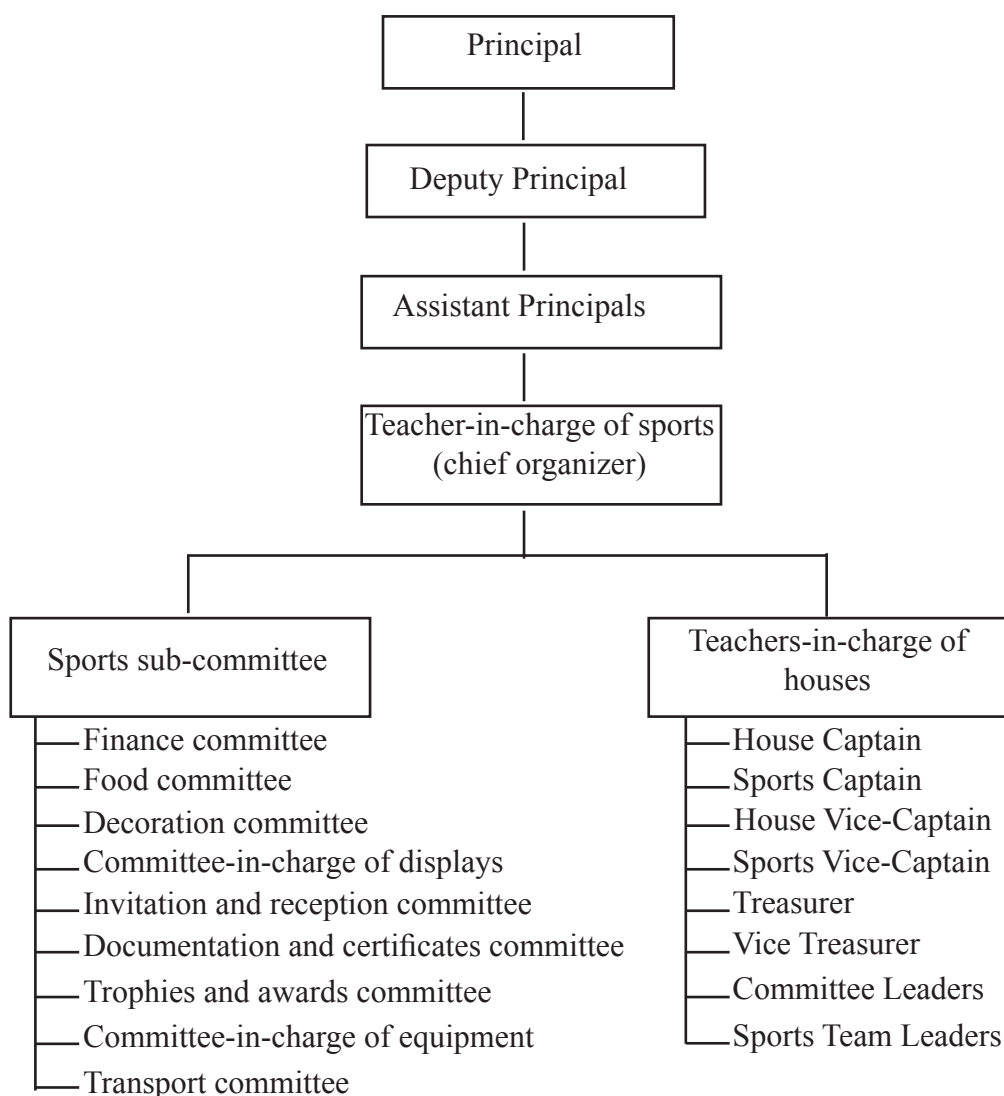
The Inter-house sports meet is an annual event which is held with the view of developing sporting skills of pupils. Pupils are divided into a few houses and competitions are held in a selected number of events. The houses are awarded points based on the performance in athletics and team events. Each house is ranked according to the points they win. The following objectives are expected to be achieved through inter-house sports competitions:

- Provide opportunity for every pupil to take part in sports events
- Develop leadership qualities among pupils
- Personality development in the pupils
- Appraisal of the sports talents of the pupils
- Develop skills related to team work
- Promote collective action and team spirit

- Develop skills related to communication and organization of events
- Train pupils to accept victory and defeat alike
- Train pupils to adopt a healthy lifestyle
- Grooming pupils to face challenges.

Diagram 6.1 shows how duties and responsibilities in organizing an inter-house sports meet can be devolved:

Diagram 6.1



(Note – The above is only a model)



Figure 6.9



Activity

Prepare a list of duties and responsibilities of a house captain / team leader of an inter-house sports meet.

2. School physical fitness programmes



Figure 6.10

Outdoor activities contribute a lot in maintaining good health among pupils. The school physical fitness programme is conducted at every school with a view to create a healthy and active generation in Sri Lanka. The Ministry of Education has introduced separate sets of physical exercises for pupils of primary and secondary classes. It is compulsory for every school to engage all the pupils in physical exercises. In addition, there are various other physical fitness programmes organized at school level.

3. Other sports programmes

There are many other sports programmes that are conducted at school level. They include;



Figure 6.11

- Different sports competitions
- Athletics training camps
- Training camps for team events
- Camps related to outdoor education
- Fitness tests for players / athletes
- Drill displays
- Scout and girl guide camps
- Cadet coaching camps

4. Sports / Physical Education Day

The objective of holding a sports / physical education day at school level is to conduct a one-day workshop to develop sports / physical education skills of the pupils. The following are some of the activities that can be done during such programmes:

- Implementing a programme to check the physical fitness of every pupil.
- Measuring the body mass index (BMI) of every pupil
- Implementing a programme to improve their nutritional status.
- Organizing a sports tournament.
- Directing pupils to create and play simple games or improvised forms of games that they already play.
- Implementing awareness programmes on the importance of engaging in sports and physical exercises.

5. Accord recognition to sports persons



Figure 6.12

Pupils who display outstanding talents in various sports / games deserve due recognition at school. Therefore schools should have formal means of recognizing such pupils. One such way is to award certificates and colours annually to pupils who show outstanding talents in sports events. In addition, pupils can also be encouraged to engage in sports by publishing newspaper reports, displaying reports on the school notice board about those who excelled in various events displaying their names on banners or appreciating them at the school assembly.

6. Health Week

You must be knowing that a health week is declared at schools annually and various programmes related to health are implemented during that week. The objective of holding a health week is to identify and conduct the activities that need to be done in school to create a healthy school environment. Some of the activities that can be implemented at school include:

- Conducting a Shramadana campaign at school.
- Removing dangerous and unsafe conditions prevailing in the school environment.
- Exhibiting posters and paintings related to good health.
- Inculcating the habit of taking nutritional food like ‘kolakenda’ among pupils.

- Engaging pupils in activities such as cleaning the school environment.
- Implementing counselling programmes.
- Raising awareness among pupils on health issues by conducting seminars with the participation of doctors or other officials in the health sector.
- Raising awareness among pupils on road safety in association with police officers.



Figure 6.13

- Conducting workshops on first aid.
- Conducting clinics on oral health.
- Conducting workshops on improving mental health and implementing religious programmes.
- Raising awareness among pupils on maintaining ideal body weight.
- Conducting workshops on the importance of prevention of the use of alcohol, drugs and smoking which are harmful to the human body.
- Raising awareness among pupils on abuse and delinquency.
- Holding debating competitions on good health.
- Assessing the standard of schools in promoting good health by evaluating the activities performed by the school based on the set criteria.

Summary

Rules and regulations in sports have been formulated and accepted by the international associations for sports in order to ensure fairness and equality in conducting sporting events. These rules and regulations are important in maintaining ethics in sports, promoting enthusiasm and dignity of sports, developing personal qualities, minimizing accidents, protecting the rights of participants, solving problems related to sports, engaging in fair play and in maintaining the entertainment that sports provide.

The modern Olympic Games started in 1896 and the Olympics is considered the greatest sports festival in the whole world.

Doping in sports has become a major problem with an increasing trend. Doping in sports causes a great deal of long-term damage to the health of sports person who indulge in. It brings disgrace to the country / school they represent.

We can hold various programmes at school level on health and physical education. The Inter-house sports meet is one of the foremost events which contributes to develop the sporting skills and talents of the pupils. In addition, physical education day, physical fitness programmes, awarding colours and school health week can be implemented at school level to improve the well being of school children.



Exercises;

1. State five advantages that pupils gain by taking part in sports.
2. Write three ill effects of doping in sports.
3. Name four programmes that are implemented at school level on sports and health education.
4. Write five advantages that are expected to be gained by holding the annual inter-house sports meet.
5. Name three programmes that are implemented during the school health week.

Let us learn about athletics

Activities such as walking, running, jumping and throwing have naturally been connected with man's life throughout the process of evolution. These activities gradually developed and resulted in the creation of modern athletic events. It is considered that organized athletic events were first started in Greece during the Greek era. Athletics was introduced to Sri Lanka by the British. Gaining theoretical knowledge and practical experience in athletics will contribute immensely to successful performance of day-to-day activities and also pave the way to a healthy life.

In the previous grades we gained theoretical understanding and practical experience related to some athletic events like walking, running, jumping and throwing.

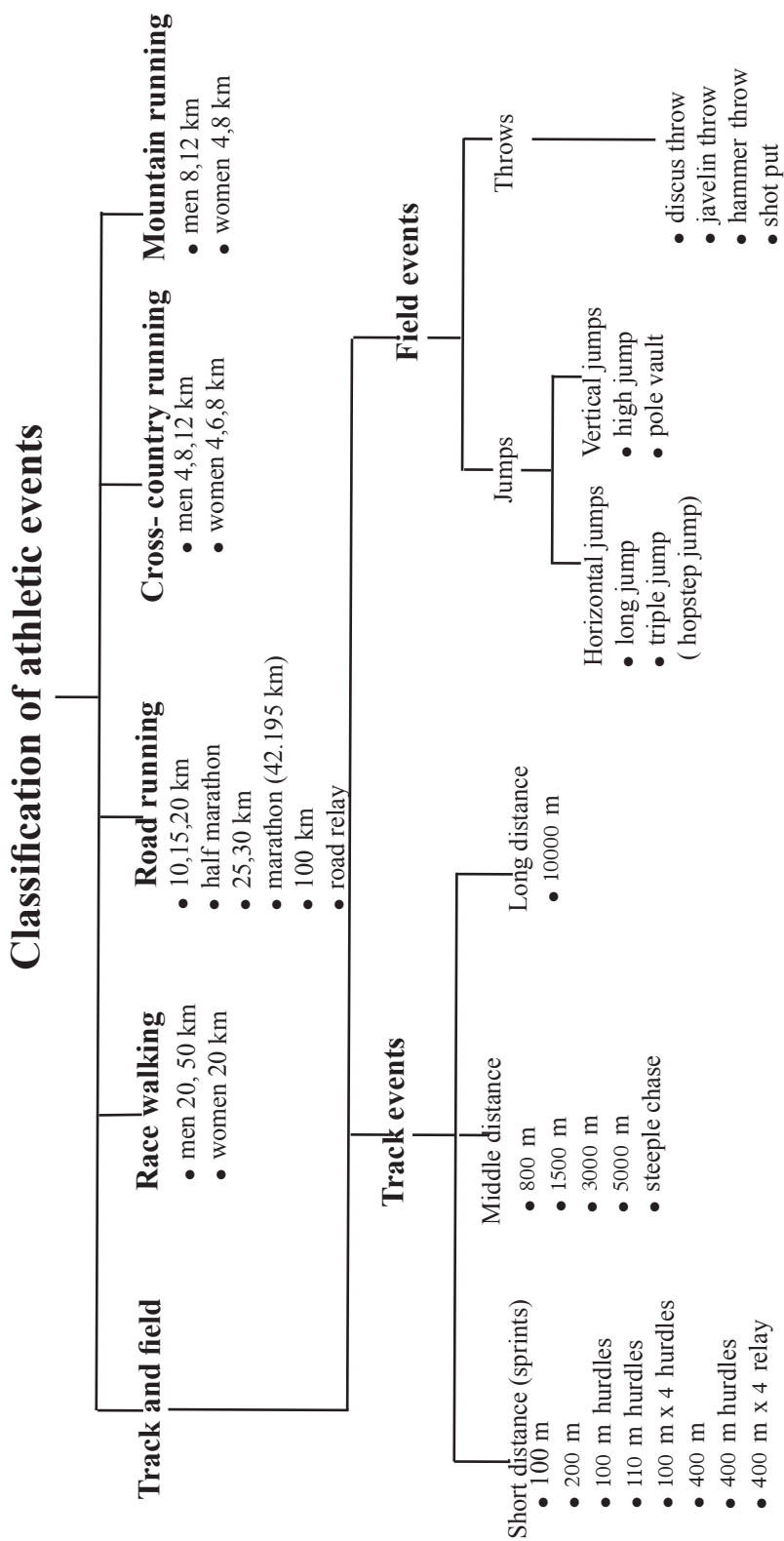
In this chapter, we will discuss the classification of athletic events, techniques of competitive walking, running, Hang technique in long jump, Fosbury Flop technique in high jump, Parry O'Brien technique of shot putt, technique of discus throw and rules and regulations related to athletics. You can gain practical experience in each of these different events, by engaging in the described activities related to them. **Engage in them in the playground with your physical education teacher.**

Classification of athletic events

Of these athletic events, walking and running events have been classified based on the distance of the race; jumping events have been classified based on the way of taking off; and throwing events have been classified based on the process of throwing and the type of equipment used. All events identified under athletics have been classified into five groups.

1. Track and field
2. Race walking
3. Road running
4. Cross - country running
5. Mountain running

Diagramme 5.1



Combined events

Combined events have several athletic events combined together and performed by a single athlete. They are, pentathlon (5 events), heptathlon (7 events) and decathlon (10 events).

Pentathlon is held in one day while heptathlon and decathlon are held over two days.

Pentathlon (Men's)

Long jump, javelin throw, 200m running, discus throw and 1500m running.

Heptathlon (Women's)

100m hurdles, 200m running, 800m running, high jump, shot put, long jump and javelin throw

Decathlon (Men's and Women's)

100m running, 400m running, long jump, high jump, shot put, 110m / 100m hurdles, discus throw, pole vault, javelin throw and 1500m running.

Race walking

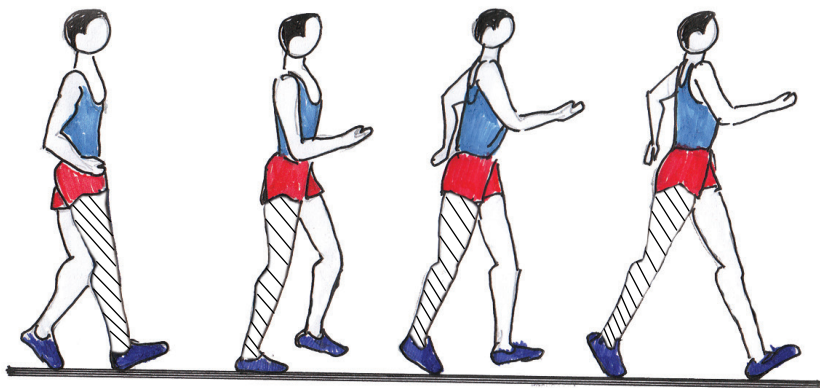


Figure 5.1 – Race walking.

Walking is an activity naturally performed by everybody. It is a motor skill that man naturally possesses. However, with the passage of time it also evolved into a racing event.

Although race walking differs from the way we naturally walk, there are some common features between the two.



Activity

Get into groups and make a list of similarities and differences between walking and running.

Every step of race walking consists of two stages.

Single-support phase:

- The stage in which the race walker makes contact with the ground with one supporting sole is called the single-support phase.
- In this stage the speed necessary for forward movement is generated and the free leg makes the next stride.

Double-support phase:

- The stage in which the race walker makes contact with the ground with both soles is called the double-support phase.
- This stage is necessary to maintain continuous contact with the ground.

Foot work in race walking

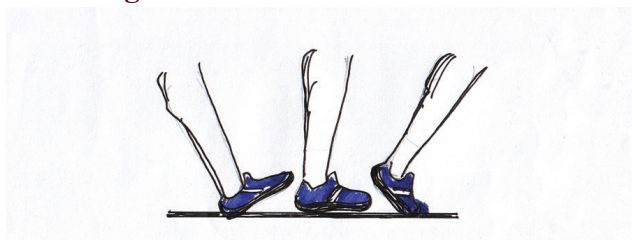


Figure 5.2- Footwork in race walking

When walking, the sole of the foot makes contact with the ground at three points- the heel, the ball and finally the toes.

- The back foot gives a powerful and rapid push for the forward movement.
- The toes and the knee joint of the front foot are directed straight forward.
- The walker steps along a straight line.
- The back foot lies erect anchored to the ground until the front foot lands.

Hand movement

- Shoulders are kept relaxed.
- The arms are bent by about 90° at the elbow and move forward and backwards rapidly from the shoulder.

Hip movement

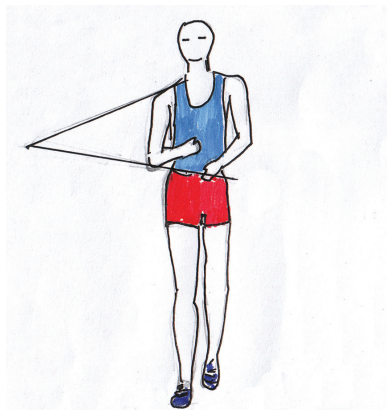


Figure 5.3 - Hip movement

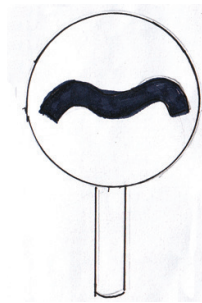
The axis of the shoulders and the hip move upwards and downwards alternately as shown in the figure, i.e. the hip of the leg which lies straight moves upward while the shoulder of the same side moves downward.

Rules and regulations related to race walking

Two rules apply with regard to stepping in race walking:

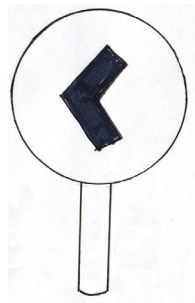
- ★ In race walking, stepping is done in such a way, that one foot is always kept in contact with the ground, i.e. the front foot should come into contact with the ground before the back foot has been taken off the ground.
- ★ The front leg should lie straight without bending the knee from the moment it first touches the ground until it becomes erect.

If race walkers violate the above rules, the following signals will be given to them.



Lack of contact with the ground

a



Bending the knee

b

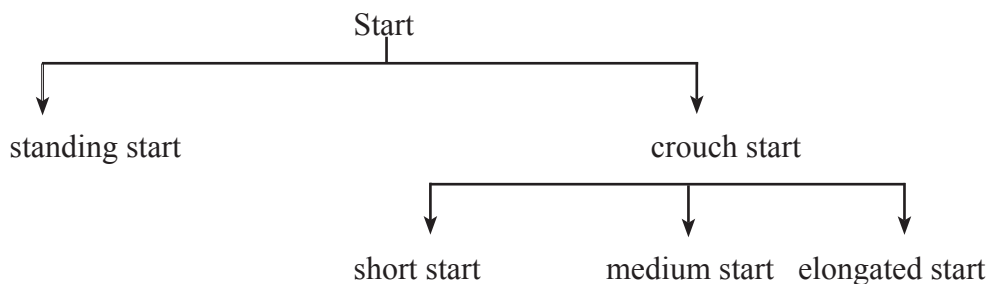
Figure 5.4

Running events

Start in running events

Start is crucial in sprint events. The slightest delay in the start of a sprinter could lead to defeat.

There are two main styles of start in running events.



1. Standing start

- Standing start is used in running races of over 400 m.
- Two commands are given for the standing start:
 - i). on your marks
 - ii). go (sound of the starting gun)

Stages of the standing start

(i) 'On your marks' stage

- Stand keeping the foot of the dominant leg very close to the starting line and the other leg behind in an easy manner.
- The arm opposite the front leg should be bent at the elbow and placed

in front. The other arm should be placed behind.

- The front knee should be slightly bent with the body leaning forward.

(ii) **‘Go’ stage (sound of the starting gun)**

- As the sound of the starting gun is emitted, the back leg should immediately move forwards and running should begin.

2. Crouch start


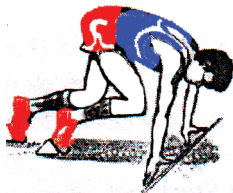
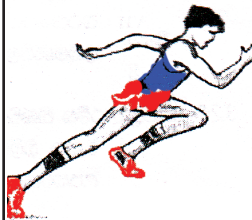
It is compulsory that the crouch start is used in 400 m races and all other races less than 400 m. Starting blocks are not used at school level and races below national level but is compulsory to use at national and international races.

There are three stages of command for crouch start:

1. On your marks
2. Get set
3. Go (sound of the starting gun)

Stages of the crouch start

Table 5.1

stage and the command	on your marks	get set	go
postures			

(i) On your marks

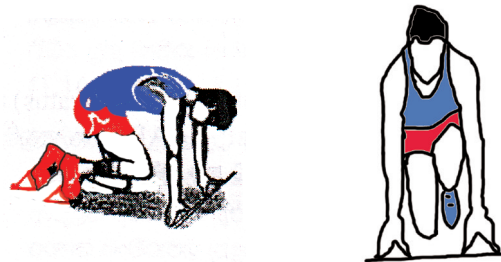


Figure 5.5 - On your marks stage

- Both hands should be straight on the ground just behind the starting line.
- Both feet should be placed on the starting block.
- The knee of the back leg should be placed making contact with the ground.
- The hands should be kept on the ground with a gap of a distance that is slightly greater than the width of the shoulders apart.
- Tips of the fingers should touch the ground forming an arch between thumb and other fingers.
- The head should lie at a level that is parallel to the level of the back.
- Eyes should be focused on the ground about 20 – 30 cm ahead of the starting line.

(ii) ‘Get set’ stage

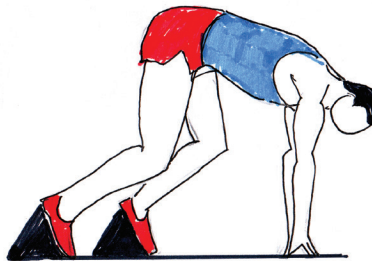


Figure 5.6 - ‘Get set’ stage

- Both knees are kept raised above the ground. The front knee lies with an angle of 90° and the back knee lies at an angle between $110^{\circ} - 130^{\circ}$.
- The hip lies above the level of the shoulders.
- Body weight lies on the two hands.

(iii) Forward push stage

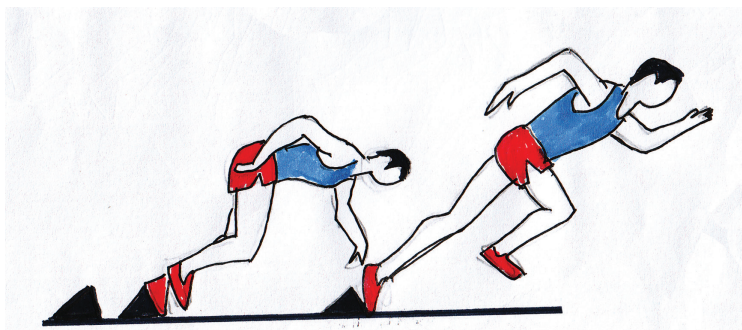


Figure 5.7 - Forward push stage

- The body is taken off as the starting block is pushed backwards with the two legs.
- The two hands are taken off the ground and the hand that is opposite to the leg in the front swings forward and the other hand quickly swings backwards.
- As the trunk is pushed forward, the back foot is quickly moved to the front.
- When moving forward, the hip and the knee are not bent.

The crouch start is divided into three styles based on the gap between the starting line and the front foot and the gap between the two legs.

short start	-	a small gap between the feet
medium start	-	a moderate gap between the feet
elongated start	-	a big gap between the feet

Offences committed at the start of a race

- ★ A runner takes too long to complete 'on your marks' or 'get set' stages.
- ★ Making the start so that the other runners are disturbed either with some noise or by any other means.
- ★ Changing the posture and starting before the sound of the starting gun is heard.

If any of the above offences are committed, the runner will be removed at the first instance. The starting officer shows the red card to remove a runner who has committed an offence.

Finishing the race

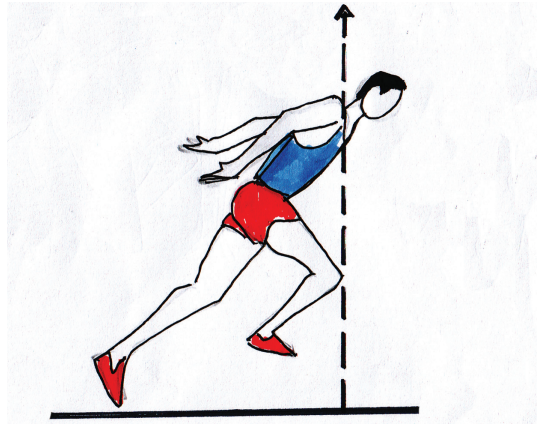


Figure 5.8 - Finish of the race

- The finish of the race is marked with a line that is 5 cm wide and perpendicular to the running direction. The finish is taken by the edge of this line that is closest to the runners.
- The winners are selected according to the sequence that the torso (the body except the head, hands and legs) of the runner reaches the vertical plane of the inner edge of the finishing line.
- It is a good finishing technique to lean the body forward with the last step before the finishing line.

