DEPARTMENT OF EDUCATION

GRADE 9

PERSONAL DEVELOPMENT

UNIT 2

FITNESS AND ME

FLEXIBLE OPEN DISTANCE EDUCATION
PRIVATE MAIL BAG, WAIGANI, NCD
FOR DEPARTMENT OF EDUCATION
PAPUA NEW GUINEA

PERSONAL DEVELOPMENT

GRADE 9

UNIT 2

FITNESS AND ME

TOPIC 1	**ANATOMY AND PHYSIOLOGY IN RELATION TO FITNESS**
TOPIC 2	**FITNESS**
TOPIC 3	**PREVENTION OF AND CARE FOR SPORTING INJURIES**
TOPIC 4	**FRAMEWORK FOR SPORTS AND FITNESS**

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DIANA TEIT AKIS

PRINCIPAL

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SECRETARY'S MESSAGE

Achieving a better future by individual students and their families, communities or the nation as a whole, depends on the kind of curriculum and the way it is delivered.

This course is a part of the new Flexible, Open and Distance Education curriculum. The learning outcomes are student-centred and allows for them to be demonstrated and assessed.

It maintains the rationale, goals, aims and principles of the national curriculum and identifies the knowledge, skills, attitudes and values that students should achieve.

This is a provision by Flexible, Open and Distance Education as an alternative pathway of formal education.

The course promotes Papua New Guinea values and beliefs which are found in our Constitution, Government Policies and Reports. It is developed in line with the National Education Plan (2005 - 2014) and addresses an increase in the number of school leavers affected by the lack of access into secondary and higher educational institutions.

Flexible, Open and Distance Education curriculum is guided by the Department of Education's Mission which is fivefold:

- To facilitate and promote the integral development of every individual
- To develop and encourage an education system satisfies the requirements of Papua New Guinea and its people
- To establish, preserve and improve standards of education throughout Papua New Guinea
- To make the benefits of such education available as widely as possible to all of the people
- To make the education accessible to the poor and physically, mentally and socially handicapped as well as to those who are educationally disadvantaged.

The college is enhanced to provide alternative and comparable pathways for students and adults to complete their education through a one system, many pathways and same outcomes.

It is our vision that Papua New Guineans' harness all appropriate and affordable technologies to pursue this program.

I commend all those teachers, curriculum writers, university lecturers and many others who have contributed in developing this course.

UKE KOMBRA, PhD

Secretary for Education

UNIT 2 INTRODUCTIONS

Dear Student,

Welcome to Unit 2 of the Grade 9 Personal Development Course. This Unit is called **Fitness and Me.** You will study it, using the steps suggested in the **Study Guide** on the next page.

This Unit is based on the National Department of Education approved Syllabus for conventional high school Personal Development. So you will study at home what High school students study in school.

The four Topics you will study are:

1. **Anatomy and Physiology in relation to Fitness.**
2. **Fitness**
3. **Prevention and Care of sports injuries.**
4. **Framework for Sports and Fitness.**

Topic 1 – **Anatomy and Physiology in Relation to Fitness** – You will learn about The Human Body and Functions, Skeletal System, Muscular System.

Topic 2 – **Fitness** – You will learn about Self Body Care, Fitness Components, Periodization for Training and Fitness Programme.

Topic 3 – **Prevention and Care of Sports Injuries** – You will learn about Sports Injuries, Causes of Sports Injuries, Prevention of Sports Injuries and Treatment of Sports Injuries.

Topic 4 – **Framework for Sports and Fitness** – You will learn about Sports Structure, Teamwork and Fair Play and Skill Development and Application.

Each Topic has **Lessons** with **Practice Exercises** and **Answers**. You must read each lesson and work through the Practice Exercises. You will have to correct your own answers. The answers to the Practice Exercises are given at the end of each Topic. When you complete a Topic, you will then complete the **Topic Test** in the **Assignment Booklet**. You will repeat the same process until you complete the Unit.

We hope you will enjoy studying this Unit for your Personal Development.

STUDY GUIDE

Follow the steps given below and work through the lessons.

Step 1 Start with Topic1, Lesson 1 and work through it in order.

Step 2 When you complete Lesson 1, you must do Practice Exercise 1.

Step 3 After you have completed the exercise, you must correct your work. The answers are given at the end of each Topic.

Step 4 Then, revise well and correct your mistakes, if any.

Step 5 When you have completed all these steps, tick the check-box for Lesson 1, on the content page, like this:

☑ Lesson 1: Human body and Functions.

Then go on to the next lesson. You are to repeat the same procedure until you complete all the lessons in a Topic.

As you complete each lesson, tick the box for that lesson on the content page, like this √ This will help you check your progress.

Assignment: Topic Test and Unit Test

When you have completed all the lessons in a Topic, do the Topic Test for that Topic, in your Assignment Booklet. The Unit book tells you when to do this.

Marking:

The Topic Tests in each **Assignment** will be marked by your **Distance Teacher**. The marks you score in each Assignment will count towards the final result. If you score less than 50%, you will have to repeat that Assignment.

Remember, if you score less than 50% in three (3) Assignments, your enrolment will be cancelled. So, you are encouraged to do your work carefully and make sure that you pass all Assignments.

ALL THE BEST IN YOUR STUDIES!

TOPIC 1

Anatomy and Physiology in Relation to Fitness.

In This Topic You Will Learn About:

- Human Body and Functions.
- Skeletal System.
- Muscular System.
- Cardiovascular System.
- Respiratory System.
- Digestive System.

TOPIC 1: Anatomy and Physiology in Relation to Fitness.

Welcome to Topic 1 on Exploration of Self. In this topic you will learn about Self-Concept, Types of Self- Concept, Unique Characteristics and Future Plans.

There are four lessons:

Lesson 1: Self-Concept

In this lesson you will define self-concept and identify the qualities and abilities of an individual.

Lesson 2: Types of Self-Concept

In this lesson you will identify types of self-concepts and describe the different components that make up your self-concept.

Lesson 3: Unique Characteristics

In this lesson you will look at features that make you unique, focus our attention on the different factors that shape you and identify characteristics that influence your behaviour.

In doing so, you will find out more about yourself and others. You will explore and learn about your personal profile, image and how you feel, how to increase your self –esteem, the roles, behaviours and the types of relationships you are involved in.

In doing so, you will find out more about the human body system. You will explore and learn about your skeletal, muscular, cardiovascular, respiratory and the digestive system. You will also find out more about each body system functions.

We hope you will enjoy this Topic.

Lesson 1: The Human Body and its Systems

Welcome to lesson 1 of unit 2. In this lesson you will learn about the human body and its systems.

Your Aims:

- define body systems
- identify the systems of the body and their functions

What is a system?

A system is a collection of organised things working together as a part of a mechanism or an interconnecting network; a complex whole of something. It is a set of interacting or interdependent components forming a complex whole. A system is made of different elements that need to work together for a complete whole to function effectively.

The Body Systems

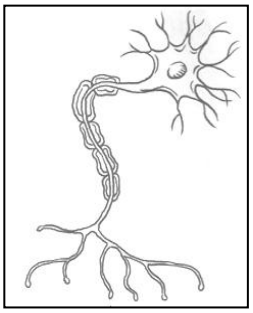
Many organs and body tissues work together in teams. These are called body systems. The body system is a group of body organs or structures that together, they perform one or more vital functions. A system of human body means a collective functional unit made up of several organs or parts or cells that work in complete coordination with one another, even though each system has its own unique function. In total, there are 11 body systems in human beings.

The human body is an incredible machine. It moves, eats, grows, feels and repairs itself. Our body does most of these things all day, every day without us having to think about it. Our body is unique to us but all human beings have the same body system. For example we all:

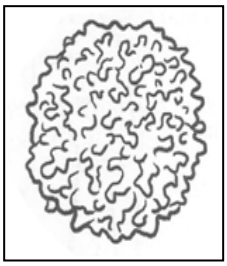
- a digestive system - for food intake
- a muscular system – have muscles
- respiratory system – breath, etc.

Some systems are smaller than others while some are more complex than others. Whatever the size or complexity, each system has its own function but has to interact or depend on other systems in the body to effectively play their part.

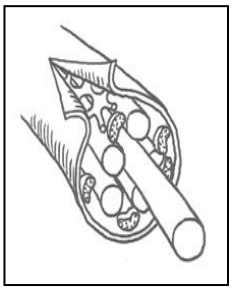
Every human being, including you, is made up of millions and millions of tiny cells, the basic units of a person's body. You cannot see body cells with your naked eyes but through a microscope. There are many different types of cells and each type has a specific job to do in your body. Below are some of the body cells and their functions.



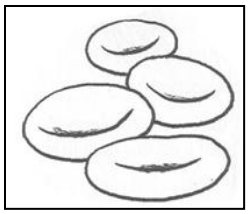
Nerve cells help you feel



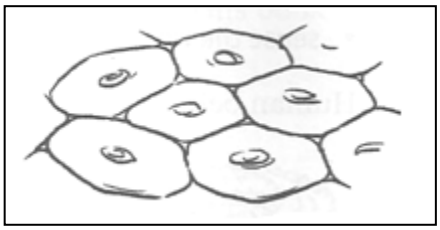
White blood cells kill germs



Muscle cells help you move



Red blood cells carry oxygen



Skin cells protect you from germs

Illustrations of different cells and their functions

- **Different types of cells and their functions**

Some of the cells in our body are organized into teams which work together. These are called body tissues. Our muscles are made up of millions of muscle cells working together. Cells are always being made and destroyed. Some cells, like bone cells, can stay alive for many years, but some last only for a few days. Our skin cells, for example, are always being replaced. Most of the dust on our pillow and sheets is dead skin cells.

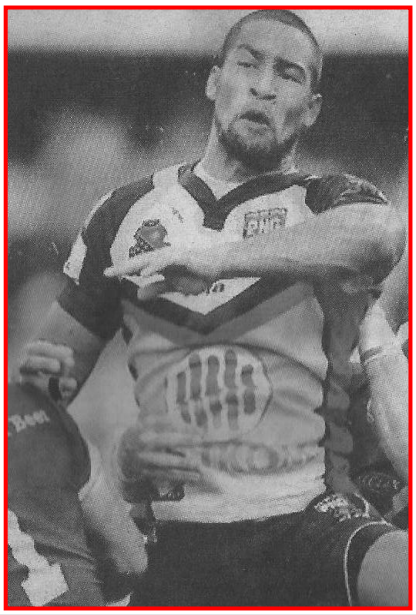
Our heart, liver, eyes and brain are examples of body organs. They are made up of a collection of cells and body tissues that work together to perform a particular function.

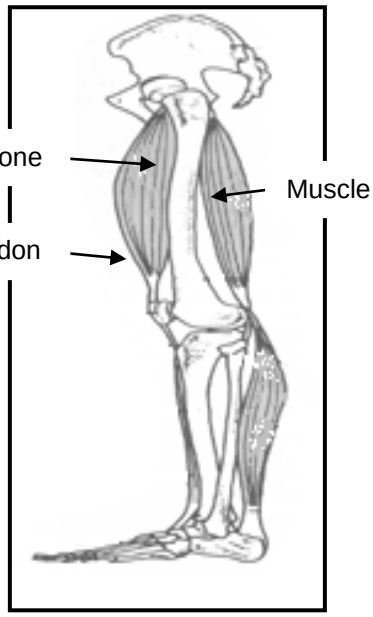
Body organs have special jobs to do in our body. Our heart is a pump which sends blood around our tissues. Our liver cleans up waste. Our lungs take up oxygen from the air to keep us alive.

Cells form tissues, tissues form organs, and various organs work together as a body system. An organ is a part of a system, made up of cells and tissues which allow it to perform particular functions. Each system has specific functions.

The ***skeletal system*** (bones) forms a framework for the body, and protects internal organs. The thigh bone helps to support our body up right. The rib cage protects our lungs and digestive organs.

The ***muscular system*** consists of voluntary muscles which are attached to the bones by tendons, and contract to allow movement. Without our muscles we would not be able to move. When you are running during a sport, your muscles expand and contract at every movement. The expansion and contraction of the muscles attached to the bone by a tendon enables the bones to be pulled and pushed to allow movement.