Running exercises (Running drills)

Running exercises and correct running techniques are important in increasing the running speed. The following can be achieved by doing running exercises:

1. Increasing power through the correct movement of arms and legs.
2. Gaining the correct motion and the rhythm of a running step.
3. Maintaining the correct body postures while running.
4. Maintaining efficient nerve – muscle co-ordination
5. Increasing the efficiency of the muscles and joints worked in running.
6. Increasing the speed
7. Improving physical fitness.

Table 5.2 -Running exercises

Running - A	<ul style="list-style-type: none"> ● The sole of the supporting leg is in complete contact with the ground. ● Then the sole of the foot is raised well from the heel, ball and up to tip of the toes. ● The supporting foot is not completely taken off the ground. ● Arms are bent at the elbow at an angle of 90⁰ and swung with a movement similar to that which is made in running. ● Footwork is continued in this manner.
Running - B	<ul style="list-style-type: none"> ● The supporting leg lies well stretched. ● The opposite leg is bent at the knee at an angle of 90⁰ and is lifted so that the thigh is parallel to the ground. ● The knee is raised forward and a forward move is made with alternate steps according to a rhythm. ● Arms are bent at the elbow at an angle of 90⁰ and swung with a movement similar to that which is made in running.
Running - C	<ul style="list-style-type: none"> ● Arms are bent at the elbow at an angle of 90⁰ and swung with a movement similar to that which is made in running. ● Both legs are bent at the knee alternately and a forward run is made while hitting on the buttocks. ● Running is continued making steps forward alternately.

Relay

Baton change

Baton change can be classified in relation to the side of the body of the receiver.

1. Inside change
2. Outside change
3. Mixed change

In the inside change, the runner receives the baton with his/her left hand (the inside hand in relation to the running track). The runner carrying the baton holds it with his/her right hand and runs close to the left edge of his/her lane.

In the outside change, the runner receives the baton with his/her right hand (the

outside hand in relation to the running track). The runner carrying the baton holds it in his/her left hand and runs close to the right edge of his/her lane.

When runners use both these baton changes alternately in a relay it is called the mixed change.

Mixed change

This is how each of the runners carry the baton and how it is changed in the mixed method.

1. The first runner carries the baton in the right hand and passes it to the left hand of the second runner (inside pass).
2. The second runner carries the baton in the left hand and passes it to the right hand of the third runner (outside pass)
3. The third runner carries the baton in the right hand and passes it to the left hand of the fourth runner (inside pass).

Receiving the baton with the left hand by the runners in the first and the third zones called the inside change while receiving the baton with the right hand by the runner in the second zone is called outside change. Accordingly, the alternate use of the inside change and the outside change is called the mixed change. The mixed change is more suitable in 100m x 4 relay races held in a 400m track.

Rules and regulations related to relay races

- ★ The baton should have the following specifications.
 - length : 28 – 30 cm
 - circumference: 12 – 13 cm
 - weight: should be less than 50g
- ★ Baton change should take place only within the changing zones.
- ★ Runners should carry the baton throughout the race.
- ★ The baton should be changed from hand to hand only.
- ★ The baton should not be passed to the receiving runner by way of throwing.
- ★ If the baton falls down while it is being changed, the runner who is giving the baton should pick it up. It is illegal for the runner who is receiving the baton to pick it up.
- ★ It is illegal to block the lanes after changing the baton so that the other runners are obstructed.

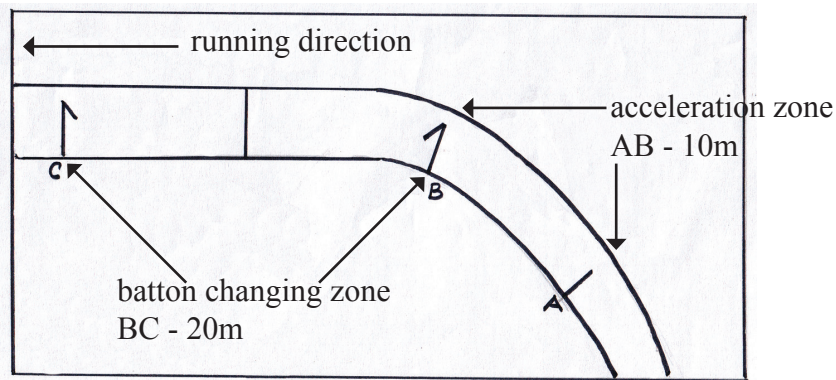


Figure 5.9 - Baton changing zone

Jumping events

There are four jumping events in athletics.

- | | |
|----------------|--------------------|
| 1. long jump | } horizontal jumps |
| 2. triple jump | |
| 3. high jump | } vertical jumps |
| 4. pole vault | |

Long jump

There are three major flight techniques for the long jump.

These techniques differ from one another according to the jumper's movements during flight.

1. Hang Technique
2. Sail Technique
3. Hitch-kick Technique / walking on the air

Whatever the technique adopted by the jumper, long jump is completed in four stages:

- i. Approach run
- ii. Take-off

- iii. Flight
- iv. Landing

The hang technique of long jump

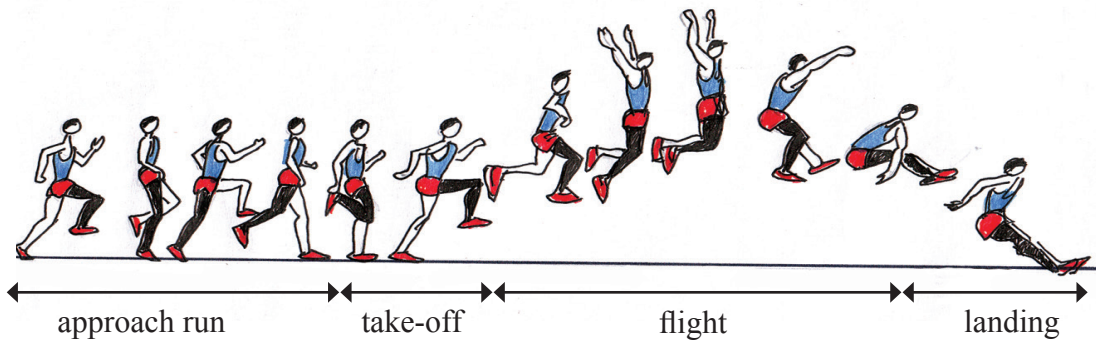


Figure 5.10 - Hang technique of long jump

Let us study these four stages under the hang technique of long jump.

Approach run

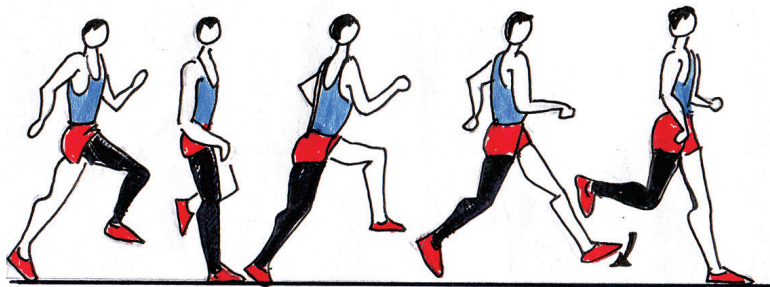


Figure 5.11 - Approach run

The approach run is crucial in the long jump. Generally sprinters are very good at long jump, too. The reason for this is that they possess the skill to control their speed and take off correctly from the take-off board. The standing start is used for the approach run.

Take-off

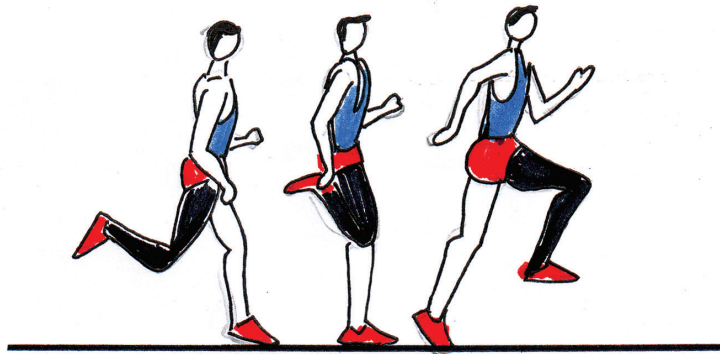


Figure 5.12 - Take-off

The phase from the moment the foot of the take-off leg touches the take-off board until the body is straightened for flight is called take-off.

- When taking off, the ankle, knee and the hip joints are well straightened.
- The free leg driven forward quickly reaches the horizontal level.
- The leg with which the approach run should be started has to be determined so that the dominant leg can be placed on the take-off board.

Flight

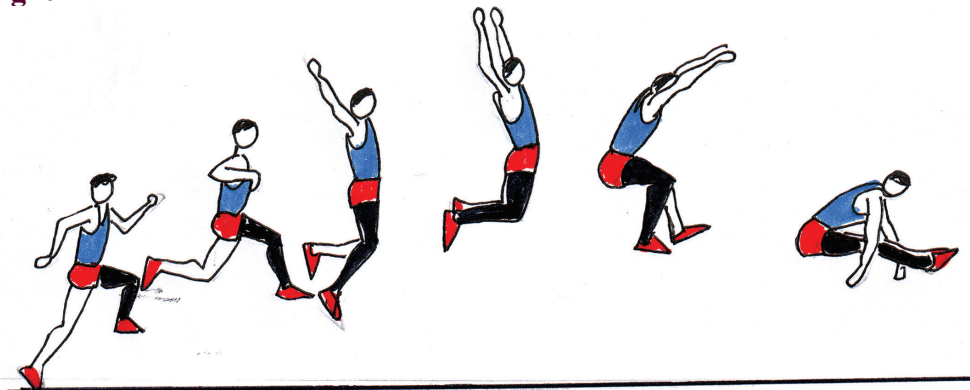


Figure 5.13 - Flight

- After taking off, the jumper lowers the free leg in front and brings it down to the level of the take-off leg.
- At this stage, the two hands are directed backwards.
- Then the jumper directs his legs forward and raises them up.
- At the same time, the hands which have been directed backwards are brought to the front.
- Before landing, the legs are straightened forwards.

Landing

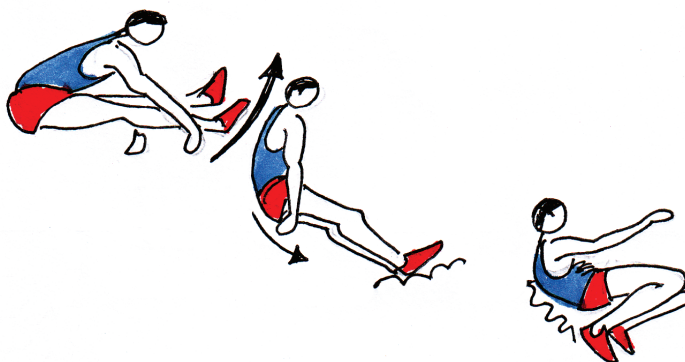


Figure 5.14 - Landing

- The body and the hands are pulled forward.
- The body leans forward.
- The legs are well straightened.
- As the feet touch the ground the knees are bent and the whole body is pushed forward along the ground in a sitting position.

Rules and regulations related to long jump

- ★ In terms of the rules and regulations of long jump, the following jumps are considered to be foul:
 - When taking off, touching the area beyond the take-off line with any part of the body.
 - When taking off stepping on the ground on either side of the take-off board.
 - Touching the ground between the take off line and the landing area while jumping.
 - Using summersaults while running or jumping.
 - When landing, touching the ground outside the landing behind the closest landing point with any part of the body.
 - Taking more than one minute to start the attempt after the jumper's number has been announced.

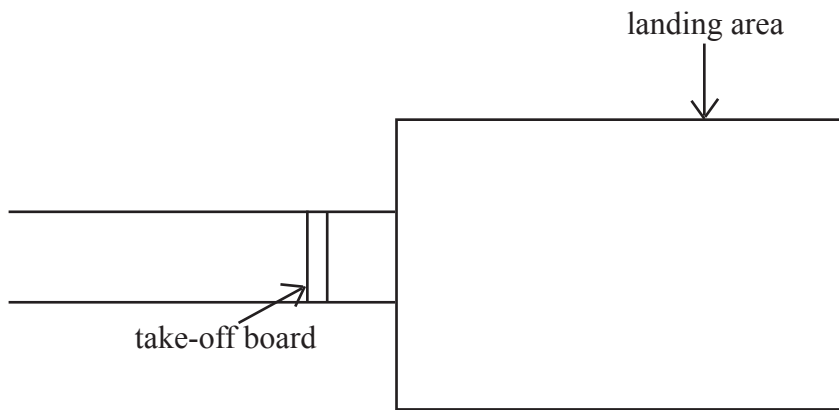


Figure 5.15 - Long jump pit

- ★ When measuring the distance of long jump, the perpendicular distance from the take-off line to the closest landing mark is measured in centimeters.

High jump

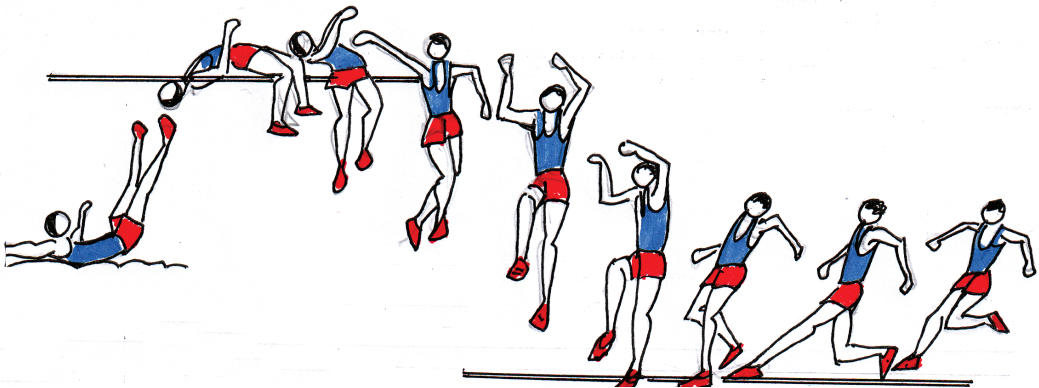


Figure 5.16 - High jump

High jump is a vertical jump. Various techniques have been used for high jump since ancient times. There are five techniques of high jump based on the position of the body during bar clearance.

1. Scissor jump
2. Eastern cut off
3. Western roll

4. Straddle

5. Fosbury flop

With the development of technology, Fosbury flop style has become the most widely used technique at present for better performance.

High jump can be divided into four stages under any of the techniques.

- i. Approach run
- ii. Take-off (flight)
- iii. Bar clearance
- iv. Landing

Lets us study these four stages under Fosbury Flop style.

Approach run

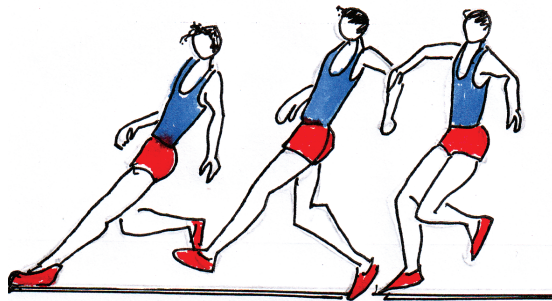


Figure 5.17 - Approach run

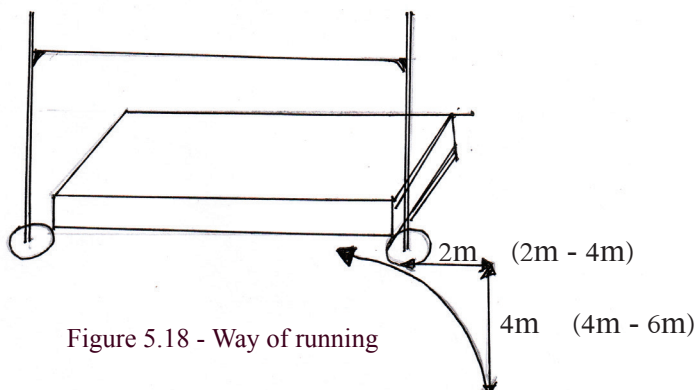


Figure 5.18 - Way of running

- During the approach run, jumper runs on the front part of the feet.
- Jumper uses the first phase of the run to gain speed.
- In the second phase, the jumper controls his/her speed to prepare for the take-off.
- When the jumper is running along a circular path, his/her body is curved towards the circular path.
- At the last step of the run, the body of the jumper is tilted backwards.

Take-off (spring up)

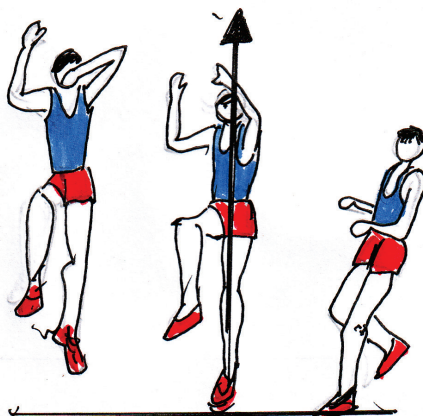


Figure 5.19 - Take-off (spring up)

- At the point of take-off the taking-off foot kicks the ground with a fast backward push.
- The taking-off foot is directed towards the landing area. The knee of the free leg is raised until the thigh is parallel to the ground.
- At the final phase of the take-off the body is erect.

Bar clearance

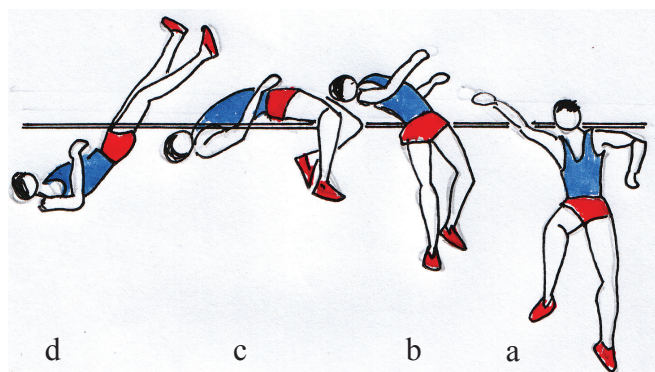


Figure 5.20 - Bar clearance

- Soon after the take-off, the jumper turns the back of his body towards the bar (figure 5.20 - a).
- As the jumper gets close to the bar, the free leg is lowered so that the thighs of both legs lie parallel to the ground (figure 5.20 - b).
- The legs are bent 90° at the knees and the body of the jumper is well bent taking an arch-shape (figure 5.20 - c).
- Just as the buttocks of the jumper clear the bar, his legs should be straightened very quickly at the knees (figure 5.20 - d).

Landing

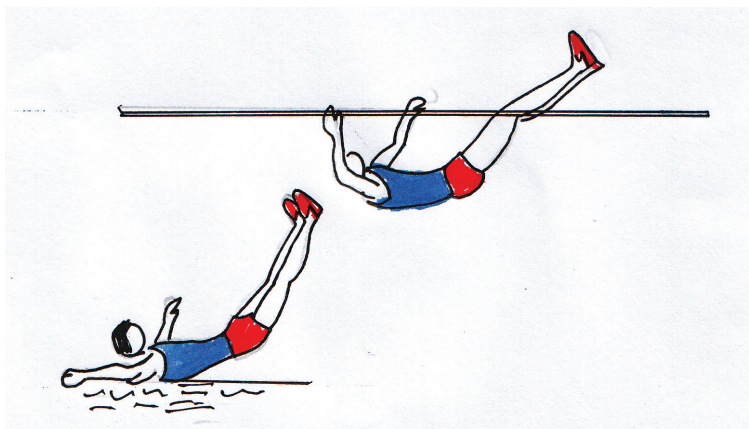


Figure 5.21 - Landing

- When a jumper has completed clearing the bar, his body lies parallel to the ground and the legs are raised.
- At this stage, the body should be kept relaxed and the landing should be done first on the shoulders and then on the arms.

It is important to keep in mind that it is dangerous to engage in training activities related to Fosbury Flop style unless proper equipment and a trainer are available.

Rules and regulations related to high jump

- ★ In terms of the rules and regulations of high jump, the following jumps are considered to be foul.
 1. Bar falling off the rests due to an action of the jumper while jumping.
 2. Making contact with the landing area or the area outside the two supporting poles with any part of the body before clearing the bar.

- ★ Take-off should be done with a single foot.
- ★ Continue to compete after three consecutive unsuccessful attempts.
- ★ A jumper has the right to refrain from attempting to clear a particular height and going to the next height. In such situations, the jumper does not have the right to ask for another opportunity to clear the height that he did not attempt.

Putting and throwing

In athletics there are four events coming under putting and throwing .

1. Shot put
2. Discus throw
3. Javelin throw
4. Hammer throw

Shot put

There are two techniques of putting the shot put.

1. Parry O'Brien technique (linear technique)
2. Rotational technique

In this chapter, let us study the linear technique of shot put

Linear technique

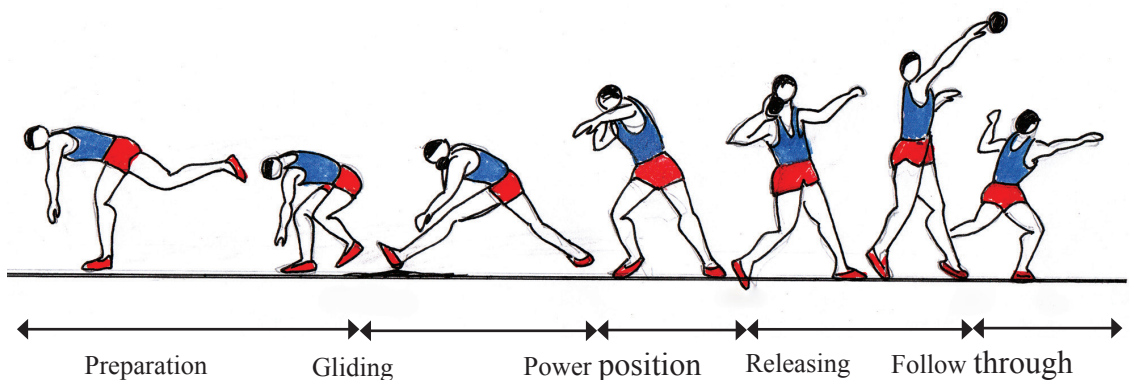


Figure 5.22 - Shot put

The linear shot put technique comprises of the following stages:

- i. Preparation
- ii. Gaining speed (Gliding)
- iii. Power position
- iv. Releasing
- v. Follow through

Let us study each of these stages under linear method of throwing the shot put.

The technique of a right-handed shot putter has been described in these examples.

Preparatory stage

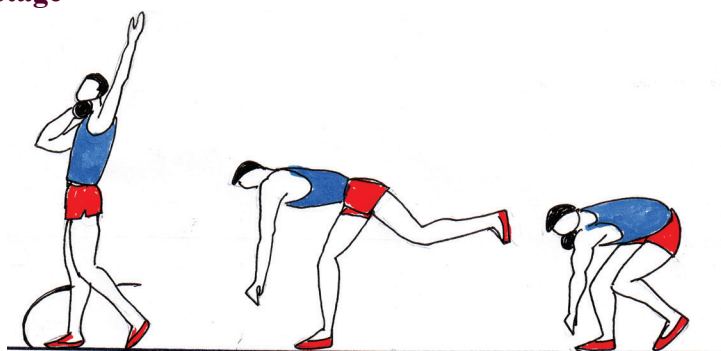


Figure 5.23 - Preparatory stage

- Hold the shot so that it touches the base of the neck below the ear and, under the chin.
- Bend the upper body forward until the body lies parallel to the ground.
- The shot putter stands on the back half of the circle turning his/her back towards the throwing direction.
- The left foot is moved backward to maintain the balance of the body.
- The left leg is then moved towards the front of the circle and the supporting leg is bent at the knee.

Gliding stage

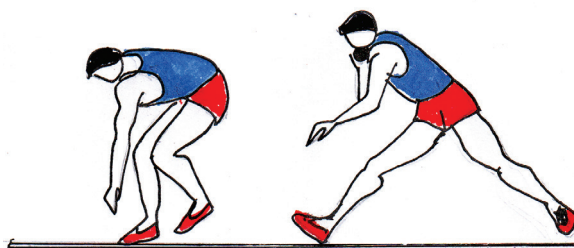


Figure 5.24 - Gliding stage

- Push the left leg backwards quickly with a sharp jerk.
- The right knee is slightly stretched at the knee.
- Gliding backwards on the ground is done on the heel of the right leg.

Power position

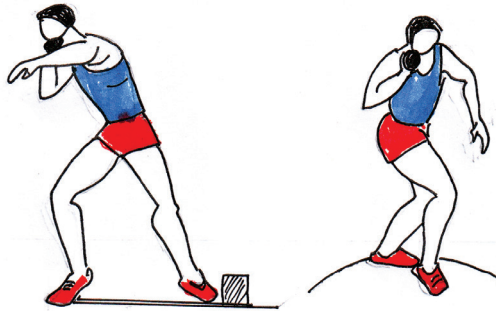


Figure 5.25 - Power position

- After gliding, the right foot is placed in the middle of the circle while the left foot is placed close to the front of the circle.
- The right leg is slightly bent at the knee and the weight of the body is on the right leg.

Release

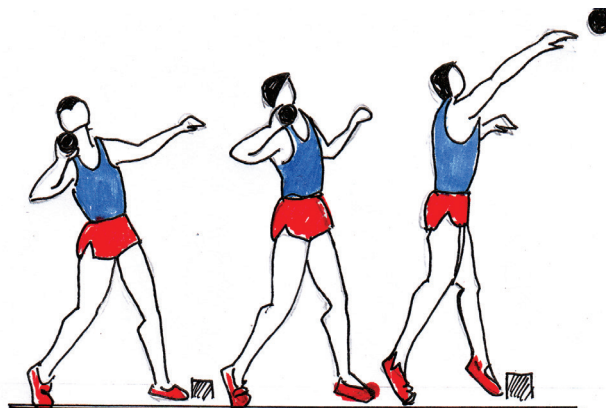


Figure 5.26 - Release

- The legs are stretched while turning the body towards the throwing direction.
- The right hand is straightened at the elbow and the shot put is released.

Follow through

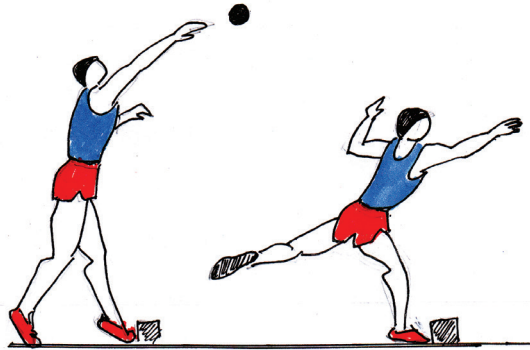


Figure 5.27 - Follow through

- When the shot put has been released, jump up bringing the back foot (right foot) to the front and the front foot to the back while in the air.
- Bend the right leg at the knee and slightly lean the upper body forwards.
- Stretch the left foot backwards in order to maintain body balance.

Weight of the shot put used for open competitions of different age limits at school level.

Table 5.3

Age limit	Boys	Girls
Under 15 years	4.000kg	4.000kg
Under 17 years	5.000kg	4.000kg
Under 19 years	6.000kg	4.000kg
Under 21 years and open	7.260kg	4.000kg

The throwing circle for shot put

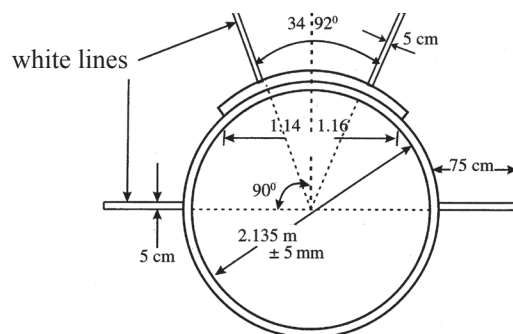


Figure 5.28- The throwing circle for shot put

Discus throw

Rotational technique is the commonly used method in discus throw. The process of discus throwing can be studied under six stages.

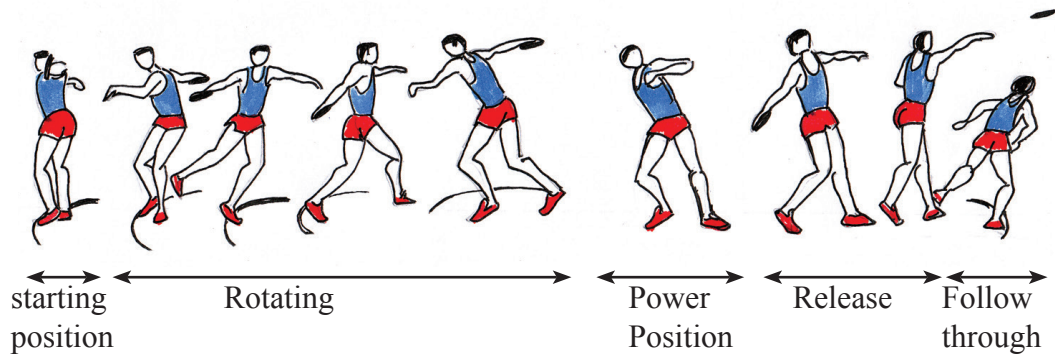


Figure 5.29 - Discus throw

Stages of discus throw

1. Preparation
2. Starting position
3. Rotating
4. Power position
5. Release
6. Follow through

The following descriptions of discus throw relate to a right-hander.

preparation



Figure 5.30 - Preparation

- When the discus is held firmly in hand, the competitor stands turning his back towards the direction of throwing.

- The feet should be kept apart close to the edge of the circle with a gap slightly over shoulder width.
- The knees should be slightly bent.

Starting position

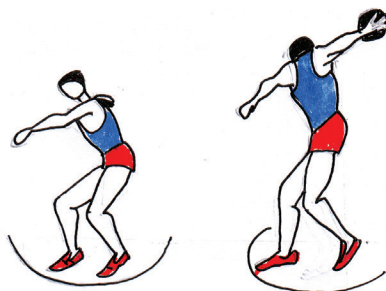


Figure 5.31 - Starting position

- The body is turned clockwise swinging the discus backwards.
- The hands should be at a level close to that of the shoulders.

Rotating stage

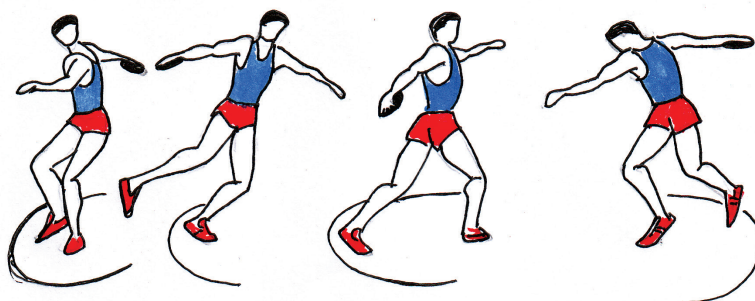


Figure 5.32 - Rotating stage

- The left knee, the left hand and the toes of the left foot are turned anticlockwise towards the throwing direction.
- The right foot is rotated forward anticlockwise close to the ground along the edge of the circle.
- A forward leap is made by pushing the body with the left leg and the right leg is landed close to the centre of the circle.
- When this landing has been made, the body lies in a position that the back of the body is turned towards the throwing direction.
- The left leg is swung forwards fast and landed close to the front area of the circle.

Power position

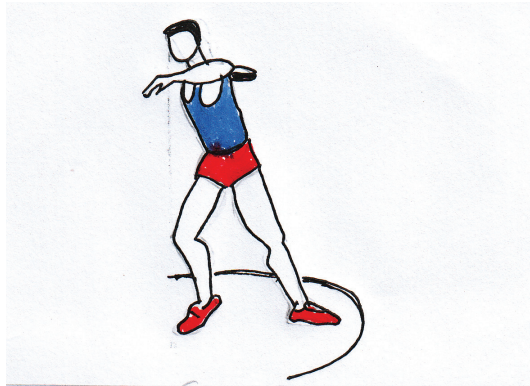


Figure 5.33 - Power position

- The bent right knee bears the weight of the body.
- The shoulder axis lies above the right leg.

Release

- The right leg is well stretched with the hip turning anticlockwise.
- The body is turned towards the throwing direction and the discus is released (figure 5.34-a,b)

Follow through

- As the discus has been released from the hand, the position of legs is changed so that the right leg is in the front and the left at the back.
- The right leg is bent at the knee and the body is slightly bent forwards.
- The left leg is moved and stretched backwards (figure 5.34-c)

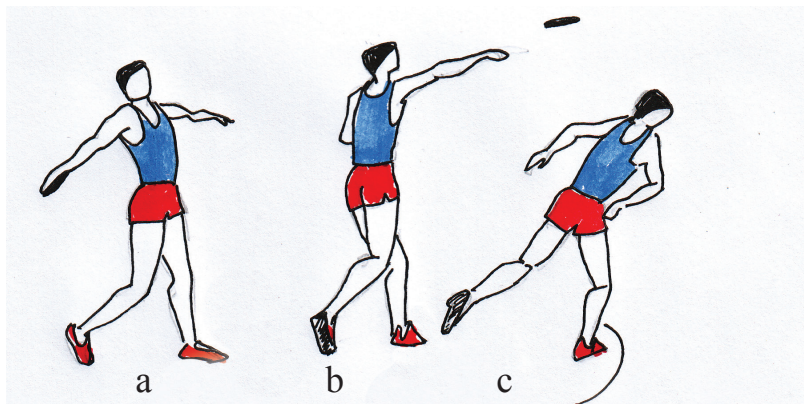


Figure 5.34 - Release and follow through

Weight of the discus used for open competitions at different age limits at school level

Table 5.4

Age limit	Boys	Girls
Under 15 years	1.000 kg	1.000 kg
Under 17 years	1.000 kg	1.000 kg
Under 19 years	1.500 kg	1.000 kg
Under 21 years open	2.000 kg	1.000 kg

The throwing circle for discus

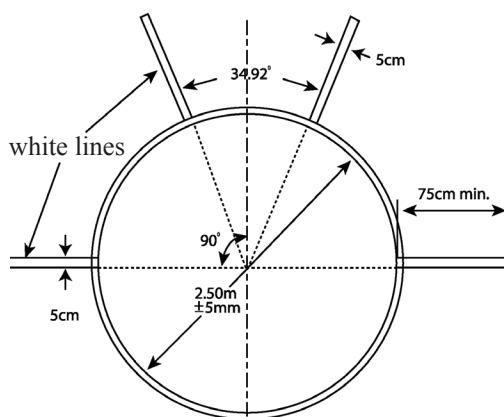


Figure 5.36 - The throwing circle for discus

Some of the rules and regulations related to shot put and discus throw

- ★ After a competition has started, the circle and the area on which the equipment lands cannot be used for training activities.
- ★ The place that each participant has won is decided on their best performance in all the rounds.
- ★ An attempt should be started with a steady position within the circle.
- ★ The participants should be within the relevant limits when an attempt is made.
- ★ The participants should not leave the circle after throwing until the equipment has touched the ground.
- ★ After an attempt has been made, the participant should leave the circle through the back half.
- ★ It is a foul attempt to touch the ground outside the circle, the top of the iron rim or the stop board or the area beyond that with any part of the body.
- ★ Participants are not allowed to wear gloves.



For extra knowledge

Except for high jump and polevault, the method used to resolve a tie position of competitors.

The maximum achievements of four long jumpers has been tabled below in meters. let us find the places of the four competitors according to the results tabled.

Name of the competitor	1st round	2nd round	3rd round	4th round	5th round	6th round	highest achievement	place
Supuni	4.50	×	4.18	4.43	4.32	4.13	4.50	1st
Samadhi	×	4.00	4.43	4.07	4.18	4.50	4.50	2nd
Amaya	3.96	3.77	4.50	3.95	4.38	×	4.50	3rd
Pasindi	4.02	3.72	×	×	4.46	4.12	4.46	4th

Summary

All events coming under athletics have been classified into five groups, namely track and field events, race walking, road running, cross-country running and mountain running. Track and field events can be classified again into track events, field events and combined events. There are three types of combined events based on the number of events held.

Each step in race walking consists of two stages namely, single-support phase and double-support phase. The standing start and the crouch start are the two techniques used when starting a running event. The baton change in relay races can be classified according to the technique used. The hang technique of long jump can be studied under four stages. The Fosbury Flop technique of high jump too, has four stages. The linear technique of shot put and the discus throw rotating technique consist of several stages. There are rules and regulations governing each of these events.



Exercises;

1. Prepare a chart classifying the athletic events according to the standard classification.
2. Write two rules and regulations related to race walking.
3. State five advantages that can be gained by engaging in running exercises.
4. Write five rules related to relay races.
5. Prepare a chart classifying the jumping events.
6. State three situations in which an attempt is considered to be foul in long jump.
7. Write three rules and regulations that are related to shot put and discus throw.

Let us learn about sports and outdoor activities

Engaging in sports and outdoor activities create the opportunity for us to spend our leisure time effectively. Sports contribute towards reducing stress, gaining pleasure and developing personal values. Sports also help us develop the ability to obey rules and regulations and the spirit of working as a team.

In previous grades you have gained knowledge about minor games, leadup games, folk games and organized sporting events.

In this chapter you will gain knowledge about the skills of spiking and blocking in volleyball; attacking, defending and shooting in netball and kicking, stopping and heading the ball in football. You will also learn exercises that are useful in developing these skills and rules and regulations related to these games while gaining some knowledge about the judging criteria as well. In addition, you will also learn about outdoor activities like hiking and expeditions to forests which are related to outdoor education.

4.1 Volleyball

Volleyball is a team event played between two teams of six players. In volleyball each team has to pass the ball over the net by hitting the ball using any part of the body and ground it in the opposite court. After the player on the right hand side of the back row of a team has served the ball to the opposite side, the ball is played until it goes out of court or until a team fails to return the ball properly to the opposite side.

Volleyball is very important for us because it is the national game of our country.

Volleyball has become popular because of following reasons:

1. Does not incur a high cost
2. Minimum equipment is required
3. Limited space is required
4. Does not take much time to complete a game

5. Rules are simple and clear
6. Easy to follow and a rich source of entertainment



Activity

Prepare an article for a wall newspaper on the history of volleyball.

Skills related to volleyball



Out of these skills you will learn spiking and blocking in this chapter.

Spiking



Figure 4.1 - spiking

In volleyball, slamming the ball that is over the net into the opposing team's court is called spiking.

- ➔ Except for serving and blocking, all the other acts of passing the ball into the opposing team's court can be considered as spiking.
- ➔ When executing a spike, releasing the ball clearly off the five fingers is accepted mostly while touching and throwing the ball are not allowed.
- ➔ Spiking is considered to be complete when the ball has completely passed the vertical plane of the net or when the ball makes contact with a defender of the opposing team.

Spiking is very important in ensuring the victory of a team and maintaining the spirit of the game. Therefore it is vital that the correct technique of executing a spike is learnt. For easy understanding, let us study this under four stages.

1. Hitting approach
2. Take-off
3. Hit the ball
4. Landing

1. Hitting approach

Steps a player takes from the moment he starts getting ready for the spike until the take off is called the hitting approach. This is determined on the requirement of the individual player who executes the spike. The hitting approach could occur in two, three or four steps.

The following figure shows the three-step hitting approach for a right handed spiker.

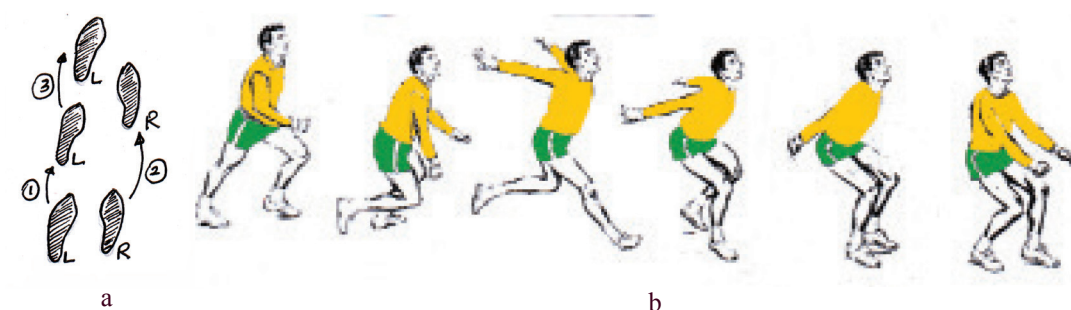


Figure 4. 2 - Hitting approach

To have a better understanding of this, study figure 4.2 b and observe carefully the movement of the hands, legs and the body.

- The way arms are swung is very important in the hitting approach; the two arms which are swung forward with the first step should be swung backwards with the second step. The second step should be longer than the first. The last step, i.e., the left foot, should be placed a little ahead of the right foot. A right-hander should take steps beginning with the left foot, then the right and the left again.
- A very good take-off can be made by generating more speed during the approach.

2. Take-off

- A good take-off is essential for a successful hit. In a good take-off greater part of the attacker's body is raised above the net. Therefore the intended hit can be made very successfully.
- During take-off, the player has to bend the knees and straighten them like a spring.
- When in the air, the body of the spiker should be bent backwards like a bow.
- When spiking, the palm of the hitting hand should be raised to a position that is above and behind the head so that the elbow moves slightly behind the shoulder.
- The free arm should lie upright before the body and be aligned with the position of the head and the eyes should be focused on the ball.

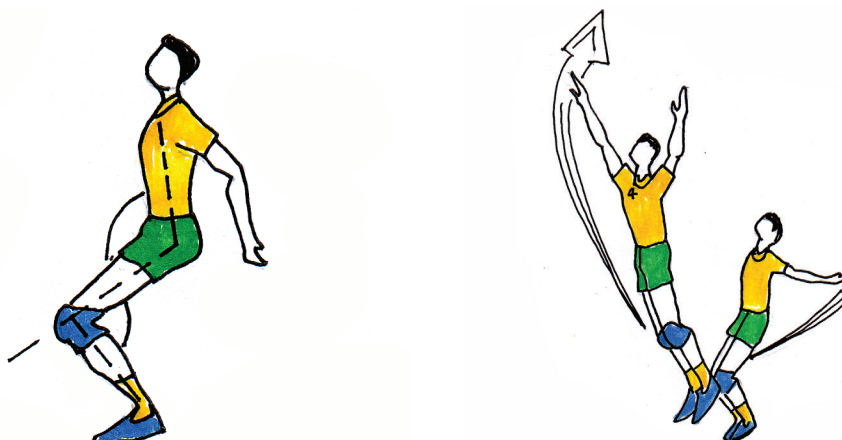


Figure 4. 3 - Take-off

3. Hit the ball

- When hitting the ball the fingers should be brought together, curved and made rigid.
- When hitting the ball, the shoulder that moved backwards should move forward very fast with stretching of the hitting arm as far as possible and hitting the ball at the maximum height.
- The balance of the body should be maintained and the free arm should move downwards at the time of hitting the ball.



Figure 4. 4 - Hit the ball

4. Landing

Landing means returning to the ground by lowering the body by way of bending the knees and controlling the body weight.

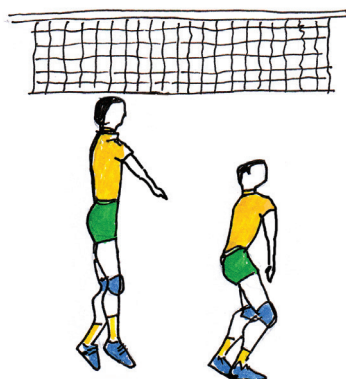


Figure 4.5 - Landing

Skills related to spiking can be developed through the following activities

1. Hold the ball with one hand, raise it above the shoulder and fling it onto the ground with great force.

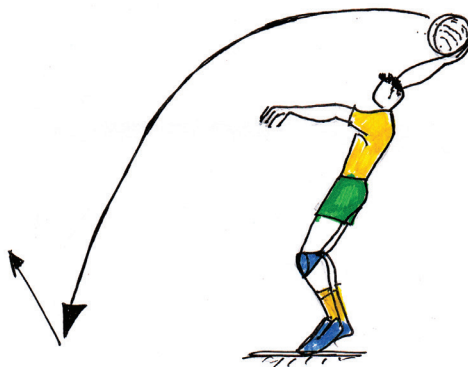


Figure 4.6

2. Hold the ball with both hands and fling the ball on to the ground with great force dashing forwards with the body bent backwards like a bow.

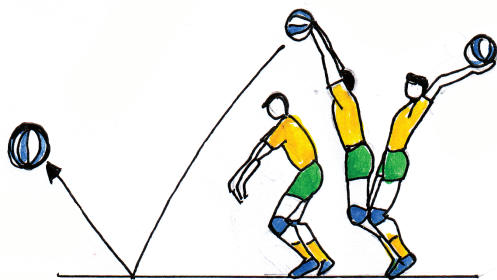


Figure 4.7

3. Drop the ball that is held in the non dominant hand and hit it with the dominant hand.

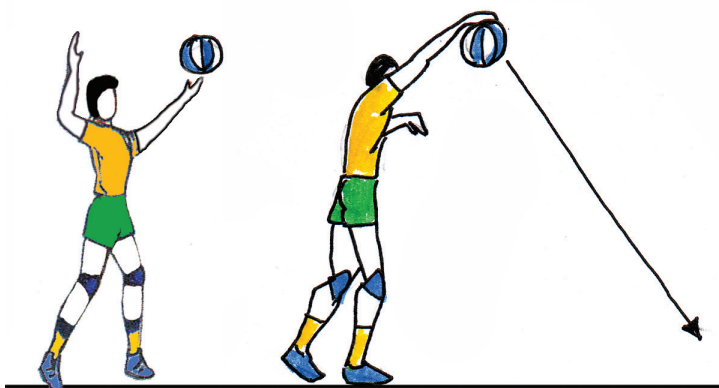


Figure 4.8

4. Throw the ball upwards with both hands and hit it standing in the same spot.

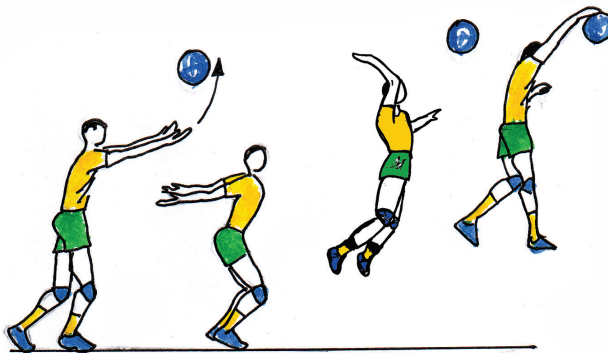


Figure 4.9

5. Keep the ball hanging above the head and hit it hard taking off with the correct spiking approach.

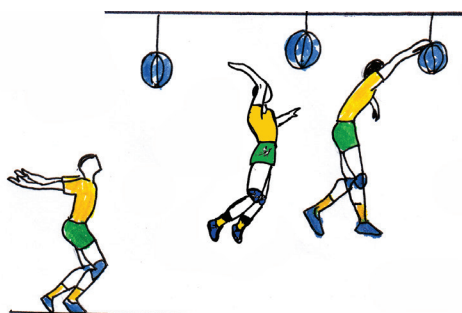


Figure 4.10

Spiking according to the rules-things to be borne in mind

Spiking

- ★ The front-row players can hit the ball that is at any height within their own court.
- ★ The back-row players can hit the ball that is at any height taking off from the back court only. It is illegal to touch the spiking line with feet when taking off to hit or hit the ball keeping the feet in front of the spiking line. It is not illegal to land on the front half of the court after hitting the ball having taken off from the rear half of the court.
- ★ A back-row player can hit the ball while in the front part of the court, but at least a part of the ball should be below the top level of the net at the point of hitting.
- ★ A team cannot complete a spike when the service ball, which is coming to the court is completely above the top level of the net.

Some fouls committed during spiking

1. Hitting the opposing team's ball.
2. Hitting the ball so that it goes off the court.
3. A back-court player coming to the front court and hitting the ball that is completely above the net.
4. Spiking and sending the ball to the opponents court, which was lifted by the libero player with finger tips in the front part of the court while it is completely above the level of the net.



Activity

Develop activities that can be used to develop skills related to spiking.

Blocking

Blocking is obstructing the ball, above the level of the net by front row players, which was hit by the opposing team and has cleared the net.

➔ This can be called a defensive as well as an attacking strategy.

The blocking technique can be studied under four stages.

1. Ready Position
2. Approaching the ball
3. Take-off and touching the ball
4. Landing

1. Ready Position

- At the ready position, the player has to position himself facing the net about 50cm behind the net and should keep the body balanced (See the figure 4.11).

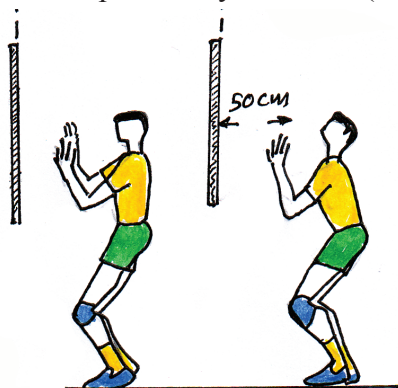


Figure 4.11 - Ready position

2. Approaching the ball

- When the setter sets the ball to some place the blocker has to move to that place. There are three ways of approaching the ball. They are side steps, cross steps and the dash.

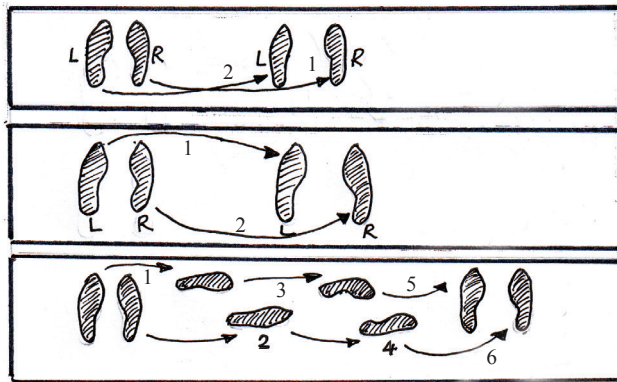


Figure 4.12

a - Side Steps

b - Cross Steps

c - Dash

3. Take-off and touching the ball

- As the knees are bent and the body is lowered, spring up and bring the feet together stretching the arms upwards.
- Stretch the fingers and slightly curve and stiffen the palm of the hands and pass the ball over the net to the opposing team using the fingers. When doing this the arms should be positioned beside the ears in front.
- Bend the body forward and as the ball comes into contact with the hands, move the hands downwards by bending the wrists.