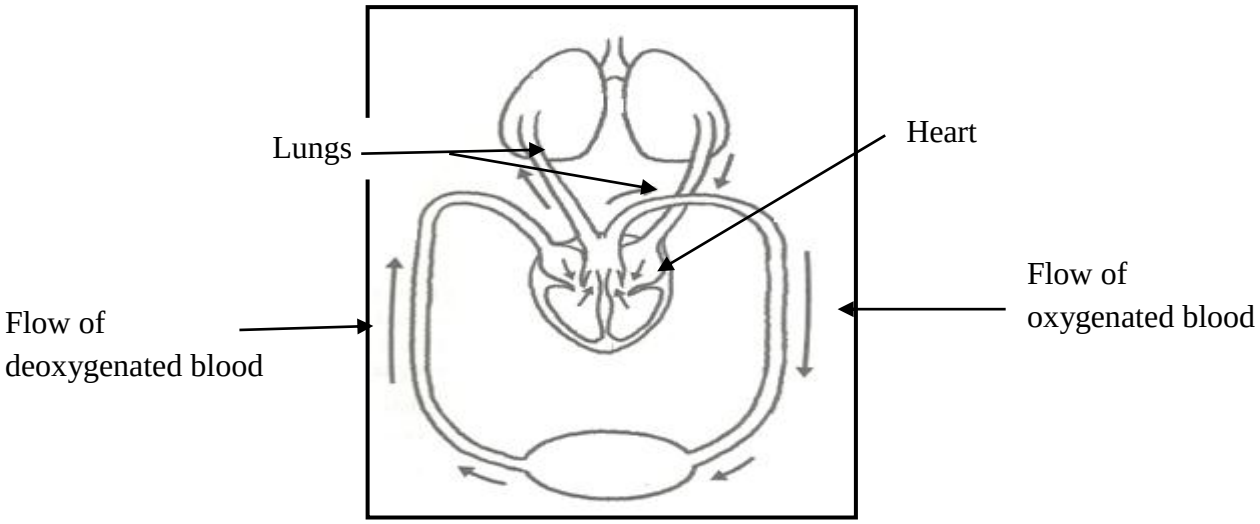


Movement and the difference between bones, tendons and muscles

- **The movement and the difference between bones, tendons and muscles**

The ***cardiovascular system***, through the actions of the heart, pumps blood around the body.

The ***respiratory system*** allows oxygen into the body and carbon dioxide out of our body. The respiratory system helps to change the deoxygenated (without oxygen) blood from the heart and change it to oxygenated (with oxygen) blood that is later moved to the heart and pumped to the rest of the body. When one is playing sport, the heart pumps blood at a faster rate. This is because the body is using up the oxygenated blood at a faster rate.



Blood flow in the cardiovascular system

Distribution

To balance out the amount of oxygen in the body, the heart pumps at twice the normal rate to exchange more deoxygenated blood to oxygenated blood from the lungs.

The ***digestive system*** allows digestion and absorption of food and excretion of waste products. The contraction of the stomach muscles makes the food inside the stomach to be broken into smaller sizes to makes digestion faster. The large intestine absorbs mostly water needed by the body from the digested food.

The digested food helps the body cells for growth of tissues and organs of the body. Proper nutrition in the diet will make you grow well and have enough energy to perform in a sport.

Even though there are 11 body systems in the human body, the body systems mentioned above, will be elaborated on in the following lessons of this topic.

Activity 1.1 Short Answer Questions

1. What is a cell?

_____
_____
_____

2. What are tissues in the body?

_____
_____
_____

3. What is an organ?

_____
_____
_____

4. What is a body system?

_____
_____
_____

5. Name two organs present in the digestive system.

a)._____ **b).** _____

NOW DO PRACTICE EXERCISE 1 ON THE NEXT PAGE

Practice Exercise 1

The Practice Exercise consists of 5 short answer questions.

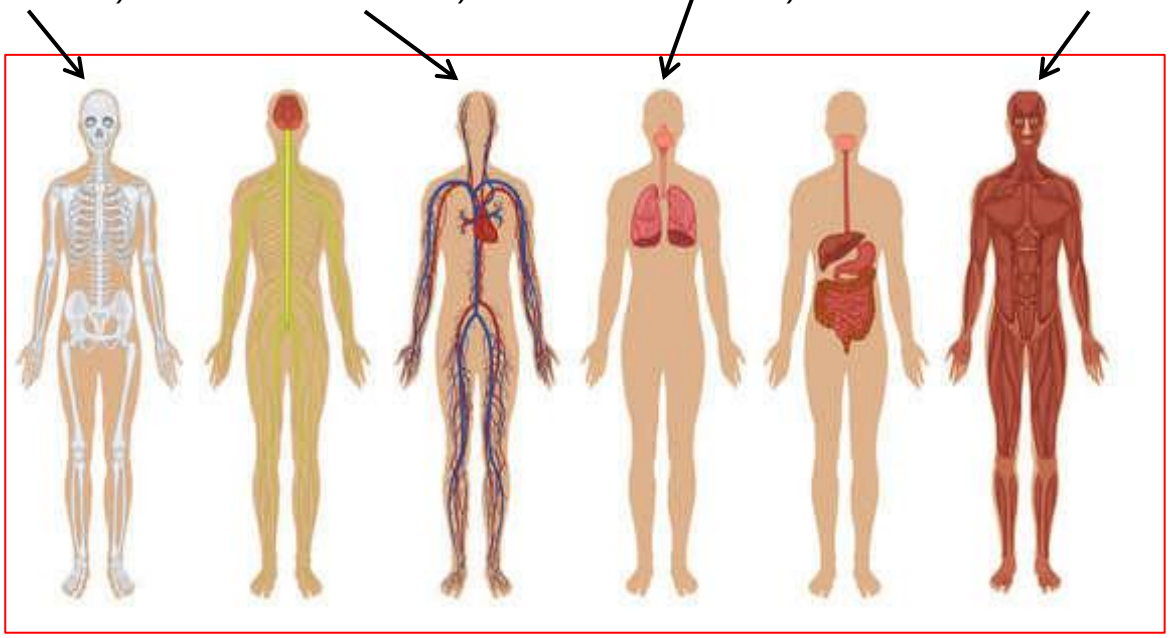
1. By ruling a clean arrow, match the organ that is associated with the body system.

Body System	Organ
a) Muscular b)Respiratory c) Cardiovascular d) Skeletal	i) Heart ii) Large intestine iii) Skull iv) Biceps v) Lung

2. Use the following terms to identify the type of body system from the diagram below. Write the name of the system on the lines provided beneath the diagram

Muscular, Digestive, Respiratory, Cardiovascular, Skeletal, Nervous

a) b) c) d)



a) _____ b) _____

c) _____ d) _____

3. Match the word and definition by writing the Letter (A-D) of the word beside the correct definition.

Word		**Definition**
a. Organ	_____	Basic units of a person's body
b. Tissue	_____	Collection of cells which are joined together to perform a specific function in the body
c. Body System	_____	Part of a system, made up of cells and tissues which allow it to perform particular functions
d. Cell	_____	Group of organs that work together to perform specific functions

4. What is the difference between tissues and organs?

_____
_____
_____
_____

5. Write three functions of the skeletal system?

a. _____

b. _____

c. _____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 1.

Answers to Lesson Activities

Activity 1.1
1. What is a cell?
The basic units of a person's body

2. What are Tissues in the body?
A tissue is the collection of cells which are joined together to perform a specific function in the body

3. What is an Organ?
An organ is a part of a system, made up of cells and tissues which allow it to perform particular functions

4. What is a body system?
The group of organs that work together to perform specific functions
5. Name two organs present in the digestive system?
Any of the following is correct: Mouth, Teeth, Oesophagus (Food pipe), Stomach, Large intestine, Small intestine, Rectum, and Anus

Reference

Body Systems in Papua New Guinea, R. Jones, J. Miller

Know your Body and Stay Healthy, S. Datta

Lesson 2: The Skeletal System

Welcome to lesson 2 of unit 2. In the last lesson you learnt about the human body and its systems. In this lesson you will learn about the skeletal system.

Your Aims:

- define the skeletal system
- identify the parts of the skeletal system
- identify the main function of the skeletal system

The Skeletal System

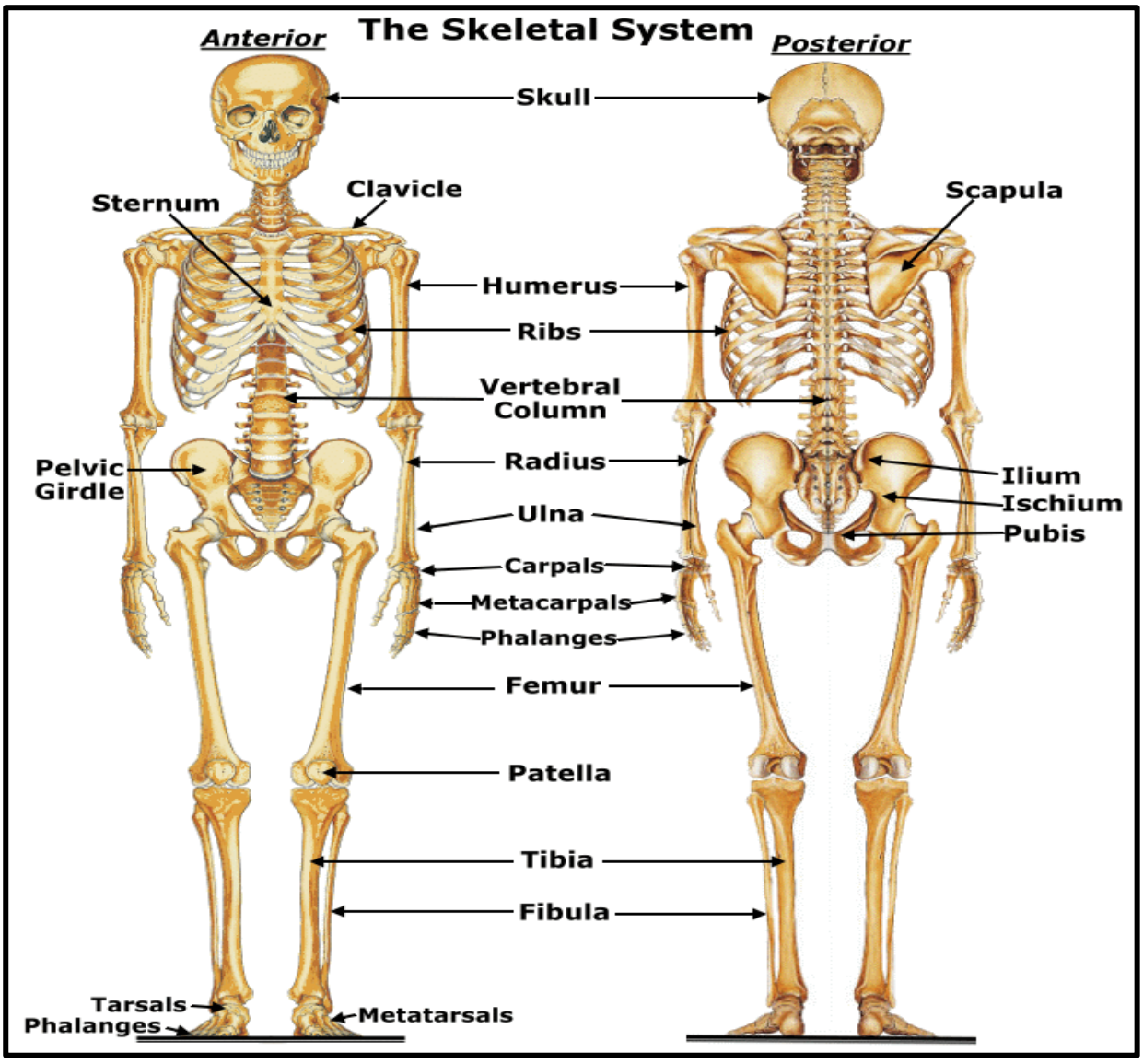
The **skeletal system** is the structure of bones that supports the body of a person or animal. It is the framework of the body, consisting of bones and other connective tissues, which protects and supports the body tissues and internal organs. The adult human skeleton consists of 206 bones as well as tendons, ligaments and cartilage that connect them.

Parts of the Skeletal System

The skeletal system is made of up of two distinctive parts: the axial skeleton and the appendicular skeleton.

- **Axial skeleton**
  The axial skeleton, with a total of 80 bones consists of the vertebral column, the rib cage and the skull. The axial skeleton transmits the weight from the head, the trunk and the upper extremities down to the lower extremities at the hip joints, which help humans, maintain our upright posture.

- **Appendicular skeleton**
  The appendicular skeleton has 126 bones, and is formed by the pectoral girdles, the upper limbs, the pelvic girdle and the lower limbs.



The front and back view of the skeletal system

Functions of the Skeletal System

The skeleton performs four main functions. The skeletal system:

- gives rigidity and shape to the body
- gives protection to delicate body organs by forming rigid, protective walls and cavities. For example the rib cage protects the heart and lungs.
- provides attachments for muscles, so that movement can be produced by your muscles at the joints
- manufactures blood cells and store minerals that are needed for other body systems

- **Rigidity and shape**

The skeletal system forms a framework for the body. The bone is made up of a strong material that is not able to break easily. The strong materials make the bones tough and therefore enable the body to withstand any force or pressure that is encountered. The skeleton also gives the perfect shape of the body that everyone enjoys.