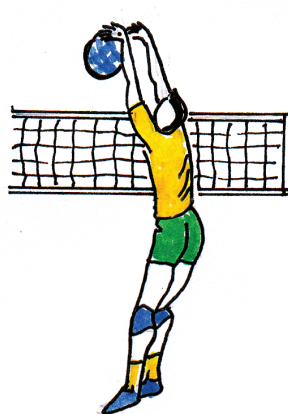


Figure 4.13 - Taking off

4. Landing

- Plan your landing by landing on the balls of your feet with your knees and ankles bent.
- Arms are swung downwards as landing takes place.
- The weight of the body should be balanced by bending the knees and the player should get ready for the next move.

The following activities can be done to practise blocking

1. Take-off properly at the net that has been tied at a lower level to suit the height of the players and practise blocking without using the ball.

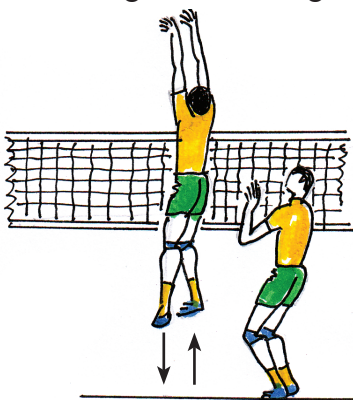


Figure 4.14

2. Two players take off from opposite sides of the net and touch each other's hands pretending to block the ball.

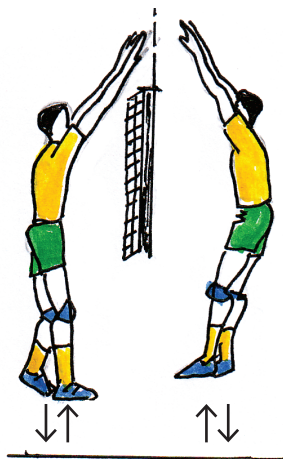


Figure 4.15

3. Stand at the net and move sideways performing the action of blocking.

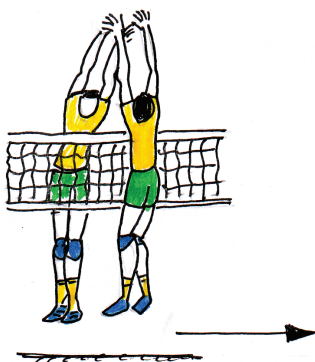


Figure 4.16

4. Two players stand on opposite sides of the net, leap up and pass the ball over the net to each other.

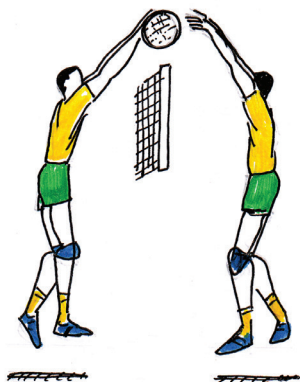


Figure 4.17

5. The ball is held above and close to the net and the players practise blocking by touching the ball.

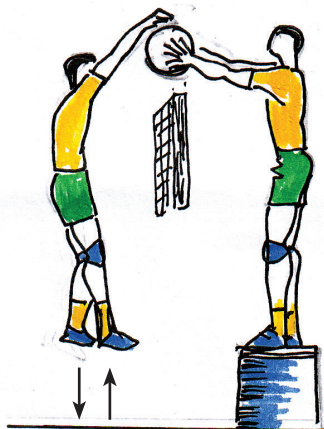


Figure 4.18

6. Block the ball that is being hit close to the net.

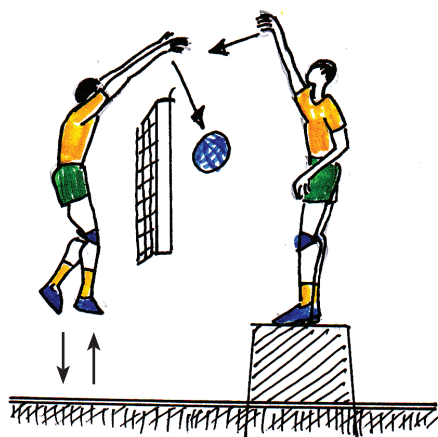


Figure 4.19

Blocking can be classified according to the number of players involved in the blocking. It can be named as single, double or triple blocking.

Blocking according to the rules-thing to be borne in mind

- ★ Only the front-court players can complete the coverage. At the time a blocking takes place, some part of the player's body should lie above the top level of the net. The blocking action without touching the ball is called an 'attempt to block'. A blocking becomes complete only after the blocker has touched the ball.
- ★ **Joint block**
When two or three players join together and perform blocking, it is called a joint block. The blocking becomes complete when any one of them touches the ball.
- ★ Repeated touch of the ball by one or more of the blockers is considered a single touch that happens during the same posture. Touching the ball while blocking is not considered a hit and therefore a team gets three hits when they receive the ball to their court after blocking.
- ★ After blocking any player of the team can make the first hit. Even the player who did the blocking can make the first hit.
- ★ While blocking, a player may attempt to block by extending the hands and arms over the net to the opponents' court so that it does not obstruct the opponents.

However, blocking can be done only after an opponent has hit the ball.

Officiating Volleyball Games

The following officials are required to officiate a volleyball match:

- First referee
- Second referee
- Scorer
- Assistant scorer
- Two or four line judges

The first referee

The first referee should carry out his/her duties seated or standing on the referee's stand located at one end of the net. His/her view should be approximately 50 cm above the upper level of the net.

The second referee



The second referee should stand on the ground outside the court close to the pole on the opposite side of the first referee.







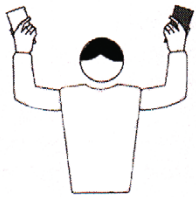

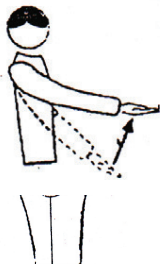
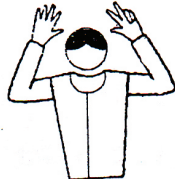
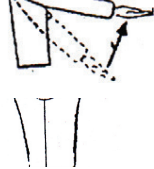

The scorer/ Assistant Scorer







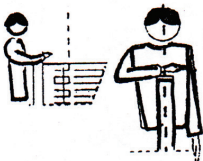



The scorer should sit facing the first referee at the scorer's table that is placed on the side opposite of the first referee's position.


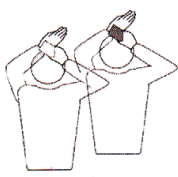
Official hand signals of the referees

When judging a volleyball game official hand signals are very important. Starting the game, the offences committed and the results are expressed through signals.

Authorisation to serve Move the hand to indicate the direction of service.		Team to serve Extend the arm to the side of the team that will serve	
--	---	--	---






Change of courts Raise the forearms front and back and twist them around the body.		Time-out Place the palm of one hand over the fingers of the other, held vertically (forming a T) and then indicate the requesting team.	
Substitution Circular motion of the forearms around each other.		Misconduct warning Showing a yellow card.	
Misconduct penalty Showing a red card for penalty.		Expulsion Showing both cards together in one hand.	
To declare the unsuitability of play the two cards in both hands raised upwards.		End of set of match Cross the forearm in front of the chest, with hands open.	
Ball not tossed or released at the service hit Lifting the extended arm with the palm facing upwards.		Delay in service Raising eight fingers with palm spread open.	
Blocking fault or screening Raising both arms vertically with palms open.		Positional or rotational fault Making a circular motion with a finger.	

Ball "in" Pointing the arms and fingers towards the floor.		Ball "out" Showing the back of the palms bending elbow perpendicularly	
Catch Slowly lifting the forearm with palm of the hand facing upwards.		Double contact Raise two fingers spread open.	
Four hits Raise four fingers spread open.		Net touched by player or served ball fails to pass to the opponent through crossing space Pointing to the net on the relevant side.	
Reaching beyond the net Place a hand above the net with the palm facing downwards.		Attack hit fault Make a downward motion with the Fore arm with hand open.	
The server has trampled the line or stepped into the court or a player is out of court Pointing to the center line or relevant line.		Double fault and replay Raising both thumbs vertically.	

Ball touched Brushing with the palms of one hand the fingers of the other that are held vertically.		Warning / delay penalty Covering the wrist with a yellow card (warning) with a red card (penalty).	
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Line Judges' Official Flag Signals

Table 4.2

Ball “in” Point down with flag.		Ball “out” Raise flag vertically.	
Ball touched Raise flag and touch the top with the palm of the free hand.		Crossing space faults, ball touched an outside object or foot fault by any player during service Waving flag over the head and pointing to the antenna or respective line.	
Judgement impossible Raise and cross both arms and hands in front of the chest.			

4.2 Netball

Netball is a sport that is very popular among females. Twelve players can be registered for a game of netball. A netball team should consist of seven players to play the game but a game of netball can also be played with five players.

Figure 4.20 below shows how players should be placed in the court at the start of a game. The symbols (letters) relevant to each player of one team is shown in the boxes. According to the rules that are applied at the start of the game, all the players, except for the centre player (C), should be within their goal areas. They can come to the centre area of the court when the referee has blown the whistle. The centre player (C) of the team which gained the centre pass after the referee has blown the whistle passes the ball from the centre circle following the rule related to footwork to another player of the own team within three seconds so that the ball can be caught by that player from within the centre area. After winning a point by shooting the ball, the two teams take alternate turns of centre pass.

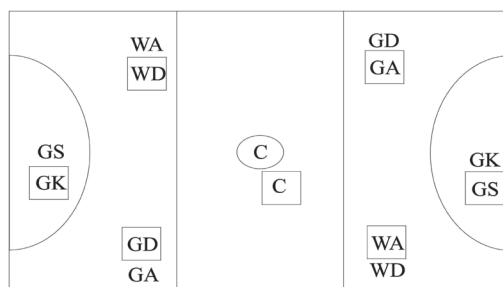


Figure 4.20 - Position of playes

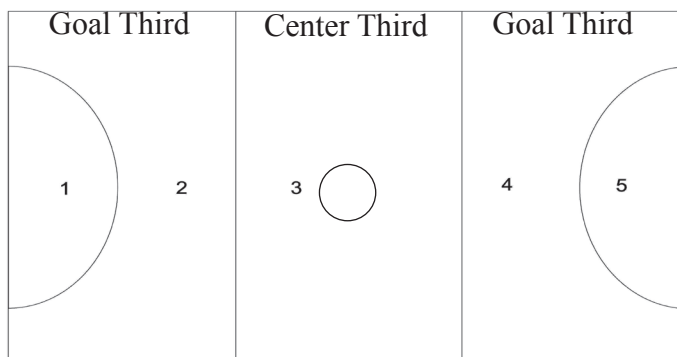
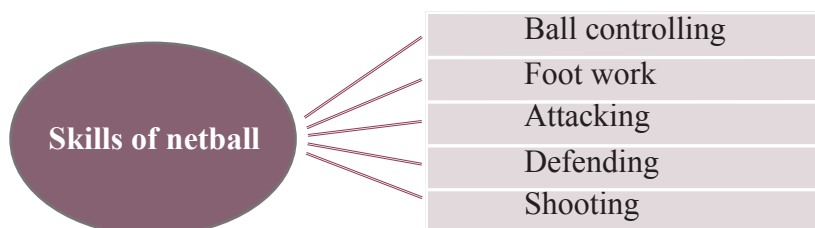


Figure 4.21 - Play area

Player	Areas allowed to play in
• GS - Goal Shooter	- 1,2
• GA - Goal Attack	- 1,2,3
• WA - Wing Attack	- 2,3
• C - Centre	- 2,3,4
• WD - Wing Defence	- 3,4
• GD - Goal Defence	- 3,4,5
• GK - Goal Keeper	- 4,5

The basic skills (techniques) of netball



Attacking

In netball when a team has received the ball, taking it to their shooting post by way of passing it among the members of the own team while avoiding the opposing players is called attacking. During attack, the players of the opposing team may obstruct in the following ways:

- prevent a player from catching the ball thrown to her by her team mate.
- prevent a player from moving to a vacant place in order to get the ball.
- prevent a player from passing the ball to her team mate.

Therefore, it is the tactical skill of the attacking player to catch the ball and pass it to a team member, avoiding the obstructing player cdefender. Given below are a few of the activities that are useful in developing this skill:

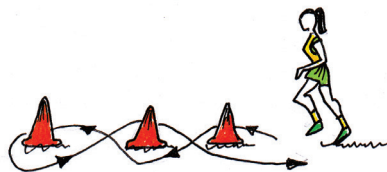


Figure 4.22

Running around obstacles in a zigzag



Figure 4.23

Running side ways.



Figure 4.24
Running backwards and forwards



Figure 4.25
Running changing the pace

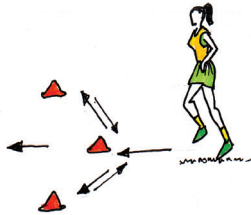


Figure 4.26
Running while abruptly changing direction

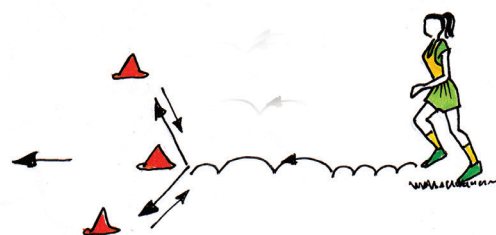


Figure 4.27
Running changing both pace and direction



Activity

Design activities in which some of the members of your group act as defenders and the others as attackers who try to pass the ball avoiding the defenders.

Defending

The aim of the defender is to limit the number of goals the opponents would score or to delay them from scoring goals. The skill of the defender is to prevent the opponents passing the ball among one another and to get possession of the ball to their team. In order to continue doing so, the defender should do the following:

- Defend the opponent very efficiently.
- Obstruct the opponent from throwing or shooting the ball that she has caught.
- Start defending the opponent soon after passing the ball.
- Quickly understand the tactics and the playing style of the opposing team.

Shooting

Putting the ball through the ring on the goal post from within the goal circle is called shooting. Shooting can be done with a single hand or with both hands. When shooting the ball, it is important to control the arms and legs correctly.

- Keep the body erect, raise the dominant hand and hold the ball with the fingers. The ball should be above the head and in front of the forehead. The free hand is kept on the ball as a support.

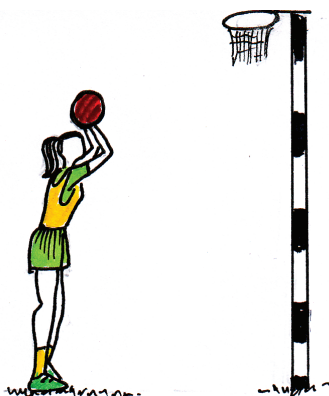


Figure 4.28

- Start shooting by bending the knees slightly



Figure 4.29

- Stretch the arms as the body straightens from the knees. Then release the ball from the hand so that the ball is pushed upwards with the wrist whilst aiming at the ring on the goalpost.

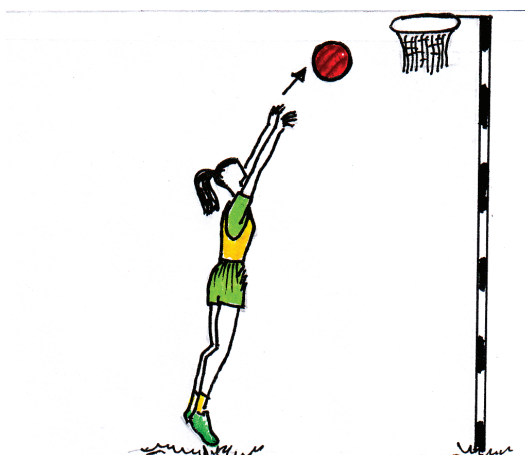


Figure 4.30

The following activities can be performed in order to make shooting successful

1. Practise shooting at different places within the goal circle.
2. Practise shooting while being obstructed by a defender.
3. Catch the ball sent by another player to the goal circle from different places and shoot.

Rules and regulations

Netball rules and regulations are introduced by the International Federation of Netball Associations (IFNA). Netball games are governed by 21 key rules. You gained knowledge about some of those rules in the previous grades and this year, you will learn some rules related to attacking, defending and shooting.

- ★ While defending or attacking, a player should neither knock against, push, strike the opponent nor grab the ball from the opponent.
- ★ Players cannot stretch their hands sideways and defend.
- ★ A player possessing the ball should not be obstructed within a distance of less than 0.9m (3 ft.).
- ★ When shooting, the shooter should not be obstructed by the opponent stretching the arms, standing within a distance of less than 0.9 m (3 ft.).

When above rules are violated, a penalty pass or a chance to shoot a goal is given on the spot. The player who committed the offence should stand by the side of the player who did not commit the offence so that she does not get obstructed. The player who committed the offence cannot join the play until the ball is released from the hands of the player who did not commit the offence.

On occasions where an attacker and a defender of the opposing teams;

1. get hold of the ball at the same time
2. commit an offence at the same time so that play is obstructed
3. move to an offside area at the same time and either one or both of them get hold of the ball,

the ball is tossed up between the two within the play area and the game is restarted.



Activity

Engage in a game of netball applying the attacking, defending and shooting skills you learnt while adhering to the rules and regulations.

Duration of the game

At national or international level, a game consists of four 15-minute quarters.

1. Quarter 1 - 15 minutes - break 3 minutes
2. Quarter 2 - 15 minutes - break 5 minutes
3. Quarter 3 - 15 minutes - break 3 minutes
4. Quarter 4 - 15 minutes

The two teams should change sides after each quarter.



For extra knowledge

At school level, a game consists of two quarters according to the requirement of the organizers.

The duration of a game at school level is as follows:

Table 4.3

Age	First half	Break	Second half
Under 15	10 minutes	3 minutes	10 minutes
Under 17	15 minutes	3 minutes	15 minutes
Under 19	20 minutes	3 minutes	20 minutes

Judging netball games

The panel of judges at a netball game consists of the following officials:

- Two umpires to control the game and to make decisions
- Two timekeepers
- Two scorekeepers

The two umpires should select their sides by tossing a coin. When the umpires stand facing the court, they judge the half of the court that lies on their right. Figure 4.31 given below shows the areas and the boundary lines which the umpires A and B judge.

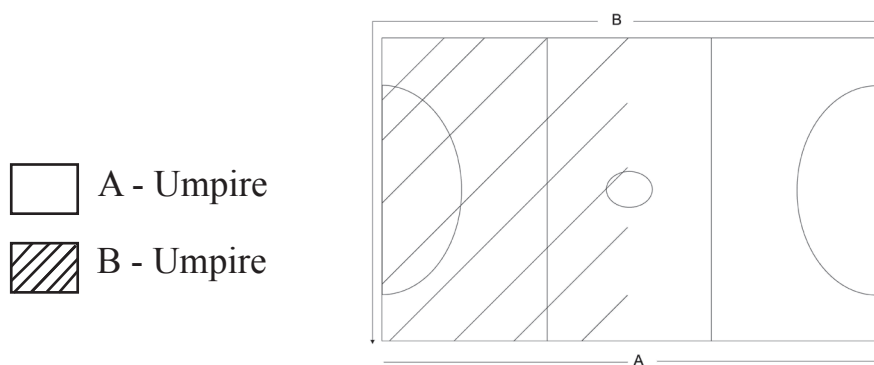









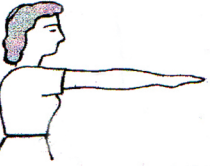


Figure 4.31

Official hand signals used by a netball umpire are given in the next page.

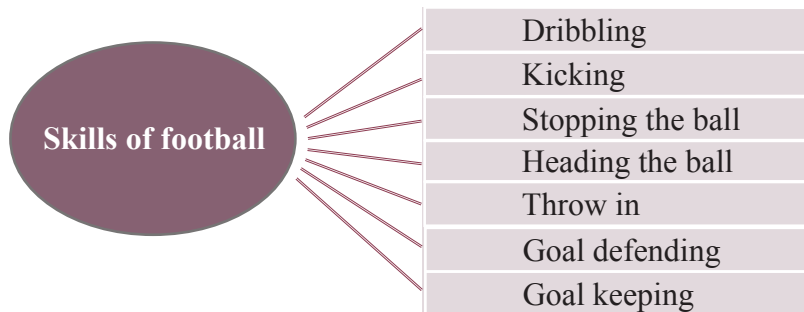
Table 4.4 - Hand signals used by a netball umpire

Direction of pass		Stepping	
Short pass		Personal contact	
Held ball		Toss up	
Time out		Obstruction	
<ul style="list-style-type: none"> - Over a third - Off side - Breaking in to the center third 		Advantage	

4.3 Football

Football is a game played between two teams with eleven players each. Each team tries to score goals by kicking the ball into the opposing team's goal. It has won recognition as the most popular sport in the world as it has become the game that is watched by the most number of people. In football, the players, except for the goal keeper, cannot touch the ball with their hands during play. Hence they engage in play employing a variety of skills.

Skills (techniques) of football



The techniques we will be learning in this section are kicking, stopping and heading the ball.

Kicking the ball

The ball can be kicked using different parts of the foot. Let us study the following types of kicks:

1. Kicking with the toe
2. Kicking with the inside of the foot
3. Kicking with the outside of the instep
4. Kicking with the heel

1. Kicking with the toe

Toe kick is used to make the ball move fast along a straight path. In toe kick, the ball is kicked with the tips of the toes.



Figure 4.32 - Kicking with the toe

2. Kicking using the inside of the foot

The inside of the foot kick is used for long-distance passes and short-distance passes. In this kick, the curved inner part of the foot is used to kick the ball.

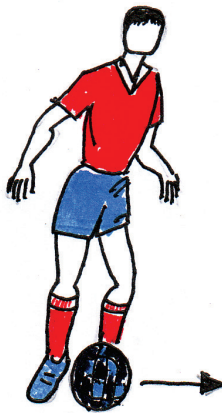


Figure 4.33 - Kicking with the inside of the foot

3. Kicking with the outside of the instep

The outside of the instep kick is used to make the ball move along a curved path. The outside of the instep is used for this kick.

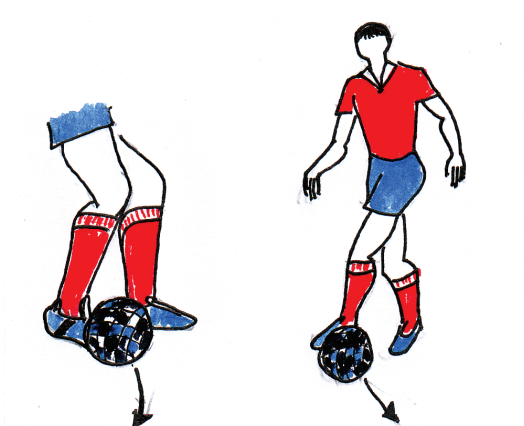


Figure 4.34 - Kicking with the out side of the instep

4. Kicking with the heel

The back heel kick is used to flick the ball backwards deceiving the opponent. The heel is used for this kick.



Figure 4.35 - Kicking with the heel

Stopping the ball

The ball coming towards a player can be stopped using different parts of his body. In this lesson let us study the ways of stopping the ball:

1. By keeping the foot on the ball
2. Using the innerside of the foot
3. Using the chest
4. Using the abdomen

1. Stopping the ball by keeping the foot on the ball

The ball is stopped by keeping the sole of the foot on the ball as it comes rolling along the ground or, if the ball is moving through the air, just as it touches the ground.



Figure 4.36 - Stopping the ball by keeping the foot on the ball

2. Stopping the ball using the inner side of the foot

A slow moving ball or a fast moving ball is stopped using the innerside of the foot. When stopping the ball in this manner, the foot is drawn a bit backwards just as the ball touches the foot.



Figure 4.37 - Stopping the ball using the inner side of the foot

3. Stopping the ball using the chest

A ball that is moving in the air can be stopped using the chest. When stopping the ball using the chest, the chest should be drawn a little backwards just as the ball hits the chest.

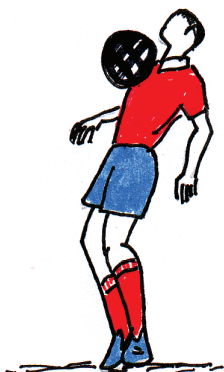


Figure 4.38 - Stopping the ball using the chest

4. Stopping the ball using the abdomen

A ball that bounces on the ground can be stopped using the abdomen. When stopping the ball using the abdomen, the abdomen is drawn a little backwards just as the ball hits the abdomen.

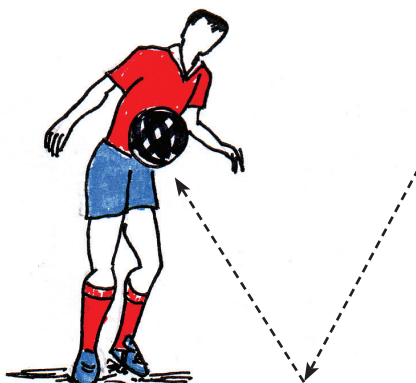


Figure 4.39 - Stopping the ball using the abdomen

Heading the ball

Heading the ball can be done adopting various body postures. In this lesson, let us study the following methods of heading the ball.

1. Heading the ball without a jump
2. Heading the ball with a jump
3. Heading the ball, that is coming from a side with a jump

1. Heading the ball without a jump

As the ball is moving in the air, heading is done using the forehead while keeping an eye on the ball. When the ball is headed in this manner, the feet are in contact with the ground and the ball moves forward.



Figure 4.40 - Heading the ball without a jump

2. Heading the ball with a jump

The eye is kept on the ball that is moving in the air and heading is done with a jump using the forehead. When heading is done in this manner, the feet lie above the ground and the ball moves forward.



Figure 4.41 - Heading the ball with a jump

3. Heading the ball, that is coming from a side with a jump

In this method, the ball that is moving in the air is headed using the sides of the head in order to send the ball in different directions. Most often, the ball is headed with a jump in this method.

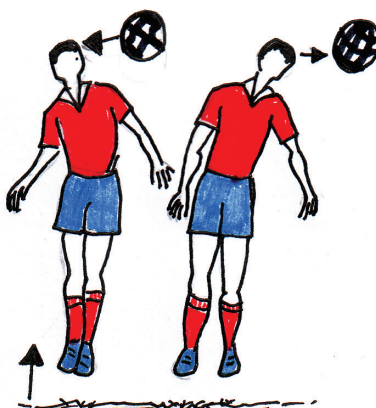


Figure 4.42 - Heading the ball, that is coming from a side with a jump.

It is now clear to you that hitting and stopping the ball can be done using different parts of the body.

Following activities will help you to develop these skills

1. Two pupils stand apart and practise passing and stopping the ball kicked by each other alternatively.

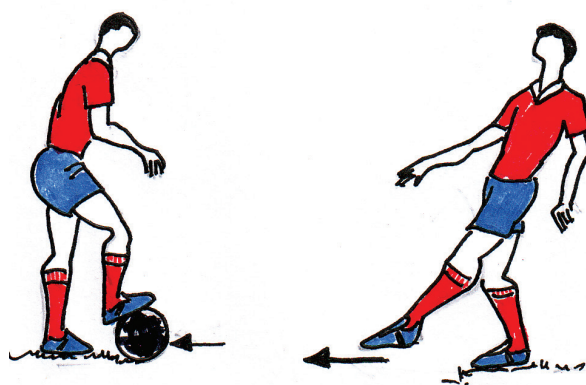


Figure 4.43

2. The ball is passed in different ways to stop using different methods (using the inner-side of the foot, instep of the foot, abdomen).

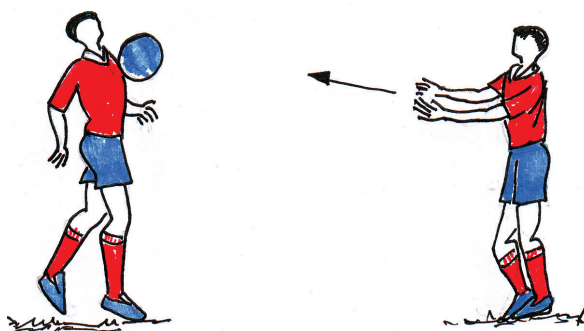


Figure 4.44

3. When the ball is passed by one student, another heads the ball with or without a jump.

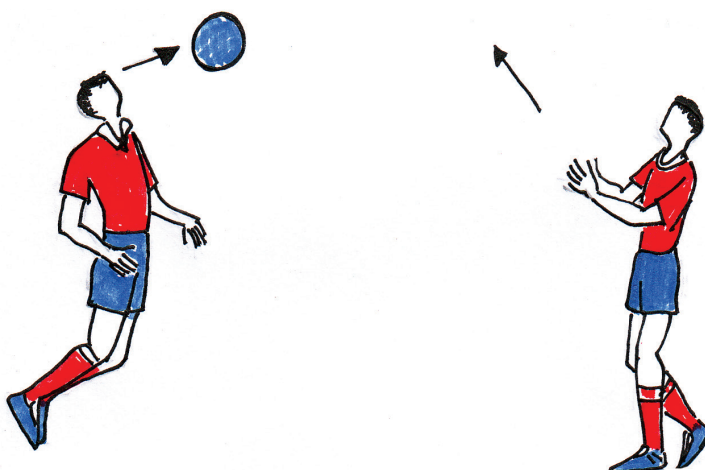


Figure 4.45

4. Three students stand apart and head the ball.

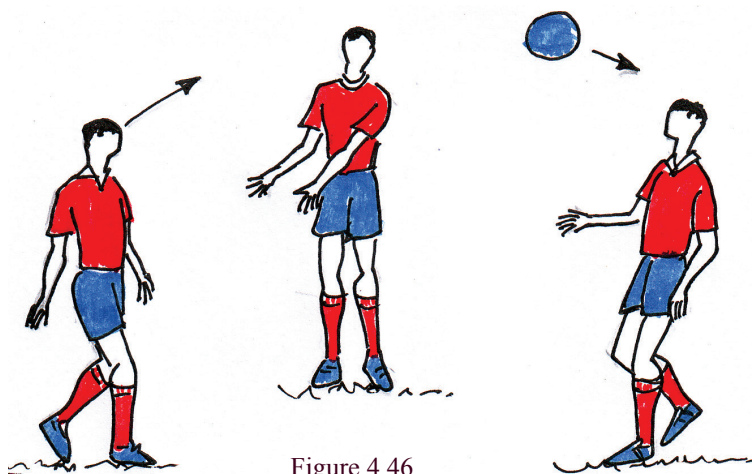


Figure 4.46



Activity

Design a set of exercises that would help to develop the skills in football that you have studied.

Rules and regulations in football

When you learn about the game of football, it is important that you gain a clear understanding of the rules and regulations of the game. We will next learn about the rules and regulations applied and signals used by referees in international football games.

★ Number of players

A football team consists of a maximum of eleven players one of whom should be the goal keeper. The minimum number of players that a team consists of is seven. There can be three to seven reserve players.

★ Duration

The duration of a game of football consists of two 45minute halves and maximum of 15 minutes break in between. (According to the game it can be reduced to 40 minutes)

★ Major offences committed in football:

- Kicking or attempting to kick an opponent
- Tripping or attempting to trip an opponent
- Jumping at an opponent
- Charging at an opponent
- Strikes or attempts to strike an opponent
- Pushing an opponent
- Holding an opponent
- Spitting at an opponent
- Deliberate handling, hitting or carrying the ball with the hand.

Judging football games

Officials who judge a football match are;

- referee
- two, side referees

Responsibilities of the referee

- Checking the legality of the football ground and the football
- Enforcing rules throughout the game
- Keeping records of the game
- Imposing penalties on players who violate rules
- Pausing the game after an accident and restarting
- Preventing outsiders entering the ground except for players and umpires

Responsibilities of the side referee

- Assisting the referee
- Giving signals when the ball moves out of the ground
- Showing the team that possesses the corner kick, goal kick and the throw-in
- Showing players who are in offside positions
- Informing substitution of players
- Informing the time limit of the game



Activity

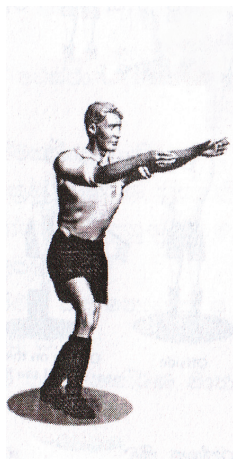
Divide into groups and engage in playing a game of football adhering to rules and regulations.

Referee's signals

Direct free kick



Advantage



Indirect free kick



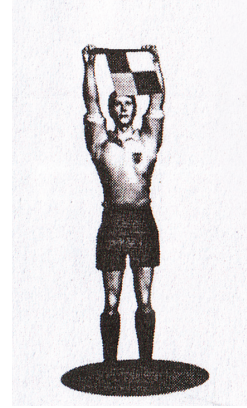
Yellow Card - warning



Red Card - removing player



Substitution



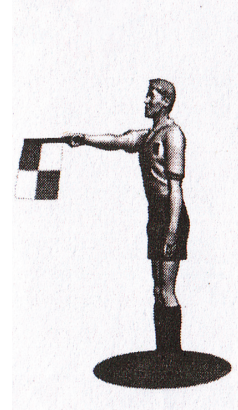
Throw-in for attacker



Throw-in for defender



Goal Kick



Corner Kick



Activity

Shown above are some of the signals used by the referees in football. Divide yourselves into two teams, appoint umpires and engage in a game of football. Ask the umpires whom you have appointed to use the signals when judging.

4.4 Outdoor educational activities

Engaging in outdoor educational activities provide an important opportunity for us to communicate with the natural environment, foster love for plants and trees, enjoy the pleasures it offers and cultivate attitudes towards protecting the environment. We have seen many outdoor educational activities carried out at school in order to create opportunities for us to commune with nature. We engage in such activities mostly to relieve our monotony and to get pleasure and enjoyment. These activities are very effective means of spending leisure, promoting collective action and developing personality.



Benefits we gain from outdoor educational activities

1. An opportunity to gain pleasure
2. An opportunity to identify the environment
3. An opportunity to understand the environment
4. An opportunity to understand the challenges nature offers
5. Develop exploration skills
6. Develop self-confidence
7. Develop leadership skills
8. Develop collective understanding
9. Develop the skill of decision making
10. Getting used to substitutes
11. Develop problem solving skills

In this chapter we will learn about hiking and jungle exploration.

Hiking

You may have seen that many kinds of hiking are organized in order to achieve various objectives. Some of them include:

1. Hikes to raise awareness of an issue among the public
2. Hikes to raise funds
3. Hikes for pleasure
4. Hikes to explore the forest
5. Hikes for political purposes
6. As a mark of protest
7. As a means of demonstration



Activity

Provide examples for the different kinds of hikes mentioned above

Jungle exploration

This is how a group of Grade 10 pupils organized a jungle exploration together with their physical education teacher.

1. Preparing plans for the jungle exploration

During planning stages, they focused on the following:

- Expected date of the hike
- The route they were going to take
- Equipment they need to carry
- Finances required for expenditure
- Persons from whom they have to get permission
- Institutes from which they have to get permission
- Places which require permission to visit
- Persons who should be informed
- Action that has to be taken in an emergency
- Preparing for possible accidents.

2. The pupils were educated on the use of the compass and to do compass readings

- The compass is a piece of equipment that is used to find the direction.
- The pointer of the compass always indicates the North when placed on a flat surface.
- The route map is marked accordingly.
- Compass can be used to find the direction to reach the destination.



Figure 4.47

3. The pupils were made aware of standard symbols used in maps and educated on how to prepare the map of their journey

Standard Symbols used in maps



Main road (A Grade)



Main road (B Grade)



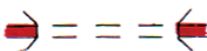
Main road under construction



Minor roads



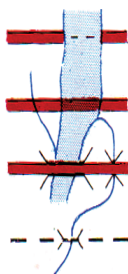
Foot path



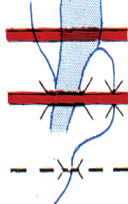
Tunnel



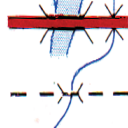
Scrub / forest



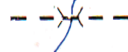
Passenger ferry



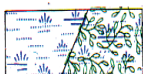
Causeway



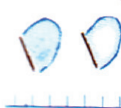
Bridge / culvert



Footbridge



Marshy land / mangroves



Tank / abandoned tank



Irrigational canal



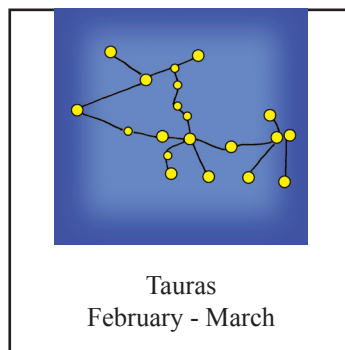
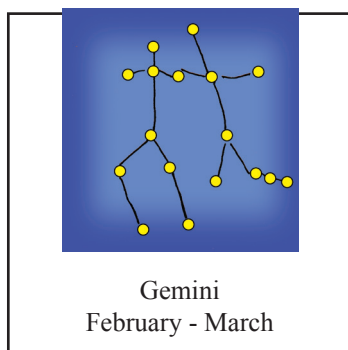
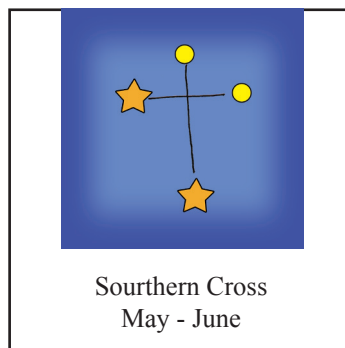
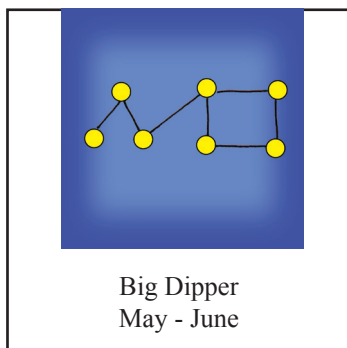
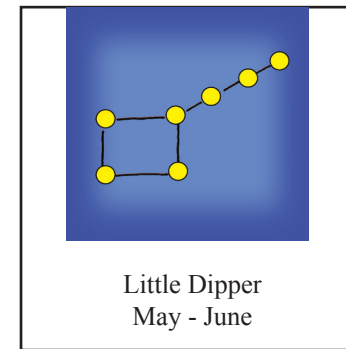
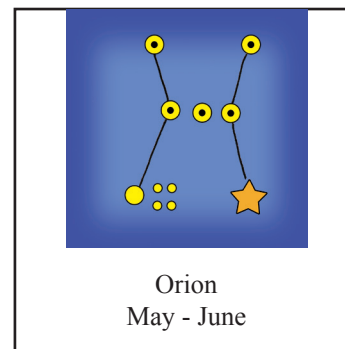
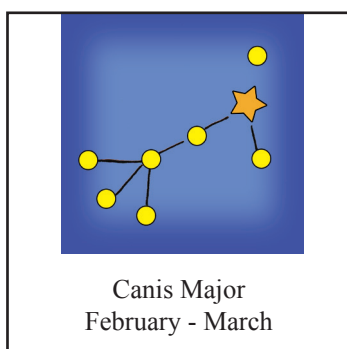
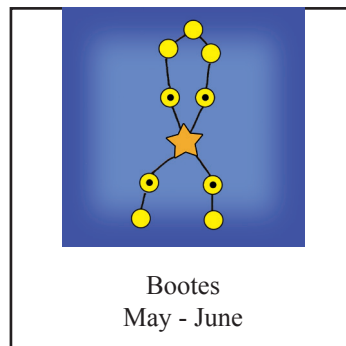
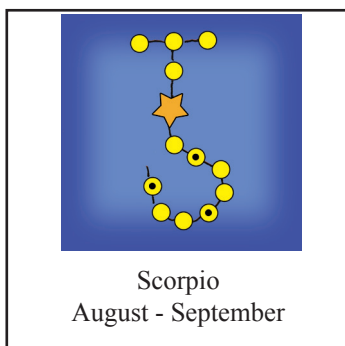
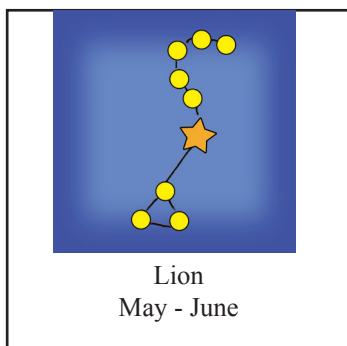
Catch pit / dam



Activity

Prepare the road map from your home to school. (Study the road signs and standard symbols and use the ones you need in your map as required and include information of the persons or places that should be informed in an emergency.)

4. The physical education teacher explained the importance of using the position of constellations in travel for the knowledge of the pupils; using illustration.





Activity

Form a group and prepare a plan to climb a mountain as an outdoor activity and make necessary arrangements to engage in this activity.

Summary

Volleyball is the national game of Sri Lanka. It is a popular game because of its distinctive features. Players can engage in different activities to develop spiking and blocking skills in volleyball. Each of these two skills can be studied under four stages. There are rules and regulations related to spiking and blocking. The official hand signals used by referees are important in communicating their judgements.

There are six basic skills in netball. Of these skills, attacking, defending and shooting were discussed in this chapter. Attacking is passing the ball among team members while avoiding the opponents and taking it to the relevant post. The aim of defending is to limit the number of goals the opponents would score or to delay them from scoring goals. Putting the ball through the ring of the goal post is called shooting. Netball is governed by 21 key rules.

Football is a game preferred by most countries in the world. It has become so popular due to its highly competitive and exciting nature. Players adopt various skills by kicking, stopping and heading the ball. Number of rules are applied and the decisions are conveyed using a number of different signals.

We enjoy engaging in outdoor activities. Gaining new experiences, new knowledge, personality development, development of organizing skills and gaining knowledge on the use of equipment are some of the benefits that we gain by engaging in outdoor activities which are in turn important life skills. Outdoor activities include hikes which are organized for various purposes. It is important to have a basic knowledge about preparing plans for jungle exploration and gaining skills in using a compass, preparing and reading maps and using the position of constellations to find the directions.



Exercises;

①

1. Write three special features of volleyball which have made it popular.
2. Write the four main stages of spiking in volleyball.

3. Write the four main stages of the technique of blocking in volleyball.
4. Write four offences that could be committed by players in a game of volleyball.
5. Name the officials who are involved in judging a volleyball game.

2

1. Describe the occasions where a team is obstructed by the opposing team when attacking in netball.
2. Describe three activities that can be done in order to practice shooting in netball.
3. Name the occasions where a penalty pass or shoot is given in netball and describe how it is taken.
4. Name the positions of each of the members of a netball team in a court.
5. Write the occasions where the ball is tossed between two players in netball.
6. Name the officials that make a panel of judges in a netball game.

3

1. Name four types of kicks used in football.
2. Write four methods of stopping the ball in football.
3. Write the three methods of heading the ball in football.
4. Write five duties of the head umpire of a football match.
5. Write six major fouls that could be committed during a game of football.

4

1. Write six advantages we gain by engaging in outdoor educational activities.
2. Name six outdoor educational activities.
3. Write five facts that attention should be paid to when preparing a plan for a jungle exploration.

3

Let us maintain correct posture

We engage in different activities in our daily life. Standing, sitting and lying down are known as static postures. Walking, running and jumping are referred to as dynamic postures. If these postures are not maintained properly we may have to face many ailments and diseases. To avoid this let us have a proper understanding on how to maintain correct posture in our daily activities. By maintaining correct posture, we can be more efficient in our activities. It also helps us in reducing pressure on the joints, muscles and other parts of the body and maintaining a pleasant appearance. To maintain an effective posture we should apply our knowledge on bio mechanics.

In the previous classes we learnt about correct posture that helps maintain a healthy life. In this chapter we learn the principles of bio mechanics and its effects on posture.

Bio mechanical factors related to posture

There are two main bio mechanical factors that are related to posture in our daily activities

1. Centre of gravity
2. Balance

1. Centre of gravity

Any object, as well as the human body is made up of tiny particles. All these tiny particles have a weight. The weight of these objects act around a single point. This point is called centre of gravity.

The centre of gravity of an object or human body, is a point where the whole weight of an object/body is concentrated.

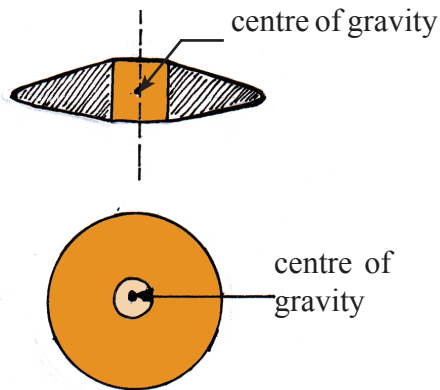


Figure 3.1

In any posture, the weight of the body acts around a single point and that point becomes the centre of gravity.

According to a person's posture, the centre of gravity changes temporarily.

A person standing straight with hands by the side will have his/her centre of gravity at a distance of about 56% of the total height measured from the ground (figure 3.2). Although the centre of gravity normally appears as described above, it could change temporarily according to the posture of the body.

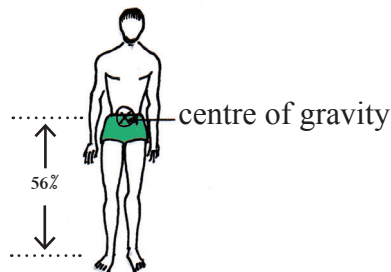


Figure 3.2

This happens as the weight spreads in different directions. When a person stands with both arms by the side and then raises the arms up the weight is spread to the upper part of the body. So the position of the centre of gravity goes higher (figure 3.3c). Study the changes in the centre of gravity that occur when both arms are stretched out on either sides of the body, only when the right hand is stretched out, both arms are raised, the body is bending forward and at the start of a race (figure 3.3).

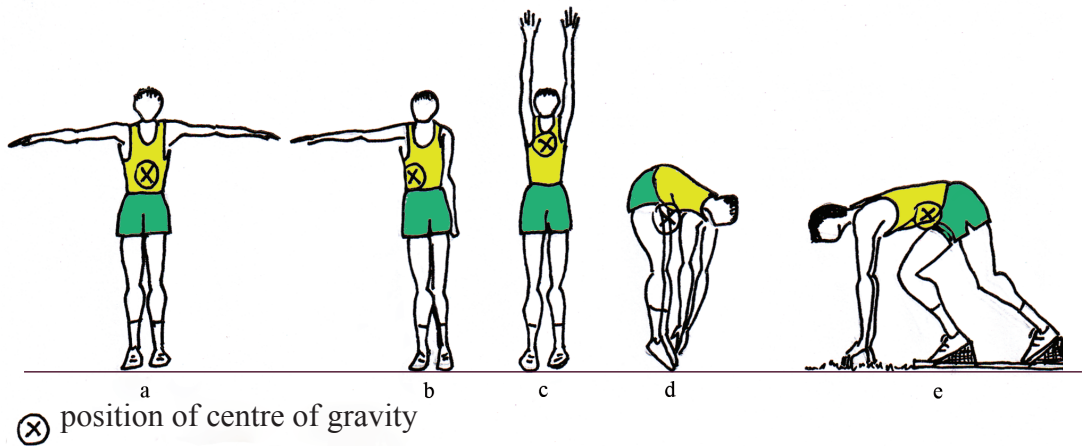


Figure 3.3

2. Balance

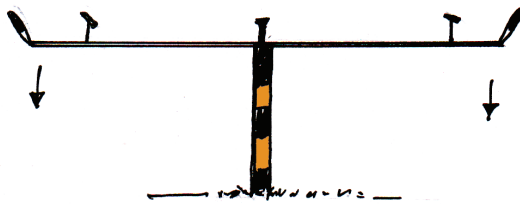


Figure 3.4

The state of a body or physical system that is at rest or in constant and unchanging motion is called balance. When an equal force is applied on either side of it, it will maintain its balance.

e.g: a see-saw shown in figure 3.4 is in a balanced position. This is because the forces that act on either side of the centre of gravity is equal and is in a balanced position. If a weight is put only to one side of the see-saw, it will lose its balance and there will be a movement around the centre of gravity.

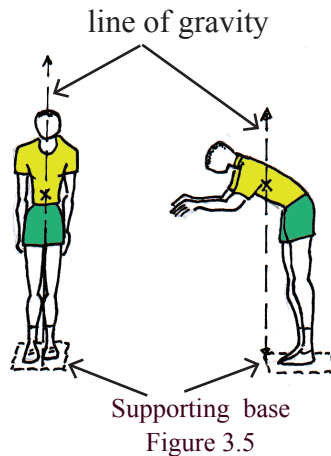
Factors that help maintain the balance at different body postures are given below.

- i. Keeping the line of gravity within the supporting base - vertical line passing through the centre of gravity is called the line of gravity.
- ii. Having the centre of gravity at a lower position (closer to the ground)
- iii. Maintaining a wider supporting base
- iv. Movement of the body in the opposite direction when loss of posture is imminent
- v. Bending the body towards an external force

Let us see how the above factors affect different postures

i. Keeping the line of gravity within the supporting base

A person standing with both legs together, bends his body forward without bending the knees and waist at one point will tend to lose his balance and fall forward (figure 3.5).



Standing with both legs together, the centre of gravity is vertically above the feet. That is to say, the line of gravity stays within the supporting base. When bending forward, the vertical line on the centre of gravity goes away from the base of the feet. As it passes the peripheral margin of the base, the body loses its balance and falls.

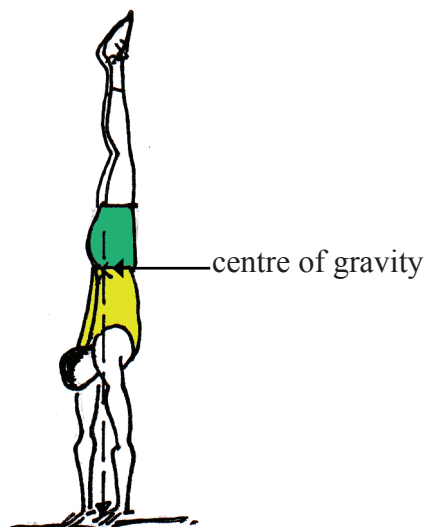


Figure 3.6

In gymnastics, the player's centre of gravity should be positioned above the supporting base (figure 3.6). When the body bends in a certain direction, the centre of gravity moves in that direction to prevent falling, maintaining the line of gravity within the supporting base. By moving the centre of gravity towards it, the player balances his body.