- **Protection**

Some bones protect the soft organs and body tissues. There are over twenty bones in the skull and face. These bones protect the brain, mouth and eyes. The ribcage bones protect the heart and lungs. Without the protection and support from these bones there would be injuries occurring easily.

- **Movement**

Some bones help you to move. These bones have muscles attached. Bones and muscles work together to allow you to move. Muscles are connected to bones with strong living ropes called tendons. When two bones come together it is called a joint. The joints allow the body to be flexible making movement to occur efficiently.

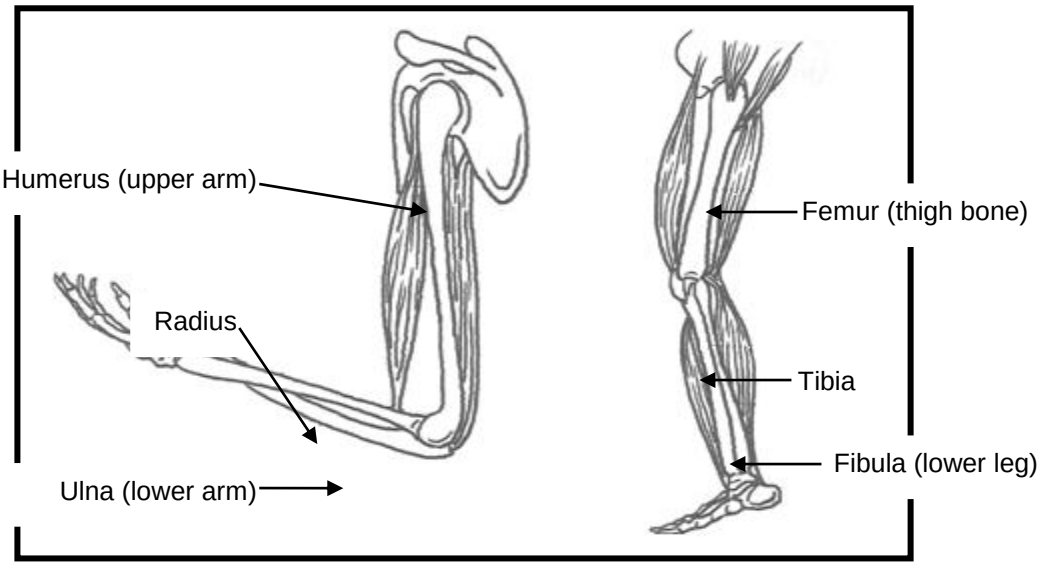


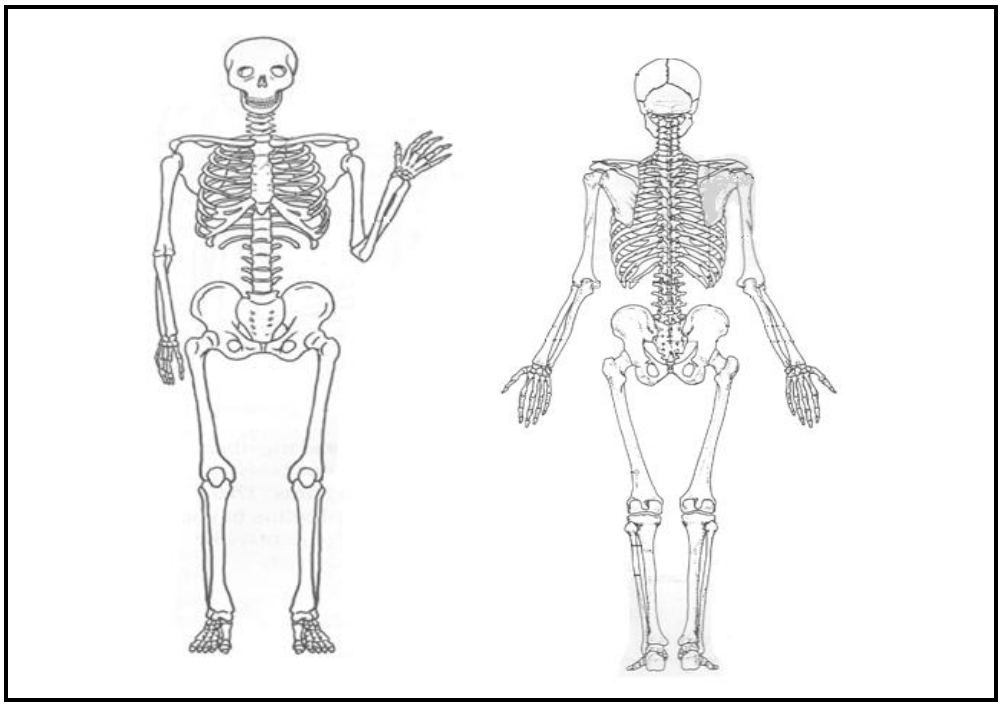
Illustration of movement in the arm and leg

- **Produce blood cells**

White blood cells which are made in the bone marrow and are sometimes referred to as the soldiers in the blood. They protect the body against invasion from bacteria, viruses, parasites or any other foreign bodies. They circulate in the blood to reach the place where there is any injury or invasion by an organism.

Bones

The main structure of the body is made up of a bony skeleton consisting of 206 bones. Bones are made up of connective tissues and provide a firm structure onto which the muscles are attached. Some bones are bound together by ligaments and cartilages. This is present at the knee joint.



The front and back view of the skeletal system of the human body

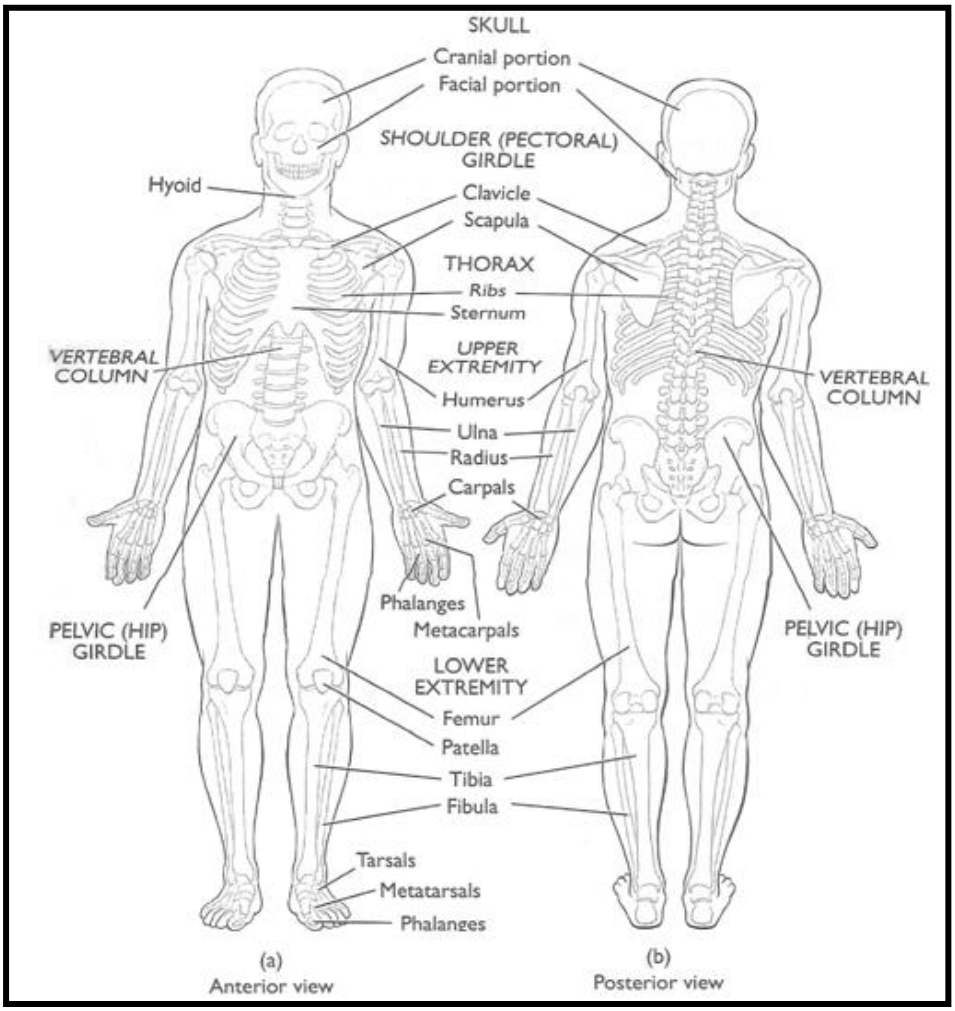
Bones are made of cells which have large stores of mineral called calcium. This is similar to the mineral found in sea shells. You cannot see your own bones, if you look at a bone from a pig or a chicken you can see the honeycomb structure in the bone and feel how hard and light it is. The spaces are part of the bone marrow. The bone marrow in some bones produces millions of red and white blood cells every second.

You need to eat or drink calcium to have strong bones.
Calcium can be found in milk, cheese and leafy greens.

Types of Bones

The bones are classified according to their shapes. There are long, short, flat and irregular bones. Long bones are present in your arms and fingers, legs and toes. Short bones are present in your wrist and ankles. Flat bones are present in your skull and ribs. Irregular bones are present in your vertebral column (spine). Bones vary in size from the longest bone which is in the thigh, to the tiny bones inside the ear.

Regardless of the different shapes and sizes, all the bones contain calcium phosphate- two very important minerals necessary for body functions such as muscle movement, blood clotting and transmission of impulses along nerves. Large amounts of both minerals are stored in the bones and teeth. A man of average size stores about 1kg of calcium in his bones. .



Parts of the skeletal system

Breaking a bone is very painful. It takes a lot of force to break a bone. Most broken bones heal well once the bone is set and plastered by a doctor. An X-ray is performed to check if there is a broken bone. The plastering of the broken limb allows the bone time to heal and once it is healed it will usually be stronger than before.

Types of Joints

- **Joints for flexibility and movement**

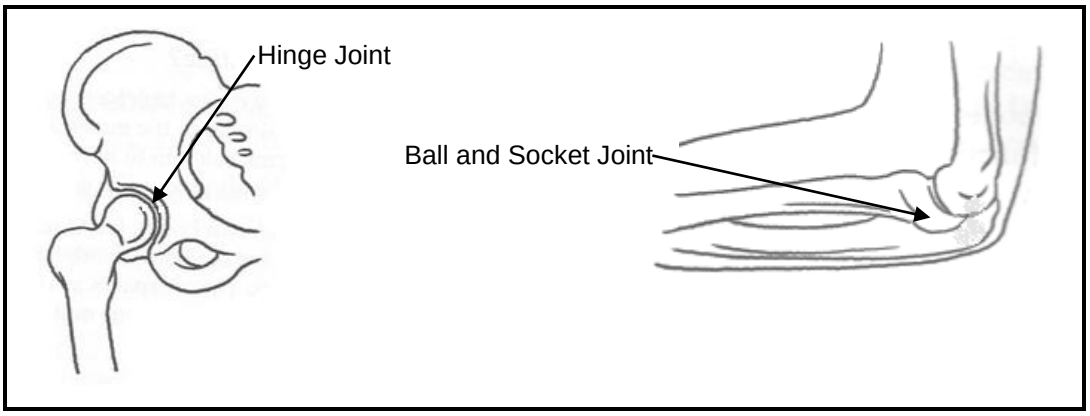
When two bones come together it is called a joint. There are about one hundred joints in the body. There are different kinds of joints. They are the hinge joints, like the knee, elbow and wrist. Ball and socket joints, like the shoulder or hip, which allows movement of the arms and legs in many directions.

My favourite rugby player does amazing things on the field because of the flexibility and movement in his joints.

The flexibility and movement from joints enabling athletes to perform well

- **The hinge, ball and socket joints**

Bones are connected to one another in different ways. Some bones are connected to one another by cartilage, which is a rubbery material. This is for joints where only a little bit of movement is allowed. Cartilage stops the ends of bones from rubbing against each other.



The hinge, and ball and socket joints

At most of the joints, the bones are connected to each other with strong cables called ligaments. These are small and thick bands of elastic tissue. Ligaments help to keep bones in place and prevent bones from moving in certain ways to protect them from breaking.

Activity 2.1

Do this activity.