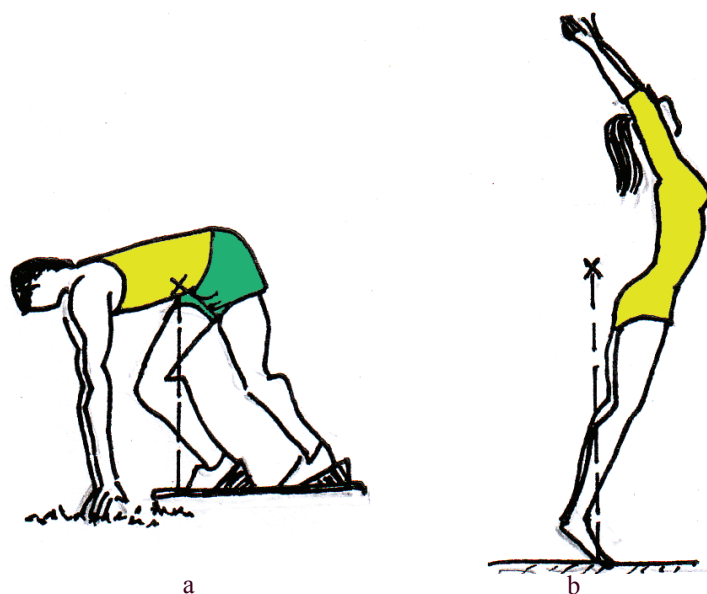


Figure 3.7

The above two figures in 3.7, show the start of the short distance race and a gymnastics movement. In both situations the centre of gravity of the player's body is placed above the supporting base. Therefore in both situations the body is well balanced.

ii. The centre of gravity at a lower level

When the centre of gravity is placed at a lower level it helps to maintain the balance of the object. The centre of gravity of the object in figure 3.8 a is at a lower level than the object shown in figure 3.8 b. The beaker in 3.8 a is in a more balanced position. If it were to lose its balance and fall, the centre of gravity of that object has to move a considerable distance but with a slight push the line of gravity of the object shown in figure 3.8 b can be moved away from the supporting base and topple easily.

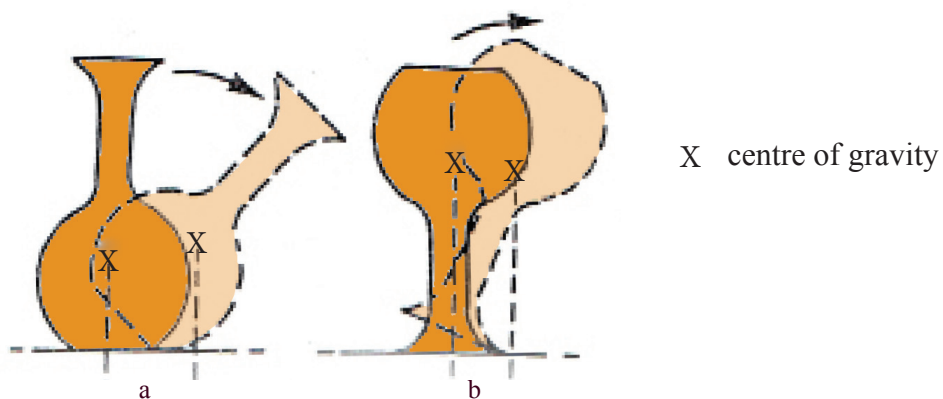


Figure 3.8

When a basketball player bends his knees, his centre of gravity is at a lower position than the centre of gravity of a player who is standing vertically and the first player is better balanced. (3.9 a and b)

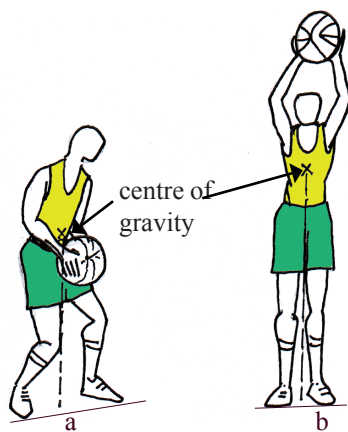


Figure 3.9

After an athlete has released the put, he always moves his body forward and downwards. This helps the player to balance his body by keeping the centre of gravity in a lower position (3.10 a). Figure 3.10 b shows how a gymnast carries the centre of gravity to a lower position to maintain balance.

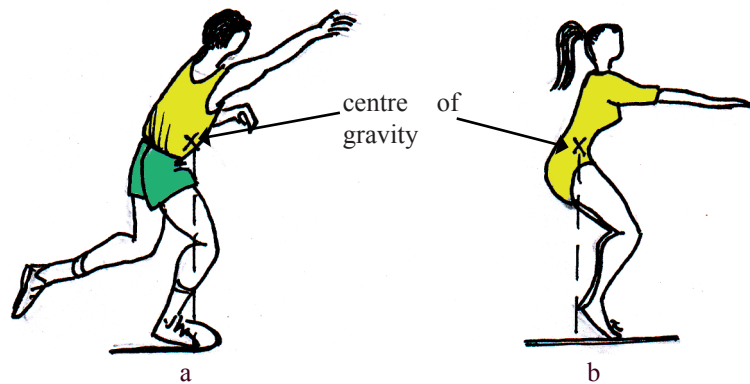


Figure 3.10

iii. Wider supporting base

When the supporting base of an object is wider it's balance also increases. We can see a better balance in a person who is standing, with feet wide apart than the person who is standing keeping the feet close together. The reason for this is the wider supporting base. (figure 3.11)

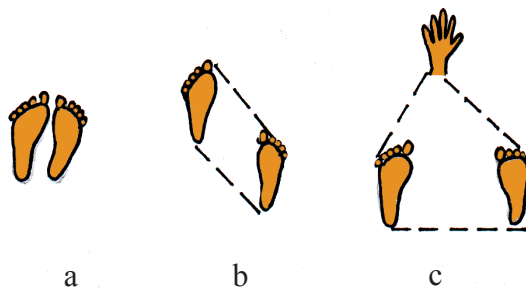


Figure 3.11

It is very clearly shown in figure 3.11 that when the ground area of the supporting base increases the equilibrium also increases. Figure 3.11a shows the player's feet kept close to each other. Here the size of the supporting base is small. In a situation like this, the player's position is not stable. Even a small external push can make him lose his balance. If the player's feet are kept as shown in 3.11b, his stability is more. As shown in 3.11c, apart from keeping the feet wide apart, keeping one hand on the ground, will increase the size of the supporting base. Furthermore, it brings the position of the centre of gravity to a lower level making it a more stable position.

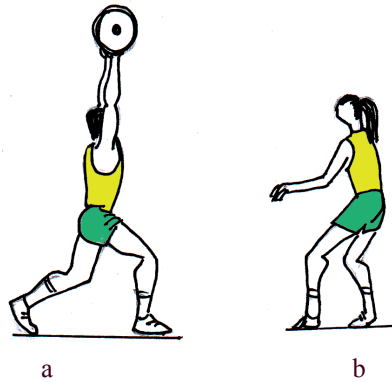


Figure 3.12

Figure 3.12 shows a netball player and a weight lifter keeping their feet apart. Due to a wider supporting base they have more stability in their stance.

iv. Movement of the body in the opposite directions.

When a part of the body moves far from the line of gravity the body may lose its balance. Moving another part of the body in the opposite direction, the former position can be balanced. The player in diagram 3.13, while stretching his left hand forward has his left leg and hand stretched backward. By doing this he balances his body.

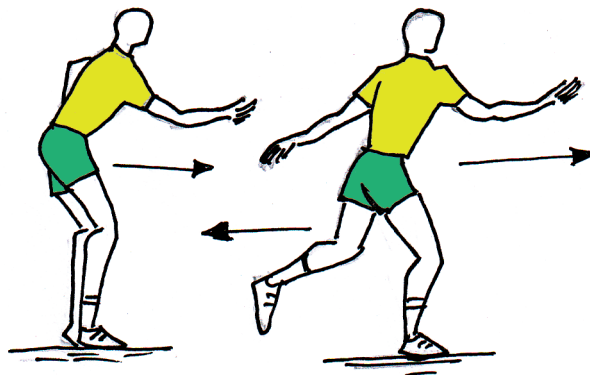


Figure 3.13

v. Bending the body towards an external force.

When an external force is coming towards you by leaning forward, you can have a better balance. If you bend your body backwards to an external force then the centre of gravity will be pushed backwards away from the base of your body and balance

will be lost. This is explained by the two positions shown in figure 3.14

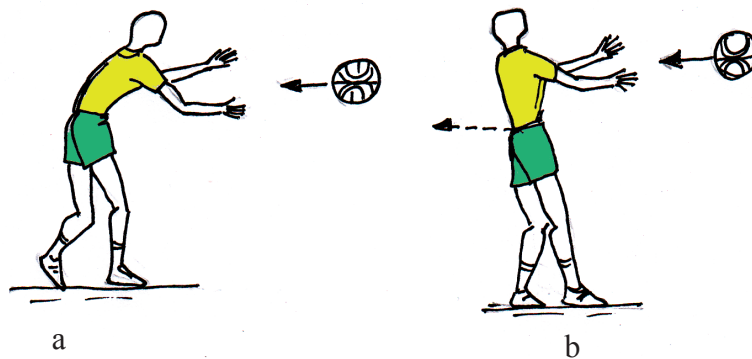


Figure 3.14

Maintaining posture according to bio mechanical factors

When we engage in static postures in our day-to-day life the centre of gravity and balance are very important and attention should be paid to it. Let us study some situations where the centre of gravity and balance are applied.

Standing

At the beginning of this chapter you studied that the centre of gravity of a person in standing posture is at a distance of about 56% of height above the level of the ground (figure 3.2).

In general a female's centre of gravity is below that of a male's. This is an advantage for females to maintain balance. A child's centre of gravity is situated at a higher level than of an adult.

When standing if the hands are moved, the centre of gravity changes. When standing for a long time, having a wider support of base, helps to maintain good balance.

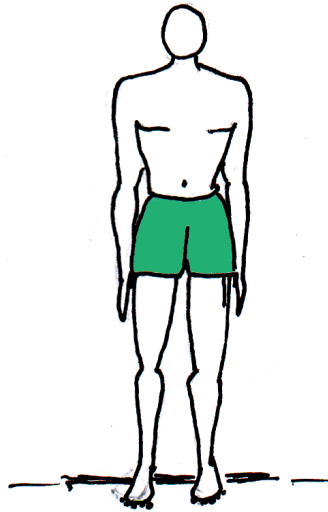


Figure 3.15

Therefore when we stand the following points should be considered:

- Body is kept in a vertical stance
- Hands are kept on either side of the body
- Keep the feet apart, at an equal distance of the shoulder and direct the body weight to spread equally to both feet

When standing and attending to any work remember to:

- keep the body in a vertical stance
- keep feet apart at an equal distance of the shoulder maintaining the balance
- adjust the working surface to the level of the elbow (e.g. ironing)



Figure 3.16

Not keeping the back straight, being hunched, leaning forward and working for a long time will result in injury to the muscles and ligaments of the vertebral column. A long term problem is kyphosis that can arise due to the spine bending forward.

Sitting

This is a common posture that we adopt in our daily life. When sitting the position of our centre of gravity is as shown below (3.17).

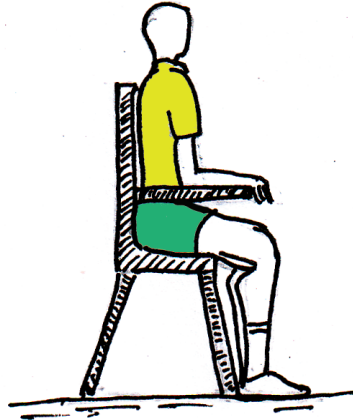


Figure 3.17

When sitting, the centre of gravity is placed at a lower position than standing. The body weight acts on the pelvis and because the centre of gravity lies at a lower level the body is balanced well. For studying purposes and resting purposes we sit in our day to day posture.

Points to consider when sitting :

- Keep the spine vertically
- Waist, knees and ankles should be bent at 90 degrees
- The soles of the feet should be touching the floor
- Use a properly designed chair with
 - a back rest to lean
 - the height of the chair equal to the height of knee from its feet
 - sitting surface not soft or too hard
 - handrests to rest the elbow.

Let us learn more on the position of sitting, in which we engage a lot in daily life.

Sitting and working at a table

- Sit closer to the table.
If the chair is higher than the normal height, we need to bend forward. So the chair should be in a position where the feet are touching the floor. The table surface should be at the level of your elbows. The distance between the table and the seat should be at least 20 cm.
- Keep the spine vertical.
- Feet should touch the ground.
- Hip and knee joints should be bent at 90 degrees
- If sitting for a long time, it is important to get up and walk from time to time. This will prevent undue pressure on the spinal cord.

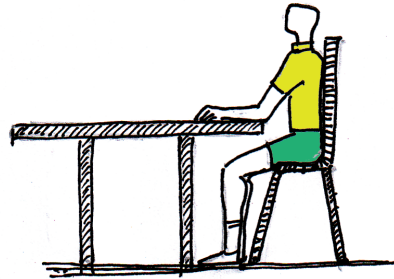


Figure 3.18

Driving a vehicle

- Sit on the driver's seat with a relaxed body.
- Hands bent slightly at the elbows.
- Keep back straight and rest completely against the backrest.
- Legs should be in a relaxed position when using brakes.

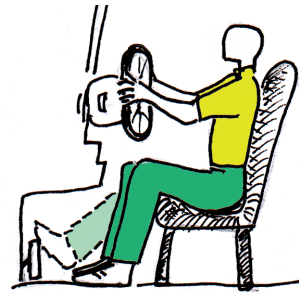


Figure 3.19

While working at the computer

- Chair should be one inch higher than the usual height.
- Spine should be vertical.
- Head should not be swayed forward or backward unnecessarily.
- Feet should touch the floor.
- Shoulder should be parallel to the hip bone.
- Change your posture every half an hour. Standing, walking, stretching hands should be done.



Figure 3.20

In all the situations mentioned above, the seat should be a well-balanced one and it is compulsory to sit in a balanced position in order to prevent neck pains, wrist aches, stress to the eyes and pain in the hands.

Lying down

Lying down is done in many ways in our day-to-day life. It is a natural static position. According to the need, place and facilities available the posture changes. Therefore the posture of lying down when asleep, when sick, after an accident and at rest would differ.

When we lie down, we usually stay in a straight position facing up, facing down or turning to the left or to the right side. The correct position to lie down is to be straight and face up or turn to left or right side. If we follow this method, the centre of gravity lies closer to the body as well as to the surface of the lying area. As a result of this the balance of the body increases.

Pay attention to the following points when you are lying down.

- The air way should not be obstructed when lying.
- The circulatory process should not be obstructed.
- Lying down in such a way that it does not give any aches and pains to the body.
- A horizontal, flat and medium soft surface should be used in order to avoid muscle related problems.
- Lying down should not affect the curves of the spine or muscles of the back.

It is important to follow the correct posture of sitting, standing and lying down in our daily life.



For extra knowledge

Dynamic Postures

The centre of gravity and the body balance are very important aspects in dynamic postures such as walking, running, jumping and throwing.

While running or walking, the body balance is maintained by moving the hands and legs in the opposite directions.

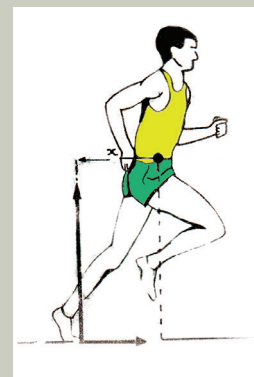


Figure 3.21

The path a jumper takes in his flight indicates the path of the centre of gravity of his body.

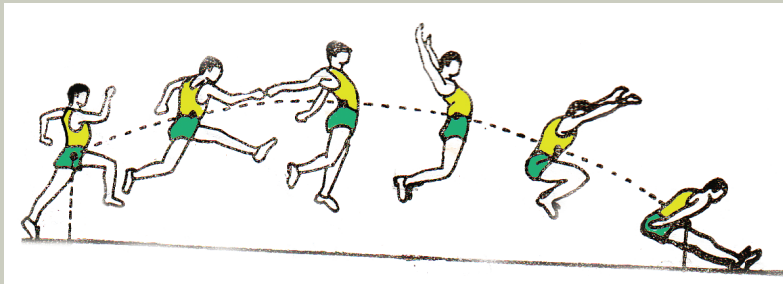


Figure 3.22

At the landing stage, when a jumper is about to land, he raises his legs forward and upwards while bending the upper body forward and downwards. The equal and opposite movements made during the flight are important in maintaining the body balance of the jumper. Such movements do not cause any change in the path that the centre of gravity of the body of the jumper takes.

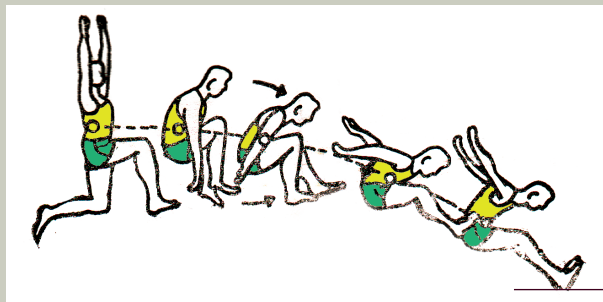


Figure 3.23

After clearing the hurdle, a hurdler drives his foot towards the ground while in flight. Then the upper body of the jumper is raised. These actions prevent the centre of gravity from moving above or below the path that the body of the hurdler takes.

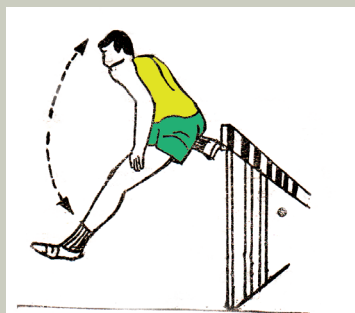


Figure 3.24

After a high jumper has taken off, he turns his body while in the air. This turning takes place around an axis which lies through the centre of gravity of the jumper's body.

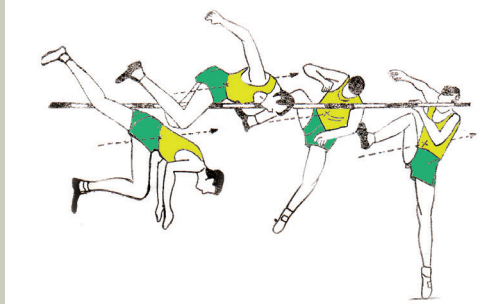


Figure 3.25

In discus throw, the centre of gravity of the body of the thrower has to move in a linear path from the beginning of the circular motion till the throw in order to exert force in the right direction.

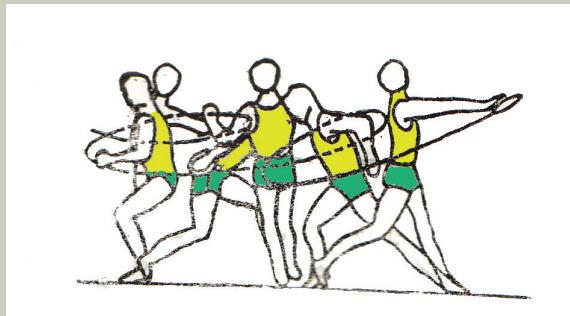


Figure 3.26

At the beginning of this lesson we learnt how a shot putter maintains his body balance by bringing the centre of gravity of his body down to a lower level by directing his body forward and downwards after the shot put has been released from his hand.



Figure 3.27

When maintaining an incorrect posture the muscles, bones and the other components of the body will be put to extra and unnecessary effort. This increases the risk of injuring joints, muscles, spine and getting disabilities in the long term. Therefore always remember to maintain the centre of gravity and a good balance by adopting correct postures.

Summary

In our daily life we adopt static and dynamic postures. Centre of gravity and balance are two important bio mechanical principles that determine the state of the posture. Centre of gravity is a point in which the weight of body acts while balance is the ability to balance the body when we engage in different types of postures. The position of centre of gravity changes according to the posture. Maintaining the line of gravity within the supporting base, maintaining the centre of gravity at a lower level, having a wider supporting base, keeping parts of the body moved in opposite directions, bending the body towards the external force are some of the important factors that will help to maintain balance. In our daily life we engage in static postures such as standing, sitting and lying down. It is important to maintain a correct posture in order to maintain the centre of gravity at a suitable point in order to balance the body. Adopting wrong postures will result in many injuries to the body and disabilities later in life.



Exercises;

1. Name the two principles of bio mechanics that affect posture
2. Write five factors that help to maintain balance in physical activities
3. Write three points that we should be mindful of when in standing position.
4. Write three points that we should be mindful of when in a correct sitting position
5. Write three points that we should be mindful of when lying down
6. Explain the position of the centre of gravity using diagrams, in jumping and throwing.

2

Let us learn about development through childhood

The foundation of growth takes place during the pre natal and infant stages of life. Studies have shown that 80% of brain cells are formed by the age of 3 years. At this stage a rapid physical growth is also seen. Physical growth means an increase in height and weight. By measuring growth parameters (height and weight) we can determine whether the child is growing adequately. Muscle strength and mobility are developed with physical growth. Mental and social skills are developed through interactions with the environment. This is known as a child's psycho-social development.

Understanding the psycho-social development of a child helps identify the needs, importance of fulfilling the needs and ways of fulfilling them. This knowledge will help you in the future.

In the previous classes we learnt how to lead a healthy life through balancing different needs in different situations. In this lesson let us learn the stages in childhood and how their needs could be provided.

Stages in childhood

- | | | |
|--------------------|---|-------------------------------------|
| 1. Prenatal stage | - | the period inside the mother's womb |
| 2. Neonatal stage | - | the first 4 weeks after birth |
| 3. Infant stage | - | from the first to the twelfth month |
| 4. Early childhood | - | from 1 year to 5 years |
| 5. Late childhood | - | from 6 years to 10 years |

Points to know before becoming a mother.

1. Although the Sri Lankan law permits a girl to get married once she completes 18 years, it is important to ascertain whether she has adequate physical and mental maturity. She should be mentally and socially stable. The family should be financially stable to bring up a child.
2. It is important to prevent marriages between blood relatives, (e.g: first cousins or close relatives) as this could lead to some genetic disorders in the off spring, (e.g: Thalassaemia). This is an important factor to be considered when considering marriage and pregnancy. Bad effects can be prevented by a well planned marriage.
3. Folic acid is very important for a woman who is planning on becoming pregnant after marriage. Sufficient folic acid levels in her body before and during pregnancy helps to prevent the baby developing brain and spinal cord abnormalities. Therefore a woman who is planning a pregnancy should begin taking folic acid supplements weeks before she gets pregnant. (Folic acid is present in green leaves found plenty in Sri Lanka)
4. It is important for every girl who has completed 15 years, to get the rubella vaccination to prevent getting German measles. (If a female has not received this rubella or MMR vaccine before, it is advised to get the vaccination at least three months before getting pregnant.)
5. A woman hoping to get pregnant after marriage, should plan it properly. Medical advice can be sought from health services, attending family health clinics and maternity clinics with proper planning. A girl can have an uncomplicated pregnancy and safe motherhood with proper planning.

Prenatal stage (In mother's womb)

Prenatal stage is the period from the moment the sperm unites with the ovum until the birth.

The period during pregnancy and the moment of child birth are the happiest moments in the life of parents. Every pregnancy should be well-planned and prepared. A pregnant mother should be in very good physical and mental state. This is essential for the healthy growth of the new born baby. During the pre natal stage the mother should be aware of the progress of her pregnancy.

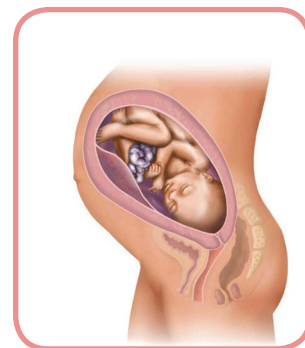


Figure 2.1

Following are a few steps that can be taken during this period.

1. Once becoming aware of the pregnancy, proper medical advice must be obtained. In this regard valuable assistance can be obtained from the public health midwife.
2. Special attention should be paid to the food the mother eats, as it will affect the growth of the baby. The expected healthy birth weight of a baby is between 2.5 kg to 3.5 kg. This weight gain is through the necessary nutrients that are obtained from the mother. So during this period if the mother does not take a balanced diet, nutritional deficiencies will affect the growth of the embryo. The child will have a low birth weight, be born prematurely, have suboptimal mental functions or be prone to infections.
3. A pregnant mother should have a good mental state as it will affect the development of the baby's brain. The mother should be free of physical and mental stress. Other members of the family should share the household work and make her comfortable. She should be happy and relaxed.



Activity

The foundation for the future of the pre natal baby depends on the balanced diet taken by the mother, as well as the mother being in a good mental and social state as well as being free of diseases. Considering these points, design a leaflet with instructions, which can be distributed at the maternity clinic in your area.

Neonatal stage (from birth to one month)

Neonatal stage is the period from birth to 28 days. In this period the child is exposed to the new environment.