1. Write the name of the chemical substance present in bones.

_____

2. How many bones are said to be present in the human skeletal system?

_____

3. What is a joint?

_____

4. What type of joint is present in the knee, wrist and elbow?

_____

5. Write the name of the strong cable like tissue that joins two bones.

_____

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

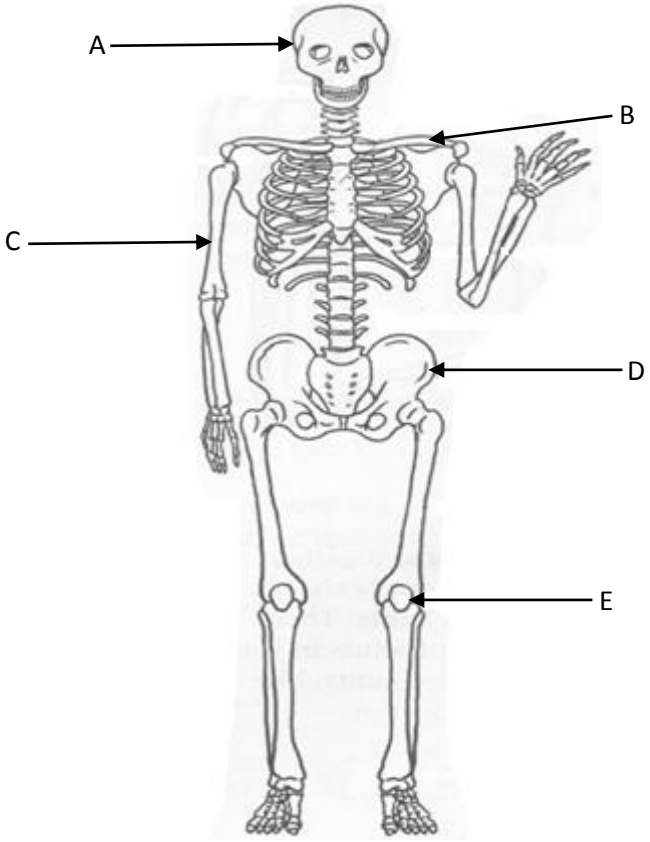
- The skeleton provides a framework for the body; supports soft tissues; protects many internal organs, e.g. the skull protects the brain; provides attachment for muscles so movement can occur; stores important minerals such as calcium; and produces various types of blood cells.
- The human skeleton is made up of 206 bones. These bones are alive and they are incredibly strong and surprisingly light.
- Bones are different sizes. The largest bone is the femur (thigh bone). The smallest is a tiny bone in the ear.
- Bones are built with a very strong outer layer and a soft spongy inner part. Your bone cells make a special honeycomb structure called bone marrow which gives the bones their amazing strength.
- Different bones perform different functions in the body.
- When two bones come together it is called a joint. There are about one hundred joints in the body. There are different kinds of joints.

NOW DO PRACTICE EXERCISE 2 ON THE NEXT PAGE

Practice Exercise 2

The Practice Exercise consists of 5 short answer questions.

1. Refer to the diagram below. Fill in the missing labels of the skeleton diagram below.



A. _____

B. _____

C. _____

D. _____

E. _____

2. List the functions of the human skeletal system.

a. _____

b. _____

c. _____

d. _____

3. From the list of bones below arrange them as hinge or ball and socket joint.

List: knee, shoulder, elbow, wrist, hip

a. Hinge joint

_____

b. Ball and socket joint

_____

4. Write the name of the rubbery material that connects two bones.

_____

5. How many joints are present in the human skeletal system?

_____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 1.

Answers to Activity 2.1

1.1. Write the name of the chemical substance present in bones?

Calcium

2. How many bones are said to be present in the human skeletal system?

206

3. What is a joint?

When two bones come together it is called a joint

4. What type of joint is present in the knee, wrist and elbow?

Hinge Joints

5. Write the name of the strong cable like tissue that joins two bones.

Ligaments

Reference

Body Systems in Papua New Guinea, R. Jones, J. Miller

Know your Body and Stay Healthy, S. Datta

Lesson 3: The Muscular System

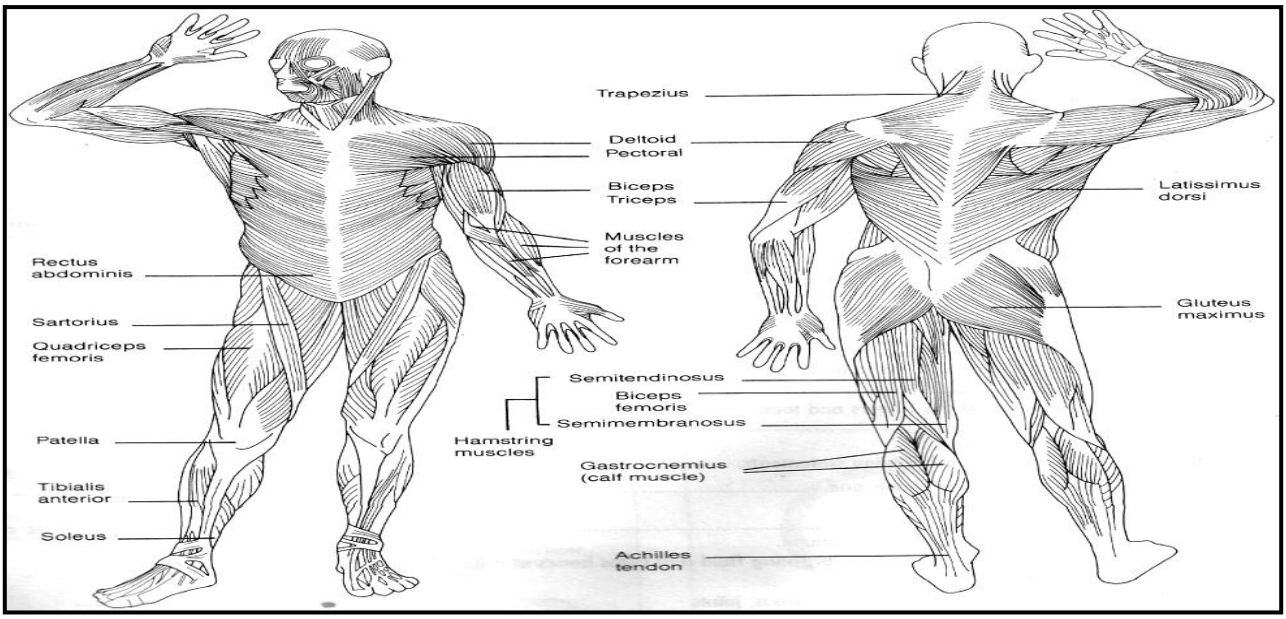
Welcome to lesson 3 of unit 2. In the last lesson you learnt about the skeletal system. In this lesson you will learn about the muscular system.

Your Aims:

- define the muscular system
- identify the parts of the muscular system
- identify the main functions of the muscular system

The Muscular System

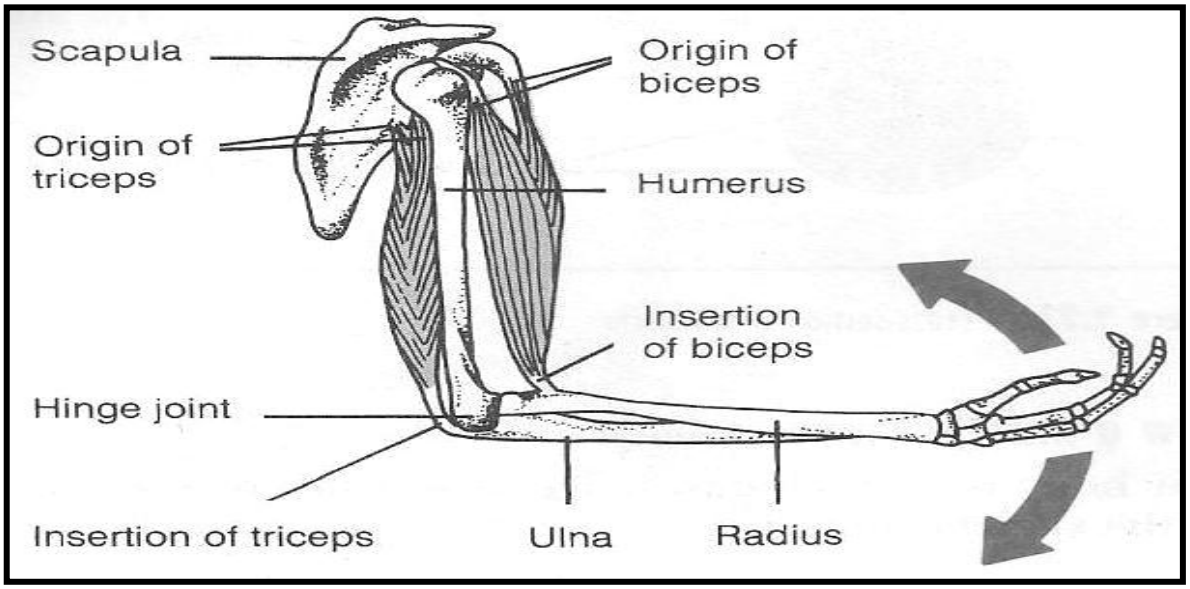
The muscular system is comprised of the sum total of muscles throughout the body that move the skeleton, maintain posture through steady contraction and generate heat through cell metabolism or breakdown. Without muscles you would not be able to move. Muscles are made up of long fibres which are made up of millions of muscle cells. They are well supplied with food and oxygen because muscles work very hard. There are so many muscles in the body that they make up about a third of the body weight.



The front and back view of the muscular system of the human body.

Functions of the Muscular System

The muscles have many different nerve cells around them. These nerve cells connect the muscles to the brain. When the nervous system sends an electrical signal to the muscles they contract (become shorter). When the muscle becomes shorter, it pulls the bone it is attached to and causes it to move. Muscles often work in pairs so the joint can be pulled back to its original position by an opposing muscle.



Movement of expansion and contraction of the muscles attached to the hand

Movement of Muscles

Some muscles need you to control them with your brain. These are called voluntary muscles and include the muscles in your arms and legs. But there are some muscles which work without you having to think about them. These are called involuntary muscles and they work even when you are asleep or doing something else. Blinking, breathing and your heartbeat are all caused by involuntary muscles.

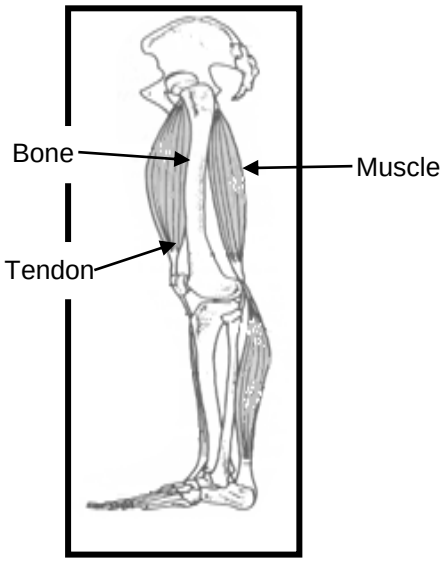
Blinking the eye. Muscles work without being controlled

Moving the arm to catch the baseball. Muscles controlled to do work

Movement of involuntary and voluntary muscle

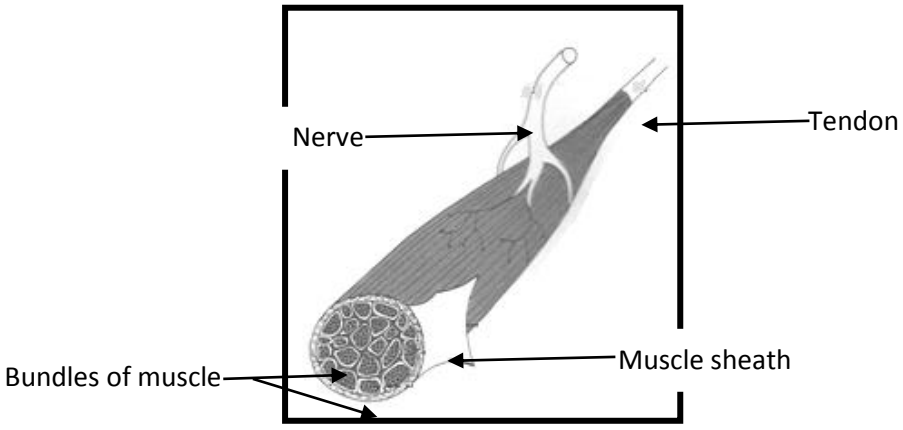
Nerve cells connect the muscles to the brain. When the nervous system sends an electrical signal to the muscles they contract (become shorter). When the muscle becomes shorter, it pulls the bone it is attached to and causes it to move

Muscles are attached to the bones by tendons. They can be felt at different parts of the body. They feel like thick, strong rubbery strings. You can feel your tendons in your wrists, the back of your hands, the back of your ankles and the bottom of your neck.



Movement and the difference between bones, tendons and muscles

The skeletal muscles are made up of long thin muscle fibres. These muscles are usually thick in the middle and taper into thin ends called tendons. The thick part or belly of the muscle is covered by muscle sheath, and each end of the muscle is joined by the strong, fibrous tendon.



The cross-section of a muscle

It is the cooperative action of the skeleton and the muscles that allows you to perform the whole range of possible movements from the ability to hold a pen and write letters, to the ability to run and play sports. If you did not have muscles your skeleton would be a jumbled pile of bones that would need a stand to hold it up.

The human body is only able to move as a result of the actions of the skeletal muscles.

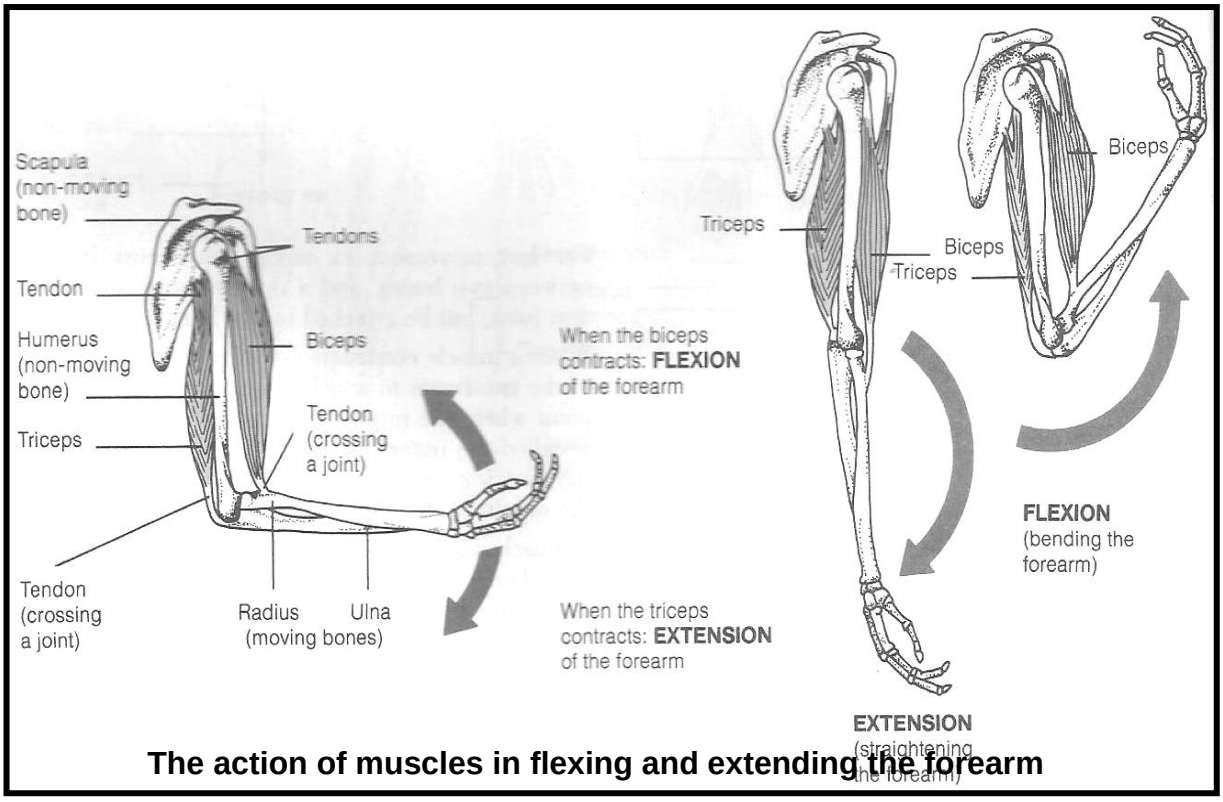
The brain➔sends a message➔by a nerve to➔the muscle and ➔you move

For any movement to occur, there must be a joint between two bones, and a muscle must not only cross that point, but be attached to two bones. When a muscle contracts (shortens in length), only one of the two bones to which it is attached can move. The point where the muscle's tendon joins the moving bone is called the insertion of the muscle.

Muscles work in pairs to achieve this movement. For every muscle that pulls a bone in one direction, there is a matching muscle that pulls the bone in the reverse direction.

The point where the muscle's tendon joins the non-moving bone is called the origin of the muscles. A muscle can only make itself shorter –it cannot make itself longer again. Once a muscle has contracted and moved a bone, another muscle must contract in order to move the bone back to its original position.

Muscles work in pairs to achieve movement. For every muscle that pulls a bone in one direction, there is a matching muscle that pulls the bone in the reverse direction. A contracted muscle is extended (returned to its normal length) by the contraction of its working partner. The muscle that is the direct cause of any movement is called the prime mover.



The action of muscles in flexing and extending the forearm

Types of Muscles

There are three different types of muscle tissues.

- **Cardiac muscle**

Cardiac muscle is the muscle of the heart itself. Because it has to pump blood around the body, it needed a constant supply of oxygen-rich blood to keep it going. It is an involuntary muscle that is not controlled by ones will.

- **Smooth muscle**

Smooth muscles are the muscles that move the internal organs. Like cardiac muscle, they are involuntary muscles. They keep on moving even you are asleep or awake.

- **Skeletal muscles**

Skeletal muscles are the muscles that move the bones or skeleton. These muscles are called voluntary muscles, because they are controlled by ones will and one can choose to move them or not.

Some skeletal muscles are both voluntary and involuntary muscles. As well as working by themselves, they are also under the control of ones will. The muscles that make you blink, and the muscles that make you breathe in and out can be voluntary and involuntary at times.

Some skeletal muscles are both voluntary and involuntary muscles

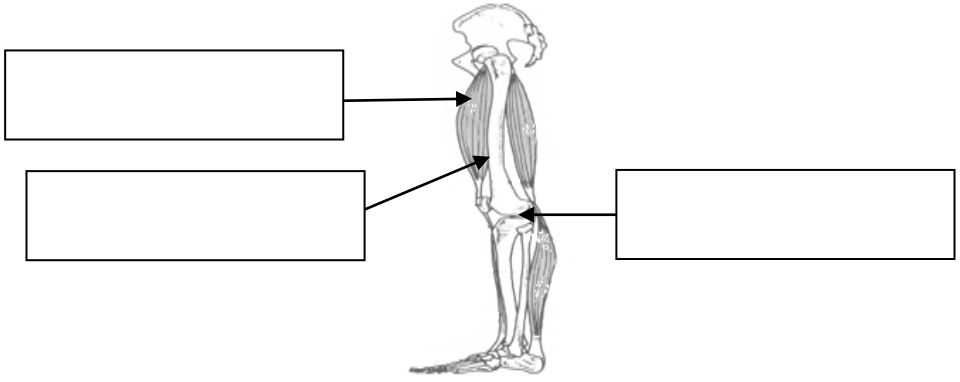
Activity 3.1

Do this activity.

Do NOT look at the correct answers. You may start now!

1. Refer to the diagram below. Write the correct word for the missing label from the list below.

List: ligament, tendon, cartilage, muscle, joint, bone



2. What is a muscle?

_____

_____

3. Differentiate between voluntary and involuntary muscles?

_____

_____

_____

4. Match these movements whether are caused by voluntary or involuntary muscles.

a. running _____

b. blinking _____

c. swimming _____

d. breathing _____

e. heartbeat _____

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

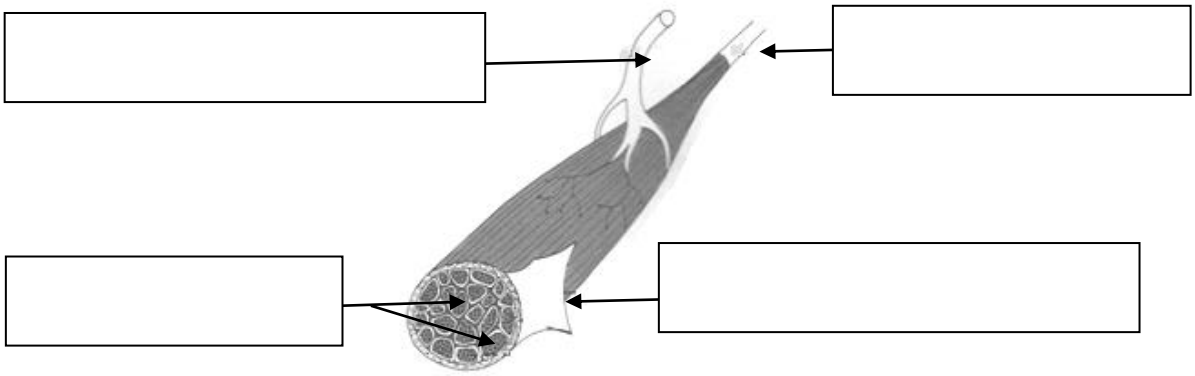
- Muscles are made up of long fibres which are made up of millions of muscle cells.
- Some muscles need you to control them with your brain. These are called voluntary muscles. But there are some muscles which work without you having to think about them. These are called involuntary muscles.
- Muscles have many different nerve cells around them. These nerve cells connect the muscles to the brain.
- Muscles are attached to the bones by tendons.
- It is the cooperative action of the skeleton and the muscles that allows you to perform the whole range of possible movements.
- For any movement to occur, there must be a joint between two bones, and a muscle must not only cross that point, but be attached to two bones.
- A muscle can only make itself shorter –it cannot make itself longer again.
- Muscles work in pairs to achieve movement.

NOW DO PRACTICE EXERCISE 3 ON THE NEXT PAGE

Practice Exercise 3

The Practice Exercise consists of 5 short answer questions.

1. Refer to the diagram below. Write the correct word for the missing label from the list below. List: ligament, tendon, muscle sheath, cartilage, muscle, nerve, joint, bone, bundles of muscle



2. Write the missing words with the correct word from the list below.

List: ligament, tendon, muscle sheath, fibres, cartilage, involuntary, muscle, cells, nerve, joint, bone, bundles of muscle, voluntary, brain

Muscles are made up of long _____which are made up of millions of muscle _____. Some muscles need you to control them with your brain. These are called _____muscles. But there are some muscles which work without you having to think about them. These are called _____ muscles. Muscles have many different _____ cells around them. These nerve cells connect the muscles to the _____.

3. List the three types of muscles.

a. _____

b. _____

c. _____

4. Write the following muscles into the correct muscle type category.

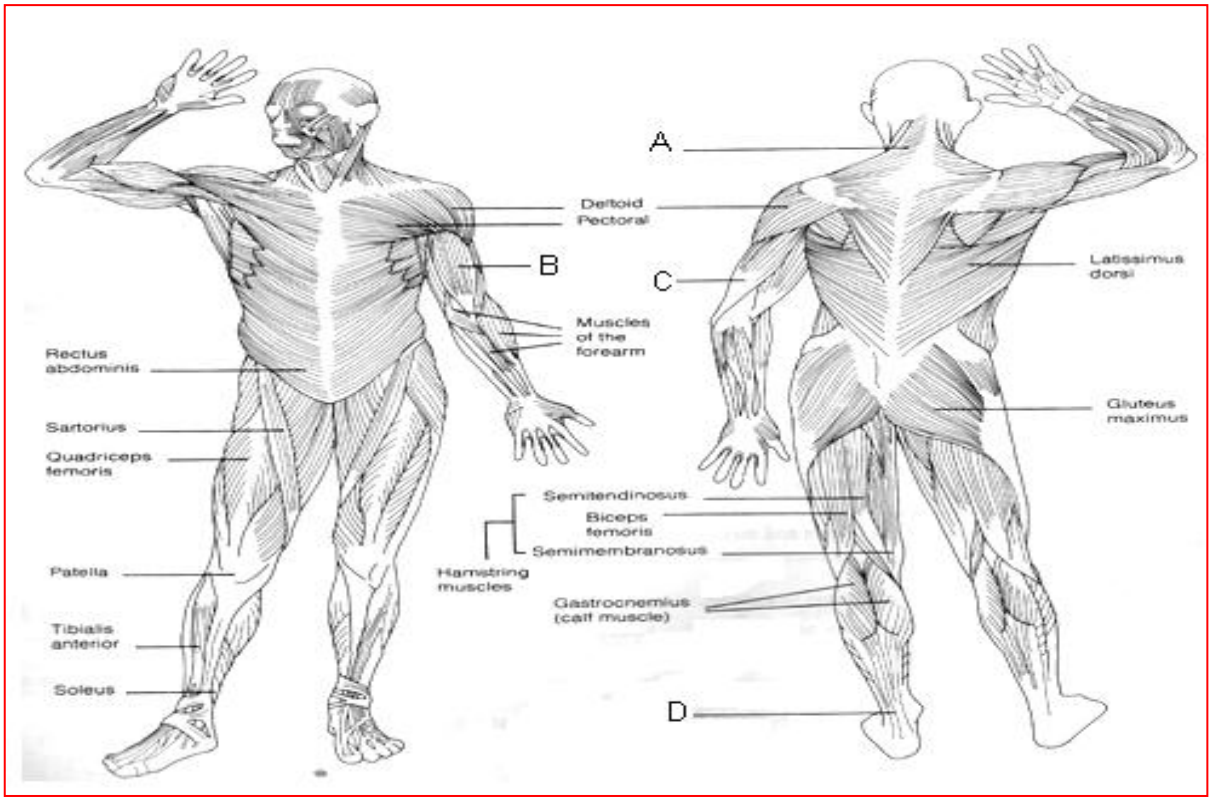
a. heart muscle _____

b. stomach muscles _____

c. leg muscles _____

d. hand muscles _____

5. Refer to the diagram below. Fill in the missing labels of the skeletal muscular diagram below.



A. _____ B. _____

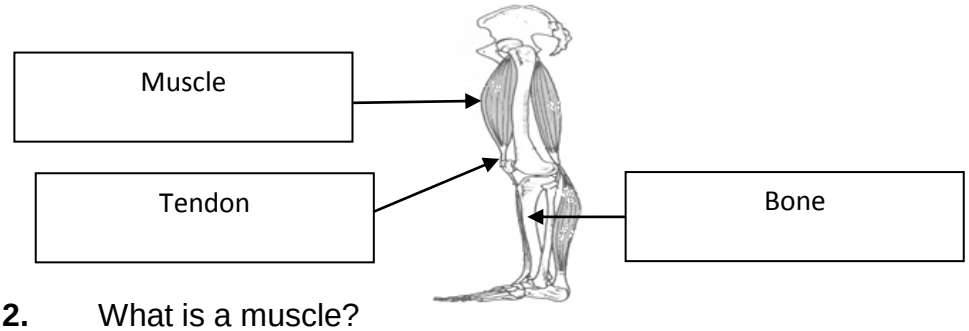
C. _____ D. _____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 1.