During this period the mother too faces rapid physical and mental changes. The baby is exposed to the new environment through the mother. The nutrients needed for the baby's physical growth are supplied through breast milk. Activities indulged in by the mother affect the baby's psycho-social development. Therefore a good mental and physical state in the mother is important for good psycho-social development of the baby.



Figure 2.2

Physical and psycho-social needs in neonatal stage.

Table 2.1

Physical needs	Psycho-social needs
<ol style="list-style-type: none">1. Nutritional needs<ul style="list-style-type: none">• Breast feeding the baby whenever the need arises. This helps the growth and immunity of the baby.2. Growth<ul style="list-style-type: none">• Adequate amount of sleep and rest is important for the growth of the baby.3. Protection<ul style="list-style-type: none">• Protect from cold and heat.• Protect from physical injuries such as falls, cuts etc.• To protect from infections avoid crowded places, maintain good hygiene and keep the baby in a well ventilated room	<ol style="list-style-type: none">1. Love<ul style="list-style-type: none">• While breast feeding hugging and cuddling the baby.2. Stimulation for mental development<ul style="list-style-type: none">• Petting, talking and singing lullabies to the baby (though the baby does not understand)• Keeping the baby in a well-lit room• Respond to the gestures made by the baby• Keep objects that will make sounds to stimulate the baby



For extra knowledge

Breast milk is the most important form of nutrition that can be given to a baby during the first six months of life. Its importance is given below.

1. All the necessary nutrients and required amount of water for the first six months can be obtained from mother's milk
2. The milk secreted in the first few days after birth is of a thick yellowish consistency known as colostrum. It is secreted in very small amounts and contains substances that will help to protect the baby from infections and helps the proper functioning of the digestive system.
3. Mother's milk is the safest and cleanest food that can be given to a baby.
4. It is always at the correct temperature.
5. It is available at any time the baby requires.

6. Breast feeding strengthens the bond between the mother and the baby.
7. It helps to protect baby from diseases.
8. It helps to prevent obesity in the future.
9. It helps to increase the baby's mental development.
10. It helps develop resistance against allergies.

Infant stage (from 1 month to 12 months)

The period from one month to twelve months is considered as the infant stage. During this stage a baby shows rapid physical and mental development while adapting to the social environment.

During this stage it is vital for the mother to take a well-balanced diet as it affects the baby directly. The diet should be rich in vitamin D and calcium. The mother's mental state affects the baby, it is important for the mother to be happy.

Mother should spend more time with the baby. Therefore the other members of the family should share the work. This helps the mother's physical and mental relaxation.



Figure 2.3

Physical and psycho-social needs in infant stage

Table 2.2

Physical needs	Psychological needs
<p>1. Nutrition</p> <ul style="list-style-type: none"> • During the first six months whenever the baby needs milk, breastfeed the baby. • On completion of six months complementary food should be introduced. • If the baby's growth is less or if mother goes to work before first 6 months, complementary food can be started at 4 months. • Avoid giving salt and sugar in the first year of life. • By the end of the first year the baby should be accustomed to family food. <p>2. Growth</p> <ul style="list-style-type: none"> • To monitor growth it is important to measure the weight every month and height at least three monthly and mark on the given growth chart. • If there is a change in pattern of growth (increase or decrease) get advise from a doctor. <p>3. Protection</p> <ul style="list-style-type: none"> • Follow the immunization programme accordingly. • Pay regular attention to the baby to protect from injuries. • To protect from infections avoid crowded places and maintain good hygiene. 	<p>1. Love and affection</p> <ul style="list-style-type: none"> • It is important to create an environment in and around the house filled with love and peace. • Parents including other members of the family should express love towards the baby. <p>2. Stimulation for the mental development</p> <ul style="list-style-type: none"> • Providing the child with colourful toys. • Showing colourful pictures to the child. • Talking, storytelling and singing frequently to the baby. • Creating an environment filled with different sounds which soothes the ear.

Early childhood (from 1 year to 5 years)

The period from 1 year to 5 years of a child's life is called the early childhood. During this period the child begins to walk and gains experience by exploring the environment.



Figure 2.4

Physical and psycho-social needs in early childhood.

Table 2.3

Physical needs.	Psycho-social needs
<p>1. Nutrition</p> <ul style="list-style-type: none"> • Five meals a day - apart from the three main meals two snacks. • Since the child is developing fast, more nutritious food should be given. <p>2. Growth</p> <ul style="list-style-type: none"> • Check the weight and height every three months and record it in the growth chart. <p>3. Protection</p> <ul style="list-style-type: none"> • Follow the immunization programme in order to protect the child. • Keep the child away from unhygienic environment to protect from infections. • Since the child is more active pay regular attention to protect from injuries. • Pay constant attention to the child. • Follow basic personal health habits. 	<p>1. Show love and kindness.</p> <p>2. Stimulation for the mental development.</p> <ul style="list-style-type: none"> • Provide opportunities to explore the environment. • Allow the child to exhibit his/her abilities. • Help the child to understand his/ her limitations and help to control emotions. • Teach good habits. • Let the child express his/her views and ideas. • Provide opportunities to develop motor abilities. • Promote and develop interpersonal relationships.



Activity

Make a chart showing the different vaccines a child should be given from birth to 15 years.

Late childhood (from 6 years to 10 years)

The period from 6 years to 10 years of a child's life is called late childhood. During this period the child starts formal education.

In this period the child is very inquisitive, hence should provide opportunities to explore the environment. As a result the child builds self-confidence.



Table 2.4

Physical and psycho-social needs in late childhood

Physical needs	Psycho-Social needs
<ol style="list-style-type: none"> 1. Nutrition <ul style="list-style-type: none"> • Provide a well-balanced diet. 2. Growth <ul style="list-style-type: none"> • Once in 4 months check the height and the weight and check whether BMI and height are within the accepted range and if necessary take action. 3. Protection <ul style="list-style-type: none"> • Provide the child with necessary knowledge and guidance to identify and prevent injuries and train them in different skills. • Make the child aware about people and situations that can cause harm to them and how to avoid these. • Educate them to be cooperative and work with others. Be aware of different intimidations that they could face from the people they work with. 	<ol style="list-style-type: none"> 1. Show love and kindness. At every opportunity talk with them 2. Stimulation for mental development. <ul style="list-style-type: none"> • Guiding with personal hygiene and good health habits. • Provide opportunities and skills to build good inter relationships with parents, relations and friends. • Provide the opportunity and skills to gain experience through activities. • Build self-esteem through praise. • Motivate to engage in different types of hobbies and creative work. • Encourage to develop psycho-social skills through group events.



Activity

Assume you are a pre school teacher, and develop three activities (on cards) you would do to stimulate the mental development of your children

Summary

The period from birth to 10 years of life is called childhood. This is sub divided to neonatal stage, infant stage, early childhood and late childhood. Pre natal stage is very important for the growth and development of the child. Every pregnancy should be well-planned and a pregnant woman should always be in a very good mental and physical state. It takes about 280 days for the baby to be born after conception.

The first 28 days is known as the neonatal stage, while 1- 12 months is known as the infant stage. The period from 1st to 5th year is early childhood and 6 to 10 years is known as late childhood. Providing the necessary physical and psycho-social needs during the different periods of childhood is important. The child will then be properly moulded, achieve optimum physical growth and mental development. A generation of healthy, intelligent, self-confident, skilful and creative children with good self-esteem will be a gift to the future world.



Exercises;

1. What are the main stages in childhood?
2. Write two stimuli that are important during infant stage for the mental development.
3. Write two physical needs, which are important in early childhood and late childhood.
4. Name five activities that you can do within the school to develop the personality of a child during the late childhood stage.

Let us overcome challenges confronted in life

We confront various challenges in our daily life. Due to the changes that take place during adolescence we face many challenges such as strong emotions, conflicts caused by interpersonal relationships, diseases, accidents, natural disasters, sexual abuse and delinquency. Having a proper understanding about these challenges help us to identify them early, respond effectively and take measures to overcome them. We have discussed some of these challenges in the previous grades.

We have learnt about certain challenges like diseases, changes taking place in adolescence and social challenges which we naturally face in day-to-day life.

In this chapter we will learn about accidents related to sports and day-to-day activities, natural disasters and sexual abuse. We will also learn about the measures that should be taken to prevent such incidents and first aid that can be given to a victim at such times.

Sports related injuries

Injuries caused by sports can be divided into two, namely, external injuries and internal injuries. Although injuries are divided into two, in reality they can occur simultaneously. This classification can be applied to other injuries, too.

table 10.1

External injuries	Internal injuries
Bruises	Injury to bones
Lacerations	Injury to joints
Cuts	Injury to muscles
Piercings	Injury to ligaments
Blisters	Injury to nerves and other internal organs

Sports injuries can happen due to personal factors and external factors.

Personal factors

- Level of physical fitness not adequate for the sport
- Participating in sports without warm up exercises
- Lack of proper training
- Not taking adequate time to recover after a sport
- Overtraining
- Adopting wrong training methods and techniques
- Taking part in activities that are not age appropriate

Poor physical health

- Not taking adequate amounts of water and food.

External factors

- Not wearing safety gear recommended for the sport
- Use of improper sports equipment
- Lack of standard playgrounds
- Not observing the rules of the game
- Environmental factors (e.g: extreme weather conditions)



Activity

Design a poster / leaflet giving instructions to pupils in order to raise awareness on ways of minimizing sports injuries during the annual sports meet of your school.

External injuries

1. Bruises

Damage caused to the external surface of the skin is a bruise. A bruise can be caused when the skin brushes against a rough surface like the ground, a sharp object like the edge of a cable or a thorny bush. A bruise does not cause heavy bleeding. Keeping the affected area clean with some simple treatment would heal the wound.

2. Lacerations

An irregular tear of the skin (including the full thickness of the skin) is called a laceration. A laceration most often happens with a contusion of the skin that lies just over a bone.

When treating a laceration, the injured area can be bandaged with a clean strip of cloth in order to stop bleeding. Sometimes it may need suturing.

3. Cuts

A cut is caused by a sharp object. A cut can be either superficial or deep; a deep cut may damage the internal organs. If the cut is deep the affected area should be immobilized using a support to stop the bleeding.

4. Piercing

Piercing could be caused by a sharp tool or a pointed object. While the surface wound caused by piercing may be small in area, the wound can go deep into the body.

When the body is pierced, internal haemorrhage (internal bleeding) is most likely to occur rather than external bleeding. Therefore it is very important that the patient seeks medical treatment immediately. If the pointed object is still present in the body, **do not** attempt to remove it. Seek immediate medical help from a hospital.

5. Contusions

In the case of a contusion, a greater damage could have happened to the organs in the inner part of the affected area than what is seen superficially on the skin. Swelling and reddening of the skin of the affected area could be noticed. A contusion could cause severe pain. Fractures and internal bleeding are also possible.

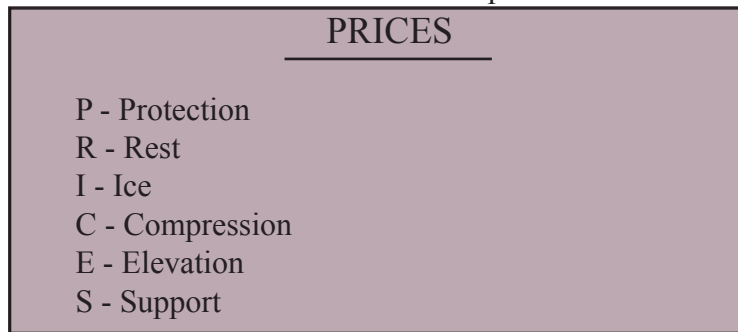
A contusion can be caused by a fall or when hit with a blunt tool. PRICES protocol (a method of immediate treatment for injury) can be used to minimize the effects of a contusion.

6. Blisters

A blister is a painful red swelling on the skin that contains liquid usually formed by burning or friction (e.g: by a new shoe or sports equipment or burn). Usually a blister will heal on its own. However, if it is broken, it can get infected. Blisters should not be covered tightly. Formation of blisters can be prevented by wearing properly designed sportswear and using the same equipment both at practice and the actual events.

Immediately after a burn injury, the affected area should be washed with flowing water. It helps minimize the formation of blisters.

- RICE treatment is a commonly used method of giving first aid for internal injuries. PRICES treatment is a further development of the RICE method.



Internal Injuries

1. Fractures

A fracture is the most common type of injury caused to bones. Bones of the limbs and even the skull can get fractured. A fracture may be open to the outside. When a fracture is suspected, the affected area should be kept immobilized and the patient taken to hospital immediately.



Figure 10.1

2. Joint injuries

The most serious injury that can be caused to a joint is for it to get dislocated, i.e., the bones forming a joint suddenly get dislodged from their correct positions. When a joint gets dislocated, the bones may fracture and ligaments may get damaged. In the case of a dislocation, keep the affected joint immobilized and do not try to put the bones back into place on your own. Take the patient immediately immobilized to hospital for treatment by a professional.

3. Ligament injuries

Ligaments are strong strips of tissue in the body that connect bones together. Ligaments can get damaged in an accident and consequent swelling, pain and lack of proper functioning of the joint can be experienced. In the case of ligament damage, the affected area should be kept immobilized, bandaged and in an elevated position (PRICES treatment).

4. Muscle injuries

Piercing, contusions, cut injuries or fractures can cause injury to muscles. Muscles

may even tear as a result of muscle strain.

There are many occasions where athletes / players suffer muscle injury in this manner. It is very important to get proper training and do warm up exercises in order to prevent muscle injuries. Keeping ice on the affected area and resting the affected muscles are the primary treatment for muscle injury.

5. Injuries to nerves and other internal organs

The most important organ in our body is the brain. Participants in sports like rugby, football, boxing and types of martial arts face a high risk of injury to brain. Concussion, is temporary brain damage caused by a fall or hard knock on the head by another player or an object.

Liver, spleen, and kidneys are among other internal organs which commonly face risk of injury by accidents. Other internal organs may be damaged in sports accidents and consequent internal bleeding may make the patient look pale or even faint. In such situations, the patient should be taken to hospital immediately.

6. Accidents due to the increase of body heat

Sports is usually done outdoors and often during daytime. In such situations, the body temperature of participants may increase as a result of intense heat and increased physical activity. The following could result when a person's body temperature increases uncontrollably during sports:

- cramps
- heat strokes
- dehydration.



Figure 10.2

These conditions can be prevented by taking proper care when planning competitions at suitable times, providing facilities, training and wearing appropriate clothing. eg: in organizing a cross-country running or a marathon, it is best to start the race in the morning when the sun is not strong. It is also important to ensure the availability of water by the roadside (feeding points) for the runners to drink and to cool the body.

In the case of a participant falling ill due to the increase of body heat, immediate action should be taken to bring down the body temperature to normal level. This can be done by giving ice, cold water to drink and by applying ice and water on the body.



Activity

1. Divide the class into two groups. Ask one group to make a list of internal injuries and the other a list of external injuries.
2. Then ask them to explain the causes of such injuries and to propose precautionary measures that can be taken to prevent such injuries.

Accidents faced in day-to-day activities

1. Domestic accidents
2. Accidents that happen in the garden
3. Road accidents
4. Natural disasters
5. Agro-chemical accidents and food poisoning
6. Animal attacks
7. War related accidents
8. Accidents due to social unrest
9. Work related accidents

Domestic accidents

Most domestic accidents result due to ignorance, carelessness and mistakes. Therefore such accidents can be prevented by acting with awareness and taking proper care. Following are ways of minimising such accidents:

- Being cautious when using sharp tools.
- Preventing small children from handling such tools.
- Refraining from using unsafe kerosene lamps.
- Storing pesticides, acids and drugs safely.
- Maintaining electric wires and plug bases with proper covering.
- Constructing safety walls or fences around dangerous places like wells.
- Keeping the surroundings of wells and taps clean.
- Checking the ingredients, date of manufacture and expiry when buying food items.
- Consuming food of proper standard.
- Making sure small children are supervised and not kept alone.
- Following safety instructions while using equipment like gas cookers and electric appliances.



Figure 10.3

- Doing warming up activities before engaging in physical exercise.
- Adopting the correct posture when lifting weights.
- Taking safety measures when lighting fireworks.

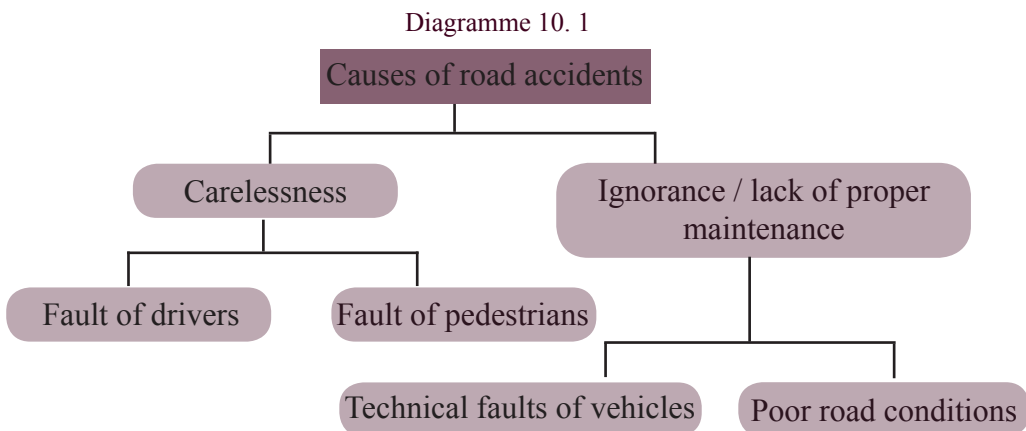
Road accidents



Figure 10.4

You may have witnessed road traffic accidents or heard about them from the media. Road traffic accidents not only endanger the lives of the pedestrians and those travelling in vehicles, but cause great damage to property too. A careful study of the causes for road accidents makes it evident that most of such accidents happen due to negligence, ignorance or mistakes of all road users.

Causes of road accidents are varied and can be categorized as follows:



Faults committed by the drivers

- Not observing road rules
- Driving too fast
- Driving under the influence of alcohol
- Driving when tired
- Driving under stress
- Parking vehicles obstructing traffic
- Not wearing seat belts / safety helmets

Faults committed by pedestrians

- Not following road signs
- Walking in the dark or wearing dark coloured clothes when walking in the dark.
- Walking on the road in groups
- Walking on the left hand side of the road
- Throwing waste matter onto the road

Technical faults of vehicles

- Brake failure
- Defunct lamps (head lights or tail lights)
- Tyres of poor condition

Poor road conditions

- Lack of properly displayed road signs and traffic signals
- Dilapidated roads
- Open uncovered drains on the edge of the road
- Unsafely placed structures on roads (e.g: electricity / telephone poles, water supply systems, buildings, etc.)
- Lack of / defunct street lamps.



Figure 10.5

Remedial measures that can be taken to prevent road accidents

- Raising awareness among motorists on the importance of driving etiquette and obeying road rules.
- Raising awareness among pedestrians on the importance of road etiquette and obeying road rules
- Pedestrians and drivers to refrain from taking alcohol and illicit drugs
- Motorists to wear seat belts.



- Motorcyclists including children to wear safety helmets.
- Taking measures to prevent overloaded vehicles from running on roads.
- Avoid driving when drowsy or tired.
- Avoid driving under severe stress.
- Preventing passengers from travelling on the footboard of public vehicles.
- Preventing passengers from getting on or off, moving vehicles.
- Pedestrians to cross the road at pedestrian crossings and being alert when crossing the road at other places.
- Preventing pedestrians from crossing the road at places where a clear view of the road cannot be obtained (e.g: at bends).
- Preventing pedestrians from crossing the road in front of or behind stationary vehicles.
- Raising awareness among pedestrians on the importance of carrying a torch / being clad in light coloured clothes or clothes made of material that can be seen in the dark when walking on roads at night.
- Preventing people from throwing waste matter on to roads e.g. banana skins.



Figure 10.6

Injuries caused by animal attacks

In Sri Lanka most of the injuries that are reported due to animal attacks are results of snake bites, scratches or bites of animals like dogs, cats, and monkeys etc. Insect stings by bees and wasps, are commonly reported accidents. Most often, small children and those engaged in farming are victims of animal attacks. Animal bites and insect stings are harmful and cause great pain, infection, shock and sometimes even death.

Precautionary measures that can be taken to prevent animal attacks

- Wearing safety boots
- Using a stick when walking outdoors
- Carrying a torch when walking in the dark
- Walking with heavy steps
- Refraining from inserting hands and legs into likely habitats of snakes e.g: anthills, tree trunks, logs, bushes and heaps of rubbish
- Refraining from touching a snake even if it appears dead
- Keeping the home environment clean
- Positioning ventilation holes high in the walls so that snakes cannot slide through them
- Checking the pillows, mattresses and bed sheets before using them

Agrochemical accidents



Figure 10.7

Most often, those engaged in farming face agrochemical accidents. The cause for such accidents is the improper use of agrochemicals. It is of vital importance to note that there are instances where agrochemicals enter a person's body without his/her knowledge. They also enter the human body by mixing with air and water and through fruits and vegetables on which they have been used.

Instances of improper use of agrochemicals

- Not following safety precautions (e.g. wearing gloves, masks etc)
- Exceeding the recommended dosage
- Spraying agrochemicals just before the harvesting days
- Spraying agrochemicals against the wind direction

Safety and health in the use of agrochemicals

- Wearing safety clothing like gloves, masks, helmets and footwear.
- Using the correct dosage of agrochemicals and at the correct time.
- Refraining from taking any food while using agrochemicals.
- Using only agrochemicals which have approved composition and standards.
- Safe washing of the equipment used for spraying agrochemicals (they should not be washed in waterways and at public wells).
- Washing the body well after spraying agrochemicals.
- Storing agrochemicals under lock and key

Work related accidents

People face various accidents while they are engaged in their vocations. The nature of the work of those who are engaged in agricultural activities, in mines or operate machinery in factories involve a high risk of accidents. Some of the commonly reported accidents include:

i. Poisoning

Most often those who are engaged in agricultural activities and those working in mines face accidents of poisoning. Poisons can enter the body in a number of ways:

- through the skin
- orally
- through the respiratory system

Most accidents happen due to ignorance and lack of knowledge.

ii. Accidents related to the use of machinery

In industries that involve the use of machinery, accidents happen due to workers' carelessness, ignorance, lack of knowledge and lack of proper maintenance of machinery. Injuries due to such accidents include cuts, bruises and occasionally death.

iii. Electrocution

People whose job involves the use of electricity as well as others using electricity domestically may face accidents due to electrocution.

Some of the precautionary measures that can be adopted to minimise work related accidents are as follows:

- Follow safety instructions while using chemicals.
- Provide facilities to workers and take measures in terms of the provisions of the Occupational Health and Safety Act.
- Take proper care when using machinery.
- Use machinery of good quality and in good condition.
- Provide sufficient training to workers on using machinery.
- Proper maintenance of machinery.
- Raise awareness among workers on how electrical systems work, how to respond to a hazardous situation and the persons who should be informed during an emergency situation.
- Take measures to prevent workers from engaging in work when they are intoxicated.

Sexual abuse

Sexual abuse are widely reported in the society. People of all age groups ranging from small children to adults can be subjected to sexual abuse. Such acts may be committed by strangers or a close family member. Some examples of sexual abuse and other forms of abuse that a person may be subjected to are given below:

Sexual abuse

- undue touching of the body
- undue kissing and hugging
- rape of women
- child sexual harassment

Other forms of abuse

- employing children as servants
- depriving of opportunities for education of children
- causing shame
- intimidation
- physical harassment
- tempting persons to use obscene material

Ways to avoid sexual abuse

- Never let anybody touch your body.
- Be assertive .
- Express your dislike looking directly at the abuser's face bravely and decisively saying "No, I don't like it."
- Go to a safe place or a person who can save you as soon as possible.
- If not, shout for help immediately.
- If you are alone at home, do not let others know that you are alone.
- Try not to stay alone; if you are alone at home, do not invite any stranger into the house.
- Do not go to any place on invitation by somebody without the knowledge of your parents.
- Be careful when keeping company with people.
- Refuse any gifts, food or money offered by strangers. Be careful even when you are offered some gift by somebody who is closely related. Keep parents and teachers aware of such moves.
- Keep your parents / guardian / teachers informed of all your associations and of all forms of harassment caused to you.
- Discuss the unpleasant incidents in society with your friends, teachers and parents and identify ways of keeping safe from such incidents.
- Avoid going to desolate spots or unknown places alone and avoid going out alone at night.

Natural disasters

Natural hazards, which we have to face in day-to-day life, have presently drawn more attention of all parties. The effects of such hazards which result from sudden and longstanding changes in the environment have been aggravated due to human activities

- Storms
- Earthquakes
- Tsunami
- Floods
- Landslides
- Bushfires
- Lightning
- Droughts

The areas affected by such disasters, the time of the year in which disasters occur and the frequency of their occurrence vary. It is very difficult to prevent the occurrence of natural disasters. Therefore to mitigate the harmful effects of such disasters, it is very important to have adequate understanding on how they occur, the times and the areas in which they occur. In addition, it is also important to be mindful of the early warnings issued through media and other warning systems.

1. Precautions that can be adopted to mitigate the effects of cyclones

- Construct houses with strong roofs.
- Remove dangerous trees which are close to houses and buildings.
- Move to a safe place when a warning has been received.
- Cut branches of large trees which lean towards houses/buildings.
- Lie on the ground or move to a place under a concrete roof.
- Refrain from making contact with broken down electric cables.