Answers to Activity 3.1

1. Refer to the diagram below. Write the correct word for the missing label from the list below.

List: Ligament, Tendon, Cartilage, Muscle, Joint, Bone



2. What is a muscle?

Muscles are made up of long fibres which are made up of millions of muscle cells that are mostly used for movement.

3. Differentiate between voluntary and involuntary muscles?

Voluntary muscles are muscles that are controlled by the brain. Involuntary muscles are muscles which work without you having to think about them.

4. Match the two movements whether are caused by voluntary or involuntary muscles.

a. running voluntary muscles

b. blinking involuntary muscles

c. swimming voluntary muscles

d. breathing involuntary muscles

e. heartbeat involuntary muscles

Reference

- Body Systems in Papua New Guinea, R. Jones, J. Miller
- Know your Body and Stay Healthy, S. Datta
- An Introduction to Health and Physical Education for Secondary Schools 2nd Edition, P. Williams

Lesson 4: The Cardiovascular System

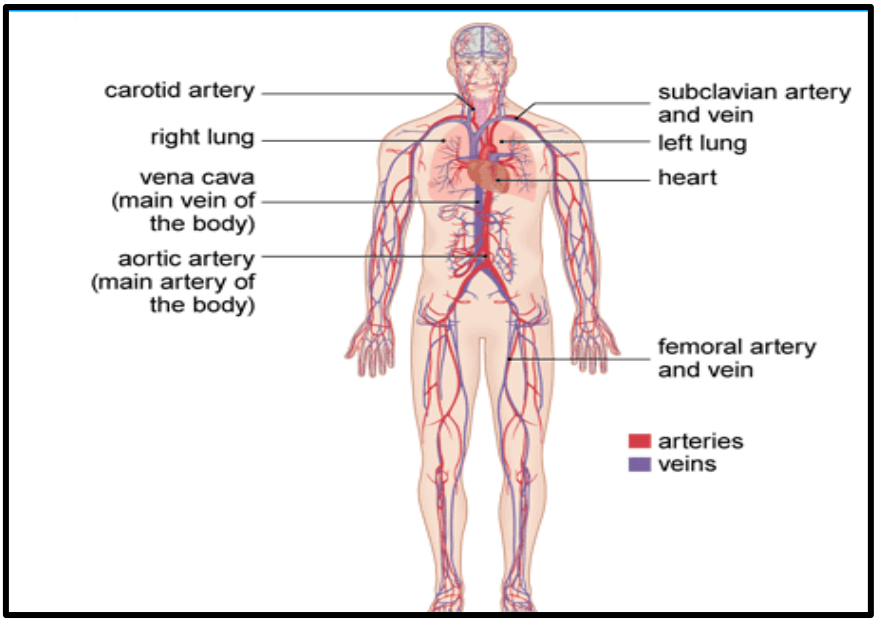
Welcome to lesson 4 of unit 2. In the last lesson you learnt about the muscular system. In this lesson you will learn about the cardiovascular system.

Your Aims:

- define the cardiovascular system
- identify the different sections/parts of the cardiovascular system
- explain the main functions of the cardiovascular system

The Cardiovascular System

The cardiovascular or circulatory system is made up of blood, heart, arteries, capillaries and veins. The job of this body system is to carry blood throughout the body to supply every cell with food and oxygen and collect waste. If the cells do not get food and oxygen they will die. The cardiovascular system also helps the body to fight diseases and to keep the body temperature at a constant level.



The main organs, arteries and veins in the cardiovascular system

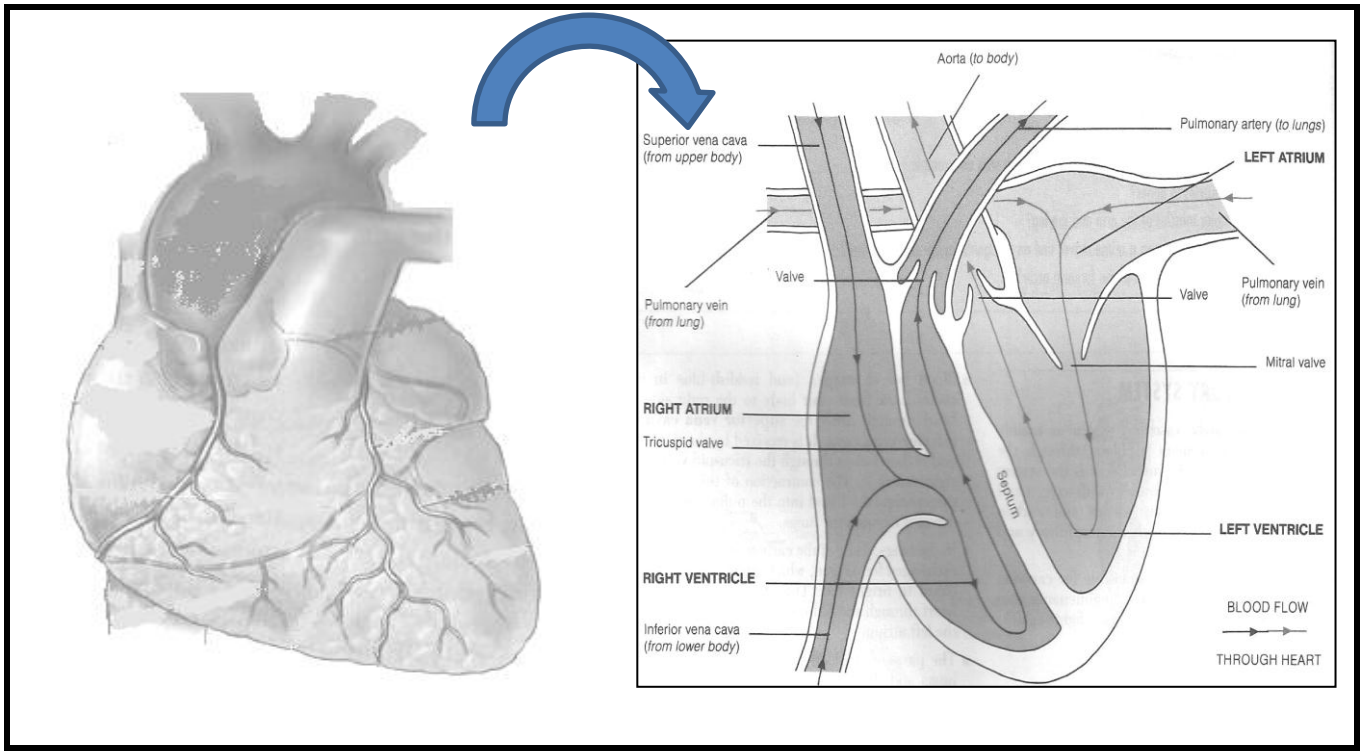
The Parts of the Cardiovascular System

The main components of the system are the heart, the blood vessels, and the blood itself.

- **The heart**

The heart is an amazing organ, which generates its own energy. The heart is about the same size as a clenched fist, and sits in the chest between the two lungs. In a human life span of approximately 60-70 years, the heart pumps about 155 million litres of blood. This

work/ effort are about the same as carrying a load of ten tonnes for a distance of 16 kilometres.



The structure of the heart

The heart has four chambers. The upper chambers are the right and left atria (each chamber is called an atrium), which act to receive blood and to pump blood into the chambers of the right and left ventricles (the lower two chambers). The right ventricle pumps blood to the lungs, and the left ventricle sends blood to all other parts of the body. Though all four chambers act as pumps, the main pumping action of the heart is done by the left ventricle.

Every minute, the heart has to pump out the same amount of blood that enters it (about 5 litres). Each day approximately 700 litres of blood pass through the heart, and in that time the heart beats about 100 000 times.

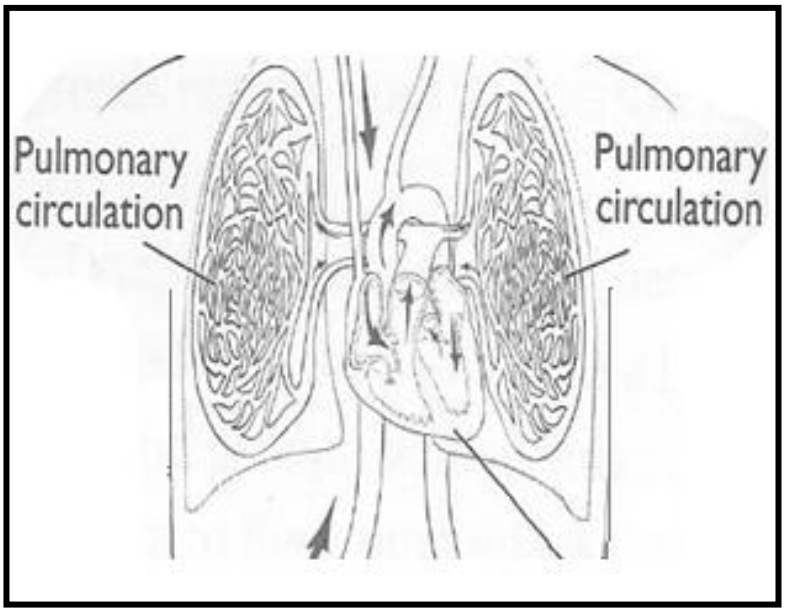
- **Blood circulation**

The two sides of the heart are completely separated by a muscle wall, the septum. This is because each side of the heart has a specific job to do.

Blood low in oxygen (and reddish-blue in colour) comes back from the body to the right side of the heart through either the superior vena cava or the inferior vena cava. It is received by the right atrium, and is then forced through the tricuspid valve into the right

ventricle. The contraction of the right ventricle then pumps the blood into the pulmonary artery and drives it through the lungs.

In the lungs, some of the carbon dioxide in the blood is exchanged for oxygen, which changes the colour of the blood to bright red. The blood then returns to the heart through the pulmonary veins and is received by the left atrium.



The passage of blood from the right ventricle to the lungs and then back to the left atrium is called the pulmonary circulation.

The pulmonary circulation

From the left atrium, the oxygen-rich blood is forced through the mitral valve into the left ventricle. It has now entered the systematic circulation. Contraction of the left ventricle then pumps the blood into the largest single artery in the body, the aorta. The blood travels from the aorta through a network of arteries that branch out to all parts of the body except the lungs. After passing through many capillary beds, the blood flows into networks of veins which ultimately join to form the superior vena cava (from the upper body) and the inferior vena cava (from the lower body). The cycle is then ready to begin again.

Note that the left atrium contracts at the same time as the right atrium, and the left ventricle contracts at the same time as the right ventricle.

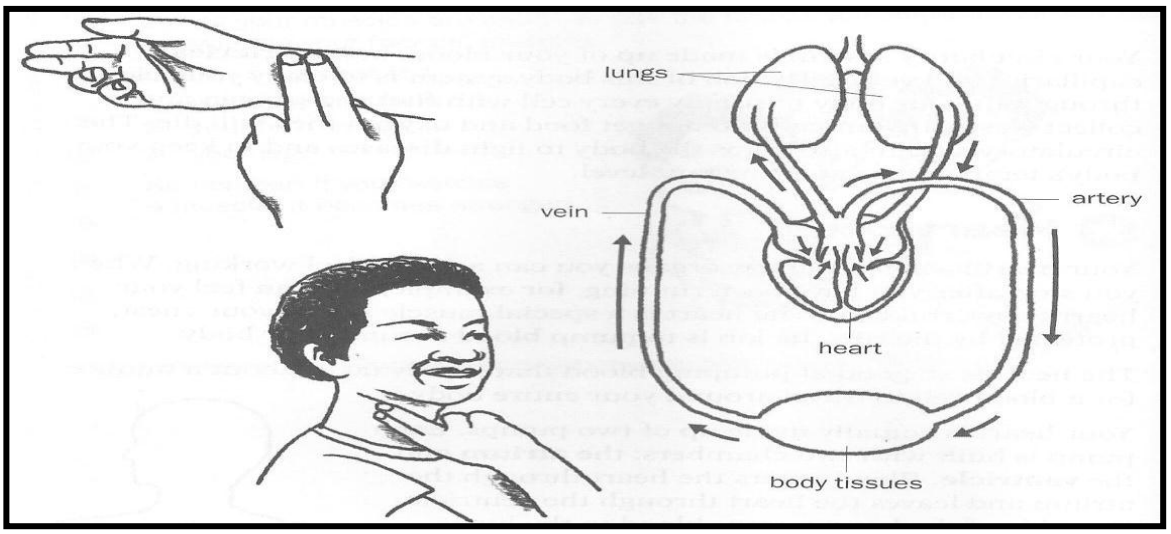
The blood pressure is the force exerted by the heart muscles to pump the blood around the body and back again to the heart. There are two forms of blood pressure.

Systolic blood pressure, or ***systole***, is a measurement of the outward pressure the blood exerts against the walls of an artery as the ventricles contract.

Diastole blood pressure or ***diastole*** is a measurement of the pressure the blood exerts against the walls of an artery as the ventricles relax. This is when the blood is being pumped into each ventricle from the atrium above it.

The ventricles contract to expel blood and relax to fill again from the atria about once every 0.8 seconds in a healthy adult at rest.

Each ventricular contraction or heartbeat produces raised pressure throughout the arterial system of the body. This can be seen and felt as the arterial pulse. The pulse rate is usually taken at the radial artery at the wrist or the carotid artery in the neck.



The arterial pulse on every ventricular contraction

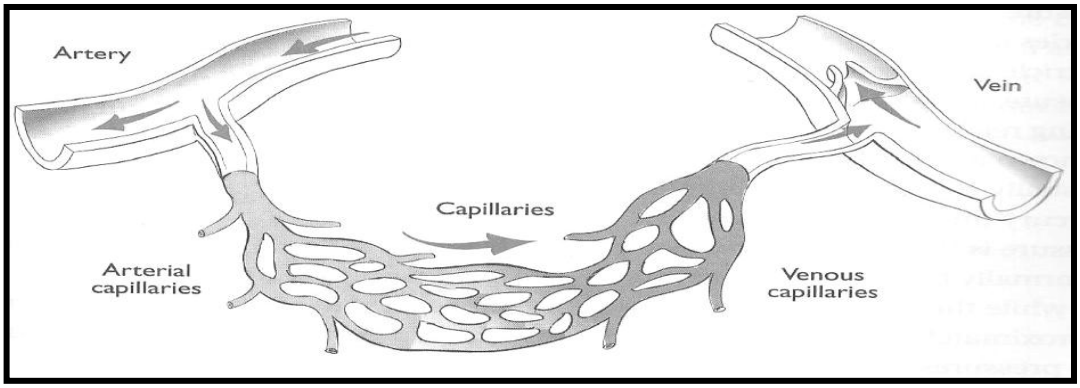
- **Blood vessels**

There are three types of blood vessels.

The ***arteries*** except for the pulmonary arteries carry blood from the heart to the body. The blood carried is bright red in colour because it is rich in oxygen. Arteries have a pulse. They are elastic in nature allowing the blood to pulse through them with each heartbeat.

The ***capillaries*** are a fine branch of an artery. They link arteries to veins. They also allow oxygen and carbon dioxide gases to be exchanged, both in the lungs and in the organs and muscles of the body.

The ***veins*** except for the pulmonary vein carry blood back to the heart from the body. The blood carried is reddish-blue in colour because it is low in oxygen and high in carbon dioxide. Veins do not have a pulse.



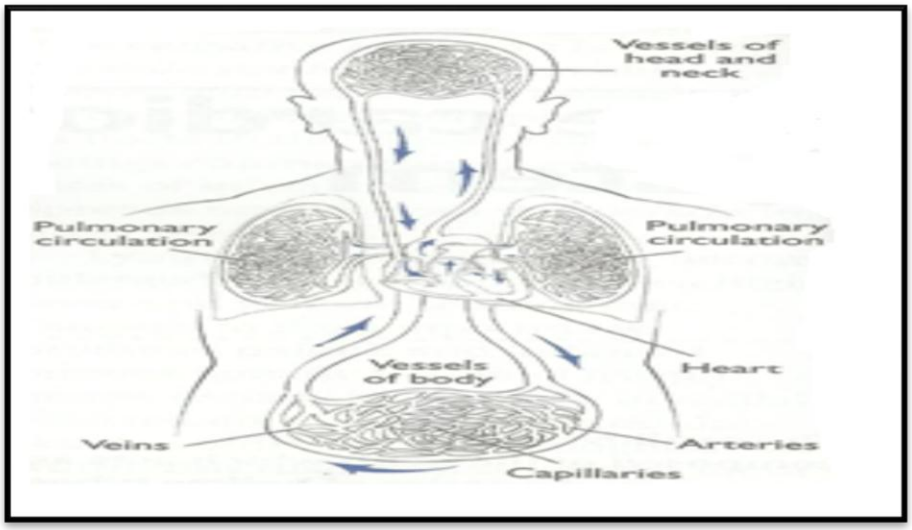
The blood vessels of the cardiovascular system

The Main Functions of the Cardiovascular System

The cardiovascular system is composed of the heart which acts as a pump, and a series of hollow tubes known as blood vessels. It is through the blood vessels that blood is pumped from the heart to all parts of the body- carrying substances such as oxygen, hormones, and nutrients from digested food to all the body cells. Blood returning from the body cells, contains waste products which are carried in the blood vessels from various parts of the body.

The circulatory or cardiovascular system is mainly responsible for the movement of blood through the body, to its organs and to the muscles. It is the system that provides these organs and muscles with oxygen and nutrients, while removing their wastes and carbon dioxide. It works very closely with the respiratory and digestive systems to achieve this.

The cardiovascular system is also responsible for carrying chemicals that assist in the growth, maintenance and repair of the body's tissues, and fight against disease and invading bacteria.



The structure and function of the cardiovascular system

Activity 4.1

Do this activity.

Do NOT look at the correct answers. You may start now!

1. What is the main function of the cardiovascular system of the human body?

_____

_____

2. Name the four chambers of the heart.

a. _____ b. _____

c. _____ d. _____

3. Name the major blood vessels that take blood back to the heart and away from the heart.

a. _____ b. _____

4. Write the word that fits the definition.

a. _____ Each ventricular contraction.

b. _____ It is the nature of arteries that allows blood to pulse through them.

5. What are the three types of blood vessels?

a. _____

b. _____

c. _____

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

- The cardiovascular or circulatory system is made up of blood, heart, arteries, capillaries and veins.
- The job of this body system is to carry blood throughout the body to supply every cell with food and oxygen and collect waste.
- The cardiovascular system is also responsible for carrying chemicals that assist in the growth, maintenance and repair of the body's tissues, and fight against disease and invading bacteria.
- The main components of the system are the heart, the blood vessels, and the blood itself.
- The heart has four chambers. The upper chambers are the right and left atria (each chamber is called an atrium), which act to receive blood and to pump blood into the chambers of the right and left ventricles (the lower two chambers).
- In the lungs, some of the carbon dioxide in the blood is exchanged for oxygen, which changes the colour of the blood to bright red. The blood then returns to the heart through the pulmonary veins and is received by the left atrium.

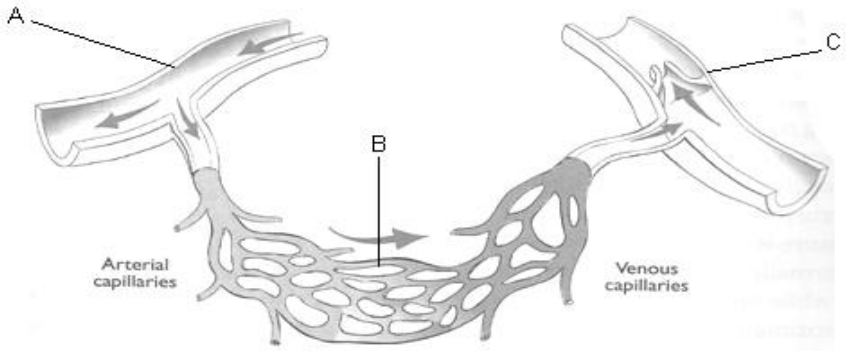
NOW DO PRACTICE EXERCISE 4 ON THE NEXT PAGE

Practice Exercise 4

The Practice Exercise consists of 5 short answer questions.

1. Refer to the diagram below. Write the correct word for the missing label from the list below.

List: ligament, tendon, artery, cartilage, vein, muscle, capillary, joint, bone



A. _____

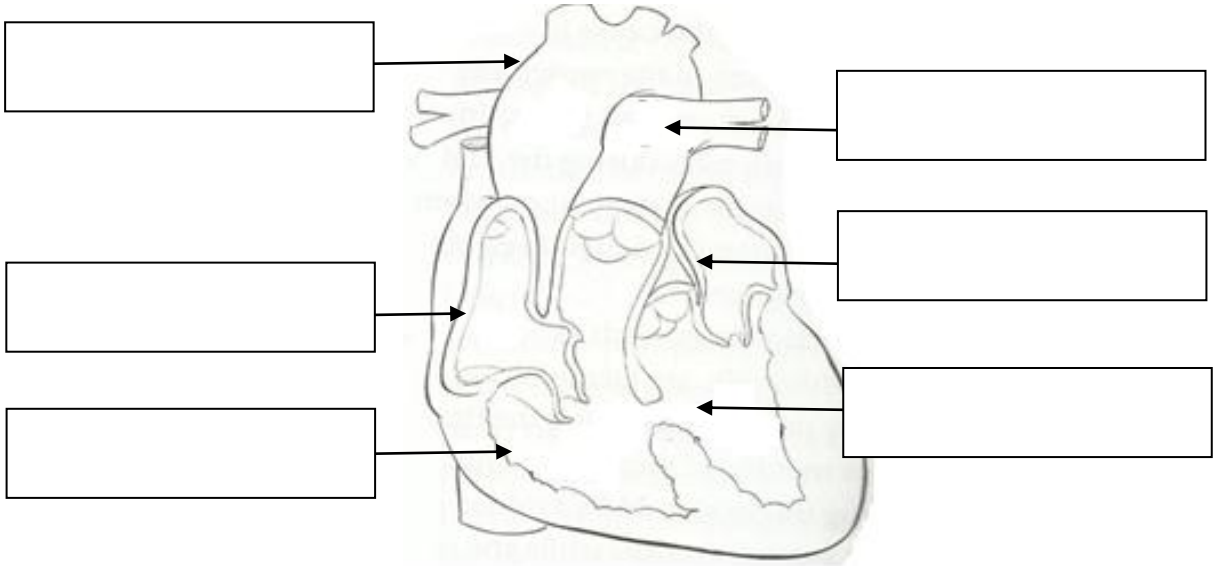
B. _____

C. _____

2. Fill in the spaces with the most appropriate term.

The cardiovascular system is composed of the _____which acts as a pump, and a series of hollow tubes known as _____vessels.

3. Refer to the diagram below. Write the correct word for the missing label.



4. Explain the difference between systole and diastole.

_____

_____

_____

5. List the three main characteristics of veins.

a. _____

b. _____

c. _____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 1.

Answers to Activity 4.1

1. What is the main function of the cardiovascular system of the human body?

To carry blood throughout the body to supply every cell with food and oxygen and collect waste.

2. Name the four chambers of the heart.

a. Left atrium b. Right atrium

c. Left ventricle d. Right ventricle

3. Name the two major blood vessels that take blood back to the heart and away from the heart.

a. Aorta b. Vena cava

4. Write the word that fits the definition.

a. Heart beat	Each ventricular contraction.
b. Right ventricle	This chamber of the heart pumps blood to the lungs.

5. What are the three types of blood vessels?

a. Arteries
b. Veins
c. Capillary

Reference

Body Systems in Papua New Guinea, R. Jones, J. Miller

Know your Body and Stay Healthy, S. Datta

An Introduction to Health and Physical Education for Secondary Schools, P. Williams

Lesson 5: The Respiratory System

Welcome to lesson 5 of unit 2. In the last lesson you learnt about the cardiovascular system. In this lesson you will learn about the respiratory system.