2. Precautions that can be taken to mitigate the effects of floods

- Facilitating good drainage of rain water.
- Refrain from constructing buildings in low lying lands, river basins or in areas close to the beach.
- Take measures to minimize soil erosion.
- Identify high lands which can be used for shelter during floods.
- Be alert on the water level of the reservoirs and the condition of the river banks and dams of reservoirs.
- Be mindful of early warnings (e.g: the times of opening sluice gates).

3. Mitigating the effects of landslides

- When early signs of a landslide are noticed, immediately move away from that locality. Such early signs may include:
 - ➔ a new crack in the surface of the slope.
 - ➔ new cracks in buildings and widening of the existing cracks.
 - ➔ subsidence of the floor of a building.
 - ➔ tilting of a tree to a side.
 - ➔ sudden appearance of muddy water on mountain slopes.
 - ➔ unusual behaviour of animals.
- identifying and minimising the human activities which cause landslides. (e.g: improper cultivations, cutting down of trees, digging up of soil).
- reforestation
- constructing retention walls / gabion walls.
- constructing drainage systems.
- identifying landslide prone environmental conditions (e.g: cracks in walls of buildings)
- moving away from relevant areas after identifying early signs of landslides.
- constructing buildings that are suited to the conditions of the land.

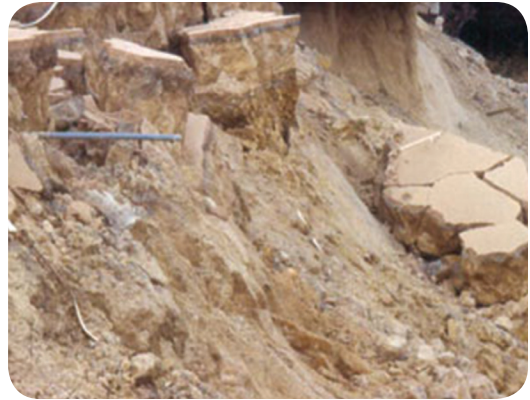


Figure 10.8

4. Mitigating the effects of earthquakes

- moving to an open area where there are no buildings
- refraining from using elevators / lifts
- disconnecting electricity and gas supplies
- if travelling in a vehicle, stopping the vehicle and getting out of it.

5. Mitigating effects of Tsunami

A tsunami is generated by the displacement of a large volume of water in the ocean due to an earthquake or some other seismic activity in the seabed. The water thus displaced travels in the form of waves into the shallow water near the coast. In the deep ocean, a tsunami has a small amplitude (about 1 m), but it grows in height as it reaches the coast (up to about 20 m).

- using early warning systems
- moving to safe, high land away from the sea coast.
- if a strong, tall building is available, climbing up to an upper floor.
- if in a low lying area, climbing up a tree.
- if travelling in a vehicle, getting out of it immediately and moving to a safe place.
- if on a boat in the sea, staying a few hours further in the sea without sailing towards the land.
- implementing tsunami disaster management programmes in advance.
- being sensitive to behaviours of animals.
- if an unusual rise or receding of sea is noticed, moving away from the coast into the inner land.



Figure 10.9

6. Mitigating effects of lightning

Lightning could occur in any part of Sri Lanka. Lightning becomes a common phenomenon specially during rainy seasons and inter-monsoonal rains in March, April, October and November.

Intense heat is created by lightning. Therefore, lightning can cause severe burn injuries. Lightning may even cause death due to such burn injuries and shock.

When there is lightning;

- Always stay inside a building. Do not stay in open areas like playgrounds, paddy fields and the beach.
- Do not stay close to electricity and telephone poles.
- Do not engage in activities like flying kites, catching fish with a fish rod, climbing trees or plucking fruits with a crook etc.
- Refrain from using metal tools like axes, knives and mamotees.
- Refrain from swimming and sailing.
- Do not use electric equipment and telephones (remove plugs).
- If the electric circuit breaker is switched off due to lightning, do not switch it on until the danger has passed.

Beside;

- Check functioning of the circuit breakers regularly.
- Install lightning conductors for tall buildings and towers.

Precautions that can be taken to mitigate the effects of natural disasters

- Always identify possible disasters well in advance.
- Always select safe places for living.
- Always keep additional dry rations, drinking water, medicine and first aid for use in an emergency.
- Be informed of the ways of obtaining services of public institutes like hospitals, divisional secretariats, depots of the Electricity Board, Disaster Management Centre, and Offices of the Department of Irrigation and Water Supply and Drainage Board.
- Be sensitive to the changes of the environment (be alert to the changes of the behaviour of animals and birds).
- Be organized as groups in order to respond to emergencies.



Figure 10.10

You will have to face various physical, psychological and social challenges when affected by natural disasters like those mentioned above. When people face natural disasters, they may suffer external injuries like bruises, cuts, piercing, tears and blisters as well as internal injuries in the nature of muscle tear, muscle strain, twists, sprains, dislocation of joints, bone cracks and fractures. Apart from that the victims may also faint and suffer burn injuries. In such situations, it is essential that the patients are given first aid.



Activity

Design a card with important telephone numbers to be displayed near the home telephone.

1	Police emergency service	119
2	Hospital	
3	Police	
4	Ambulance	
5	Disaster Management Unit	
6	Fire Brigade	
7	Emergency Breakdown Unit (Water /Electricity)	
8	Telephone numbers of a few neighbouring houses.	1.
		2.
		3.
		4.

First Aid

When a person is hurt in an accident or suddenly becomes ill, the primary medical treatment that is given to him /her as soon as possible according to accepted principles by people with proper training and understanding before that person is taken to hospital or a professional for treatment, is called first aid. Giving first aid helps preventing complications and even saving the life of the patient.

- Giving first aid without proper knowledge or training could aggravate the condition of the patient.

Importance of giving first aid

1. Possibility of saving the life of the patient.
2. Preventing deterioration of the condition of the patient.
3. Sometimes the patient can be cured completely through first aid.

Qualities that a first-aider should possess

- Proper knowledge, training and competence in giving first aid.
- Does not get easily ruffled.
- Patience.
- Has the skill of acting as the leader or a member of a group.
- Has presence of mind.
- Assertiveness.
- Vigilance.
- Works with perseverance.
- Is empathetic.
- Does not feel loathing.
- Does not feel ashamed.
- Clarity of speech.
- Is concerned about self-protection.
- Treats everybody alike.

Whenever first aid has to be given, the first-aider should always wash his / her hands before and after.

First aid kit

It is very important you have a first aid kit in the classroom, sports room, work place and home. A first aid kit can either be a box or a bag which is labelled so that it can be identified easily from a distance and it should be easy to open.

A first aid kit contains:

- sterile gauze
- ordinary gauze
- bandage
- crepe bandage
- plaster
- soap
- disinfectants (properly diluted Dettol, Savlon, 70% alcohol)
- gloves
- a pair of scissors
- a candle and a box of matches
- a pen
- sheets of paper
- a few packets of Jeevani
- paracetamol tablets



Figure 10.11



Figure 10.12

Giving first aid

A first-aider should first find out the nature of the accident that the patient has faced and identify the patient's condition. The first-aider should then identify the types of injuries that have happened to the patient. The following method of basic life support (A,B,C,D,E) can be adopted for that.

Basic Life support (BLS)

A-Airway

The first- aider should first check whether the patient's airway has been affected. If something is stuck or if the tongue is blocking the airway, the obstacle should be removed first to facilitate breathing. The patient's posture can be changed for this. If the neck seems to be injured, a hard collar should be put on around the neck. This may help prevent the possibility of an injury to the spinal cord.

B-Breathing

The first-aider should check whether the patient's involuntary breathing takes place as normal. If not, action should be taken to give artificial respiration.

C-Circulation

By feeling the patient's pulse at the wrist area or at the foot, the first-aider should check whether the patient's blood circulation is taking place properly.

D-Deformity

The first-aider should check whether the patient's limbs cannot be moved properly due to some injury to nerves or bones. If any such damage is noticed, particular attention should be paid to it and the affected area should be supported with splints so that the damaged parts are immobilized. A piece of cardboard or strips of wood can be used for this purpose. If there has been any damage to the spinal cord, use either a spinal board or a long wooden plank to support the back.

E-Exposure / Environment

The whole body of the patient should be checked. This may require full exposure of the patient's body.

If the environmental conditions are unfavourable for the patient, he / she should be taken to a safe place. In the case of any injury to the spinal cord he / she should be moved in the manner that a log is rolled. A safer method is for four people to lift the patient with in one command.

In server condition

1. Make sure the victim, any bystanders at the scene and you are safe.
2. Check the victim for a response.

If he responds:

- Leave him in the position in which you find him provided there is no further danger.
- Try to find out what is wrong with him and get help if needed.
- Reassess him regularly.

If he does not respond:

- Shout for help.



Figure 10.13

Make the victim lie flat on his back and then open the airway using head tilt and chin lift:

- Place your hand on his forehead and gently tilt his head back.
- With your fingertips under the point of the victim's chin, lift the chin to open the airway.



Figure 10.14

4. Keeping the airway open, look, listen, and feel for normal breathing.

- Look for chest movement.
- Listen close to the victim's mouth for breath sounds.
- Feel for air on your cheek.



Figure 10.15



Figure 10.16

5. If he is breathing normally:
 - Turn him into the recovery position (step 1,2,3) and get help from the ambulance service.
 - Continue to assess that breathing remains normal.

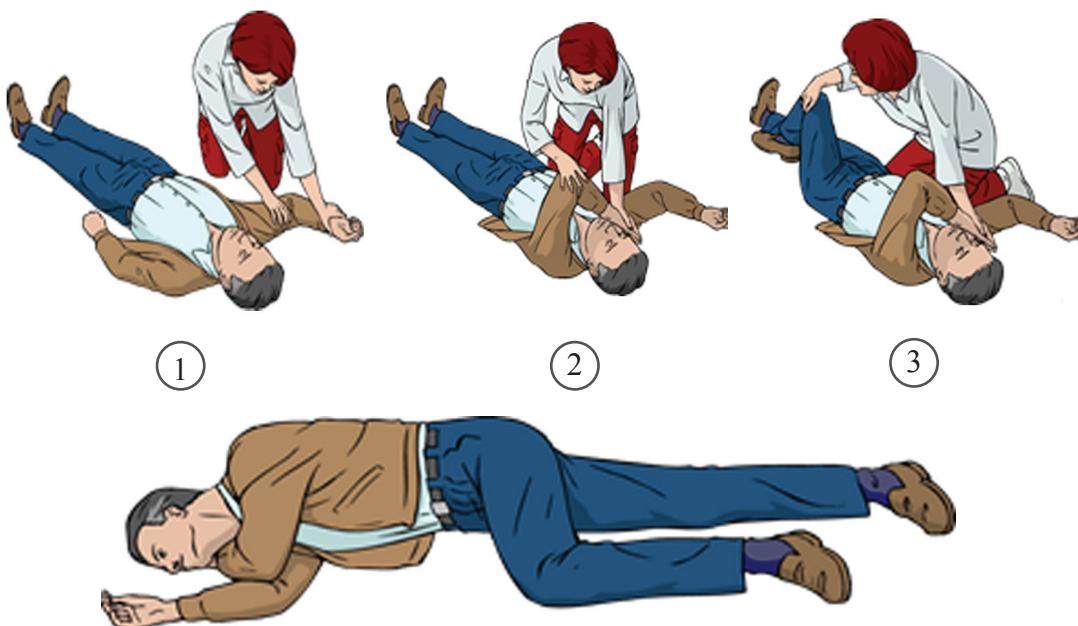


Figure 10.17 - recovery position

6. If he is not breathing normally
Start chest compression as follows:
 - Place the heel of one hand at the centre of the chest
 - Place other hand on top of it
 - Interlock fingers
 - Compress the chest
 - Rate about 100 per minute
 - Depth 5-6 cm
 - Equal compression and relaxation
 - When possible change CPR (Cardiopulmonary resuscitation) operator every 2 minute

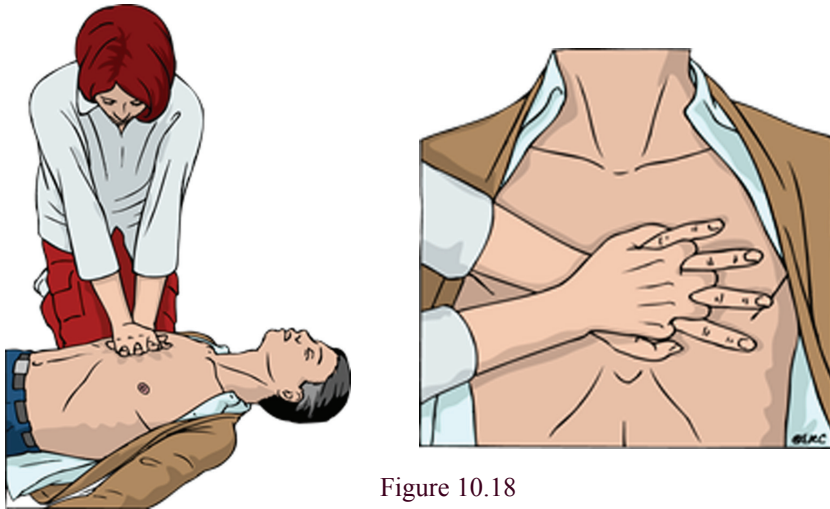


Figure 10.18

7. Combine chest compression with rescue breaths:
 - After 30 compressions.

Pinch the nose, Take a normal breath, Place lips over mouth, blow until the chest rises, take about one second, and allow chest to fall.



Figure 10.19

8. Continue with chest compressions and rescue breaths in a ratio of 30:2.
9. Stop to recheck the victim, only if he starts to show signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving purposefully and starts to breathe normally; otherwise do not interrupt resuscitation.

What we have described up to here is the ABC in Basic Life Support

Giving first aid depends on patient's condition. Here are some such important situations.

1. When a person has fainted

Lay the person flat on his or her back (on the floor or on some suitable place). Elevate the person's legs to restore blood flow to the brain. Loosen the clothes. Provide adequate ventilation. Check whether the patient has any injury.

2. When a person has high fever

If the patient is wearing warm clothing, remove them and put on light clothing. Take the patient to a place with good ventilation. Sponge the armpit and groin areas with lukewarm water. Cold water or hot water should not be used for sponging. The patient should drink plenty of fluids to stay hydrated.

3. When a person is bleeding

Put a piece of clean cloth on the wound and apply pressure on it or bandage up the area in order to stop bleeding. The injured parts should be kept in an elevated position (higher than the level of the heart). Keep the injured parts immobilized and take the patient to hospital for medical treatment.



Figure 10.20

4. When a person gets a fit

The greatest danger that a person who has gone into convulsion is faced is of losing life due to falling, drowning or blocking of airway. When treating a patient with a convulsive (fit), he / she should be made to lie on the left side of his / her body (recovery position) so that the airway does not get blocked with phlegm and vomit. Do not insert anything into the patient's mouth. Keep any object that could cause danger away from the patient.

5. When a person suffers a concussion

Follow the A,B,C,D,E method described above and take the patient immediately for medical treatment keeping him/her in a posture that is not risky. If the patient is unconscious, he/she should not be given anything to eat or drink.

6. When a person fractures a bone

If a fracture has occurred or is suspected, support that part to keep it immobilized to

reduce the pain (e.g: with splints, sling, collar, etc.).

7. When a person dislocates a joint

A person without proper training should never try to correct a dislocated joint. A dislocation occurring for the first time should never be corrected except by a trained professional. Keep the affected area immobilized using splints or a sling, and seek immediate medical treatment as dislocations are very painful.



Figure 10.21

8. When a person chokes on some object

A person may choke on small objects like parts of a toy or pieces of food. This can obstruct the patient's breathing and may even cause death. Immediate action should be taken to remove the object that is blocking the airway. The method of doing this varies depending on the age of the patient.

In the case of a small child, make the child face downward by keeping the upper part of the stomach on the bent knees and give a few blows on the back with the hand.



Figure 10.22

In the case of an adult, stand behind the person, put your arms around the waist and tip the person slightly forward. Press hard into the abdomen with a quick, upward thrust as if trying to lift the person up. Repeat thrusts until the block is dislodged. This method is called the Heimlich manoeuvre.



Figure 10.23 - Heimlich manoeuvre

9. When a person has got an object stuck in the nose

Tickle the nose (e.g. with a coconut fibre) and make the patient sneeze. The object is most likely to come out. If you fail to get it out do not try to take it out using any equipment. Take the patient immediately to a hospital.

10. Snake bites / animal bites

An animal bite or a snake bite may cause pain, infection, shock or even death.

- Take measures to allay the patient's fear.
- Keep the affected area immobilized. (Do not let the patient walk.)
- Wash the area with soap and flowing water.
- Give paracetamol tablets to ease pain. Refrain from giving any other medicine.
- Refrain from giving food items like fruit juice, king coconut or young coconut water which contains high potassium.
- Take the patient immediately to a hospital.

What should not be done when giving first aid for animal / snake bites:

- Using the mouth to suck out the venom.
- Applying tourniquets.



11. Losing consciousness due to electrocution

A person may get electrocuted if struck by lightning, touching an exposed electric cable or making contact with damaged electric wires in houses or by some other means. It could result in losing consciousness.

- Before giving first aid check if the person has contact with the electricity supply.
- Disconnect the electricity supply by removing the plug or by turning off the main switch.
- If the electricity supply cannot be disconnected, remove the affected person using a dry object (e.g: a dry stick, a dry broom shank etc.).
- Allay the fear of the patient.
- If there are burn injuries, treat them.
- The hands and the legs of the first aider should not be wet.



Figure 10.24

As a result of severe burn injuries, rapid loss of body fluids, infection and shock can occur. This may even lead to death.

- Immediately take the victim away from the danger.
- Take immediate measures to cool down the burnt area. Keep the burnt area in water or hold area under flowing water or pour water onto the burnt area. Do this for about 10 minutes or until the pain stops.
- Remove any tight clothing or other objects like a wrist watch before the burnt areas start to swell.
- Carefully cut the clothes that have been soaked in boiling liquids or chemicals.
- Cover the burnt areas with clean cloth.
- Lay the patient on a stretcher.
- Take the patient immediately to hospital.

What should not be done when attending to burn injuries

- Do not remove any material that has been stuck on the burnt areas.
- Do not apply oil or fats on the burnt parts.
- Do not use any sticky substance (plaster) to hold the dressing.
- Do not put cotton wool on the wounds.
- If blisters have been formed, do not break them.



13. Poisoning

Certain poisons enter the body very fast while others do so very slowly.

In the case of some poisons like acids or bases, which could cause burns, entering the body:

- Give some sips of hot water.
- Take the patient immediately to hospital.

If a highly volatile substance like acids, detergents, kerosene or petrol has entered the body, do not make the patient vomit. It may cause the mouth, larynx and the stomach to burn.

When some poison that does not cause any burn (e.g: poisonous seeds, roots, mushrooms etc.) has entered the body:

- Make the patient vomit.
- After the patient has vomited, give more liquids to drink.
- Take the patient to hospital.

When poisoning is suspected

- Remove any clothing which has come in to contact with the poison. If any poison has come into contact with the body, wash the affected parts well with soap.
- Make the patient feel comfortable; allay any fear.
- If the patient is unconscious or confused, turn the patient so that he/she lies on the left side of his/her body and keep him/her in a position so that the head lies at a slightly lower level. Do not give anything to drink.
- Take the patient immediately to hospital.
- If possible take the poisonous substance to the hospital for the doctor to see.



Activity

1. Make separate cards stating each type of injury that a person may suffer due to an accident and the first aid given in each situation. Distribute the cards among the pupils in the class. Ask one pupil to stand up and read the type of injury or the first aid that has been written on his/her card. Ask the pupil who has got the card stating the relevant first aid / injury to stand up and read it.
2. Ask the pupils to demonstrate first aid being given to a person with a particular injury.

Transporting a patient

Transporting a patient who suffers injuries as aforesaid should be done very carefully. Lifting the patient or carrying the patient to some other place should be done in a way that the patient does not feel pain or the condition of the patient does not aggravate.

- **When lifting or carrying a person who has had an accident, there is possibility of the spinal cord getting damaged. To prevent this when the patient is being taken to hospital, make him/her lie on a flat surface (e.g: a plank of wood) so that the back and the neck of the patient is not bent.**

The following are some of the ways which can be adopted in transporting patients. These methods can be adopted when carrying a person who suffers injury to a safer place (e.g: out of a fire, out of a pool of water). However, these methods should not be followed when the vertebral column or the neck of the patient has been damaged.

How a patient should be carried if you are alone

1. Bend down and hold the patient by the shoulders with both your hands.

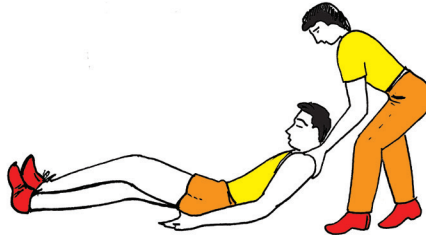


Figure 10.25

2. Raise him/her up with a single, gentle lift and put him in a sitting position.



Figure 10.26

3. When the patient is in this posture, support him with your knees.



Figure 10.27

4. Put your arm under his armpit and hold him by the upper arms with both your hands. Now lift him and bring him to a safe place.



Figure 10.28

How to support a patient who is able to walk or limp

1. Stand by the side of the patient's wound.
2. Put the patient's arm over your shoulders and hold the patient's wrist with your hand.
3. Put your other arm across the patient's back and under his/her free arm.
4. Hold the patient's upper arm and support him to walk.

How to carry a patient who is conscious with the support of another

1. Hold each other's arms as shown in the picture and form a chair for the patient to sit. The chair is formed with three hands and the free hand is used as a support to the patient's back.

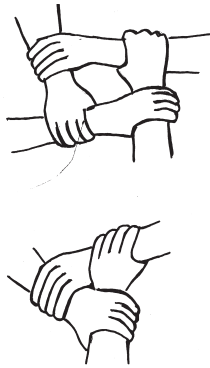


Figure 10.29

2. Make the patient sit on your arms holding onto your shoulders with both hands.



Figure 10.30

How to carry an injured person seated on a chair

This method can be used to lift or carry an injured person who is in critical condition (e.g. when carrying up or down a narrow corridor).

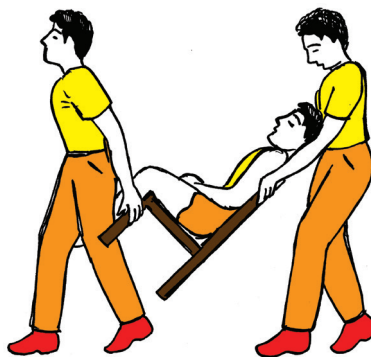


Figure 10.31

If the first aider is unable to support the injured person single-handedly, tie the person's chest area onto the back of the chair with a towel or a blanket. Tie the person's legs with another onto the front legs of the chair.

How to use a blanket as a stretcher

There should be 4 to 6 supporters in order to use a blanket as a stretcher.

1. Lay the patient on the blanket

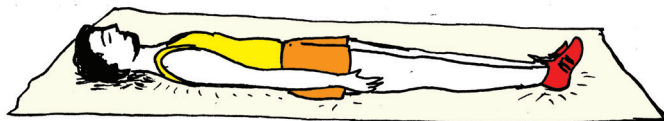


Figure 10.32

2. Roll the edges of the blanket.

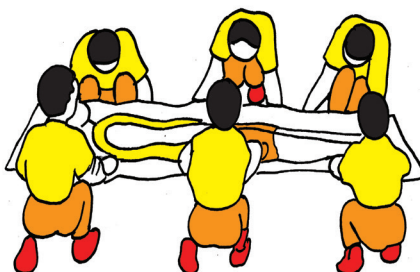


Figure 1.33

3. Kneel down face to face with the person in the opposite side and hold the rolled edge of the blanket firmly. Every person should stand up lifting the patient at a single command.

How to carry a patient with three people

1. Every person should follow the same command. Use clear commands for every move.
2. Decide on the place the patient is going to be carried to.
3. All three people should kneel on one knee in identical manner on one side of the patient as shown in figure 10.34.



Figure 10.34

4. Put the hands under and across the patient's body. The patient's neck should be supported with one hand. Gently and slowly lift the patient onto your knees at a single command. Now turn the patient towards your body.



Figure 10.35

5. Now all three persons should stand up at the same time lifting the patient. Carry the patient to the relevant place and put the patient down in the same manner.

Summary

It is very important for us to gain knowledge about the challenges we face like accidents, abuse and natural disasters which happen in day-to-day life.

An accident may happen at home, playground, garden, road or workplace. Accidents also happen due to various causes like animal attacks, use of agrochemicals and certain working environments. Internal or external injuries may result from accidents.

After an accident the injured should be given first aid before taking them to hospital. Giving first aid helps prevent complications and may save the patient from death. However, the first-aider should possess a sound knowledge and proper training on giving first aid. Knowing how to give BLS, can help save a life. Further, transporting persons who have suffered injuries should be done very carefully.



Exercises;

1. List the types of natural disasters that you may have to face in life.
2. Describe how you would respond to a flood in your area.
3. Describe how you would attend to a person who is electrocuted.
4. Name three sports related external injuries.
5. Name five sports related internal injuries.
6. List five reasons for sports related injuries.