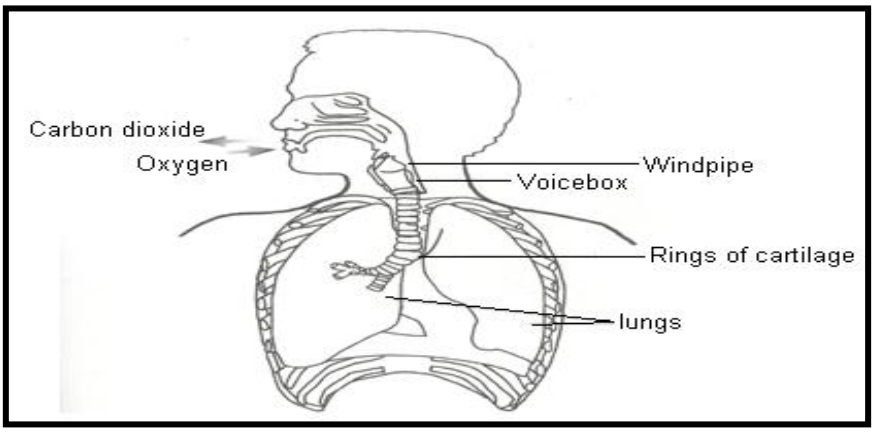
Your Aims:

- define the respiratory system
- identify, the different sections/parts of the respiratory system
- explains the main functions of the respiratory system

The Respiratory System

Human being and animals all have to breathe in oxygen and breathe out carbon dioxide. If you stop breathing you will quickly die. The body system responsible for breathing is called the respiratory system.

All of the cells in the body need oxygen. When the cells respire they use up the oxygen and release carbon dioxide as waste gas. Both of these important gases are carried by red blood cells around the body through the cardiovascular system.



The respiratory system of the human body

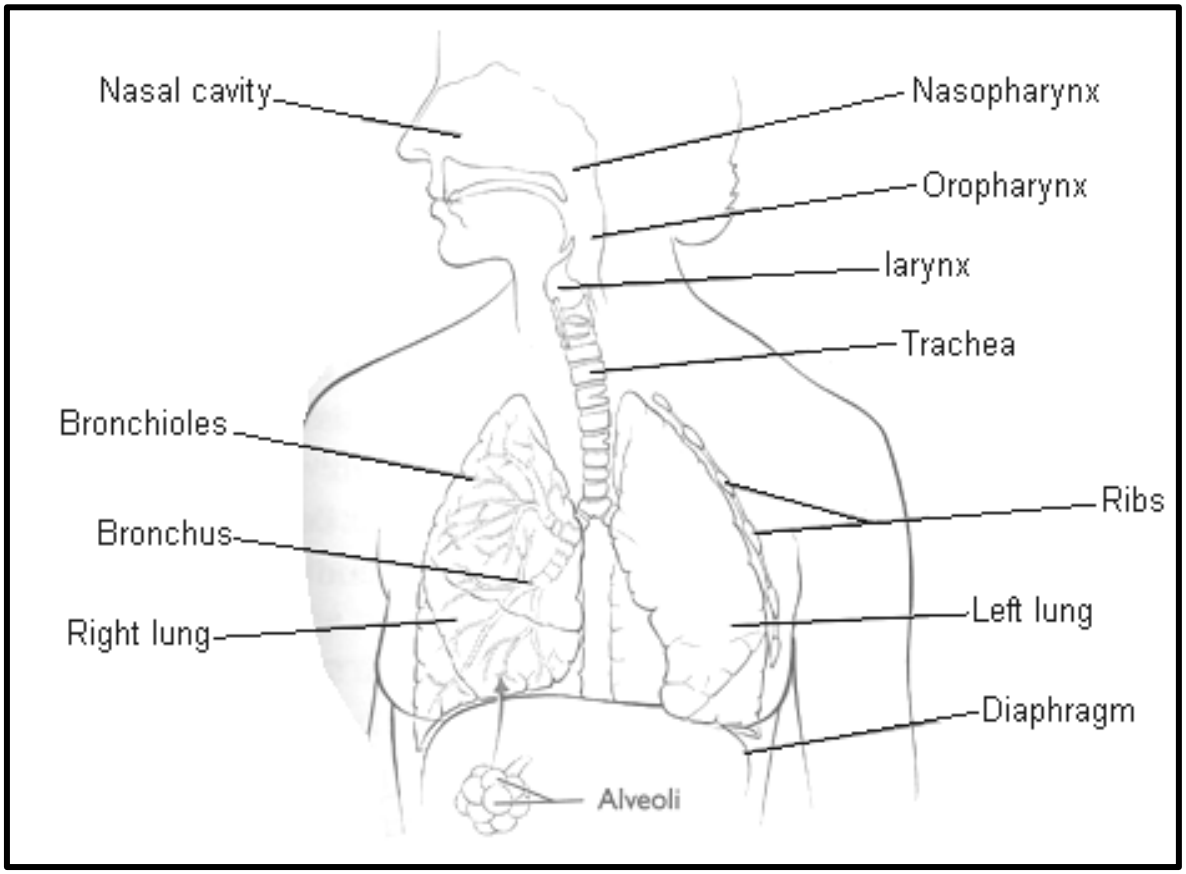
There is a close connection between the major job of the respiratory system and that of the cardiovascular system. That connection is oxygen. It is the major function of the respiratory system and that of the cardiovascular system to supply oxygen to the lungs; this oxygen then enters the blood stream and is pumped throughout the body.

But this is not the only function of the respiratory system. It is also responsible for the removal of carbon dioxide from the blood stream and the lungs.

The respiratory system also allows the senses of smell to function. As well, the voice is produced when air passes through the voice box (larynx)

Structure of the Respiratory System

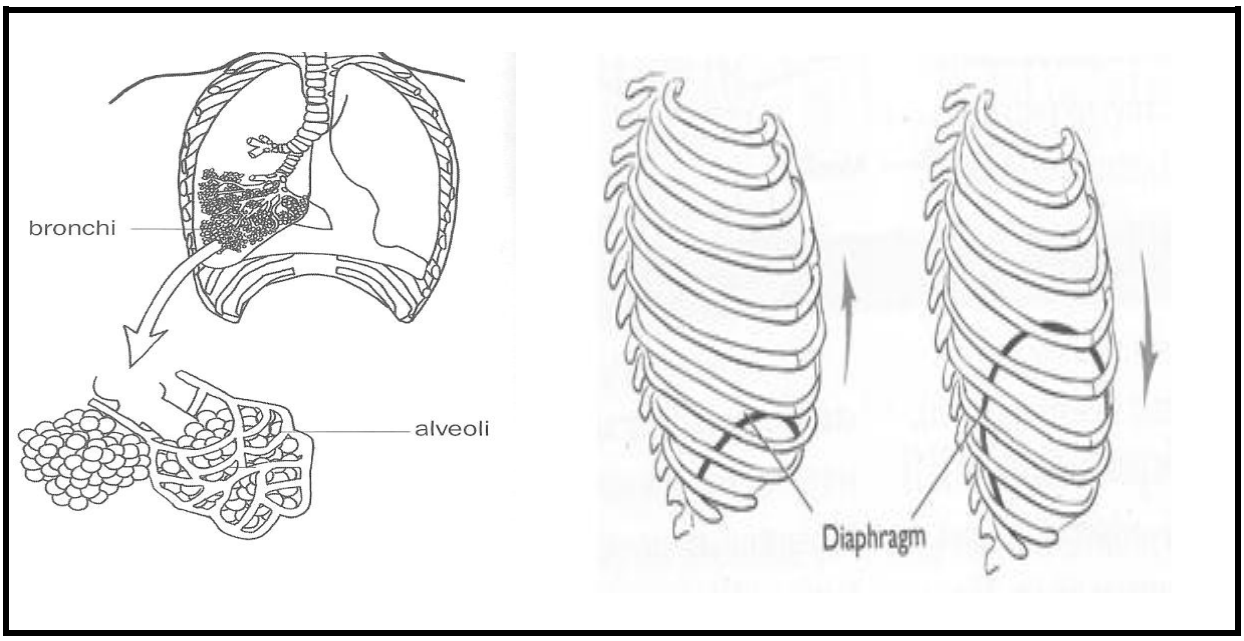
The respiratory system consists of the nose, pharynx, larynx, bronchi and lungs. The respiratory system is responsible for breathing air into and out from the body, and the exchange of gases between the blood and the lungs. The cardiovascular system then becomes responsible for the exchange of gases between the cells and the blood.



The structure of the respiratory system of the human body

The lungs are two soft and stretchy air bags full of millions of tiny tubes. Air passes down the windpipe (trachea) from the mouth and nose. The windpipe is a hollow tube protected by rings of cartilage. On the way in and out of the lungs the air passes through the voice box (larynx).

In order for the exchange of gases between the blood and the lungs to take place, all parts of the respiratory system are necessary. Ribs and the diaphragm (a dome-shaped muscle which divides the chest from the abdomen), the air passages, from the nose down to the pharynx, trachea, bronchi and bronchioles and the left and right lungs, which contain alveoli (the air sacs) and the blood vessels supplying them.



All parts of the respiratory system

Structure and Function of the Lungs

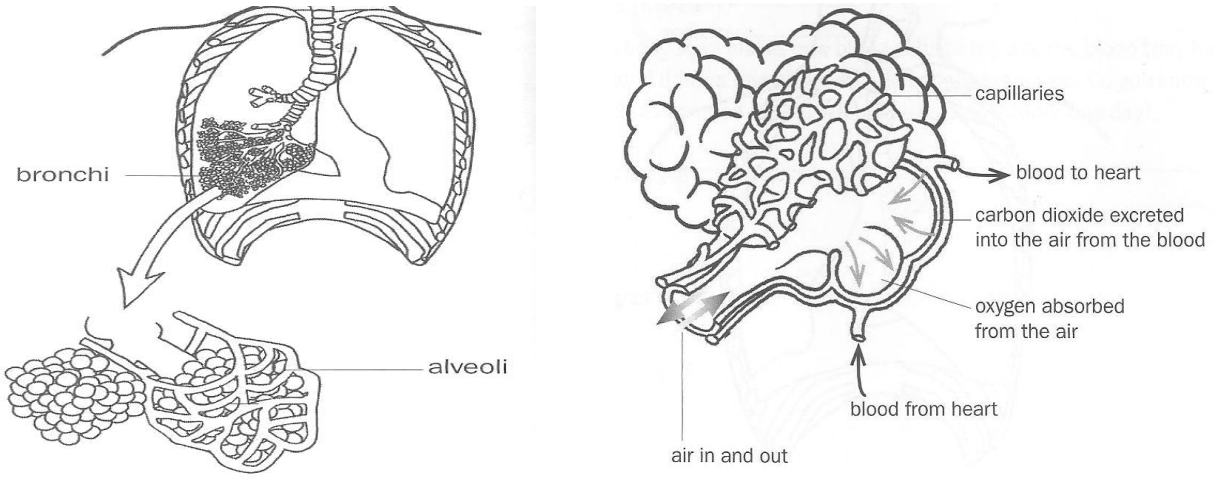
The main components of each lung are the bronchus, the bronchioles and the alveoli, which are surrounded by capillaries.

The trachea divides into two parts that go into each lung. These are called the bronchial tubes or bronchi (singular-bronchus). Each tube then divides again into smaller bronchial tubes called bronchioles.

More and more divisions occur within the bronchioles until the air passageway divides no further. At this point they connect with tiny air sacs called alveoli (singular- alveolus). There are millions of air sacs in both lungs, each surrounded by capillaries so that the exchange of carbon dioxide for oxygen can occur in the blood.

- **Gas exchange at the air sacs**
- Oxygen enters the alveoli as air is breathed into the lungs. The venous blood in the capillaries that surround each alveolus is low in oxygen and high in carbon dioxide. The pressure of oxygen within each alveolus is higher than the pressure of oxygen in the capillaries. A gas will move from an area of high pressure to an area of lower pressure. This movement is known as ***diffusion***.

Diffusion *(the movement of air from an area of high pressure to an area of low pressure)* can occur in the lung due to the one-cell thickness of the walls of the alveoli and the walls of the capillaries. Therefore, the oxygen moves from the alveolus into the venous blood in the capillary bed surrounding each alveolus. The carbon dioxide pressure in the venous blood of the surrounding capillary bed is higher than the carbon dioxide pressure in the alveolus. Therefore, the carbon dioxide moves from the blood in the capillary into the alveolus. The movement of gases is from an area of high pressure to an area of lower pressure. The blood in the capillary is now rich in oxygen and is returned to the heart for transport throughout the body.



The lungs have a rich blood supply and the red blood cells pass very close to the alveoli. The alveoli are where the gases are exchanged between the air and the blood. Oxygen is taken into the body from the air breathe in. Carbon dioxide leaves the body when breathe out.

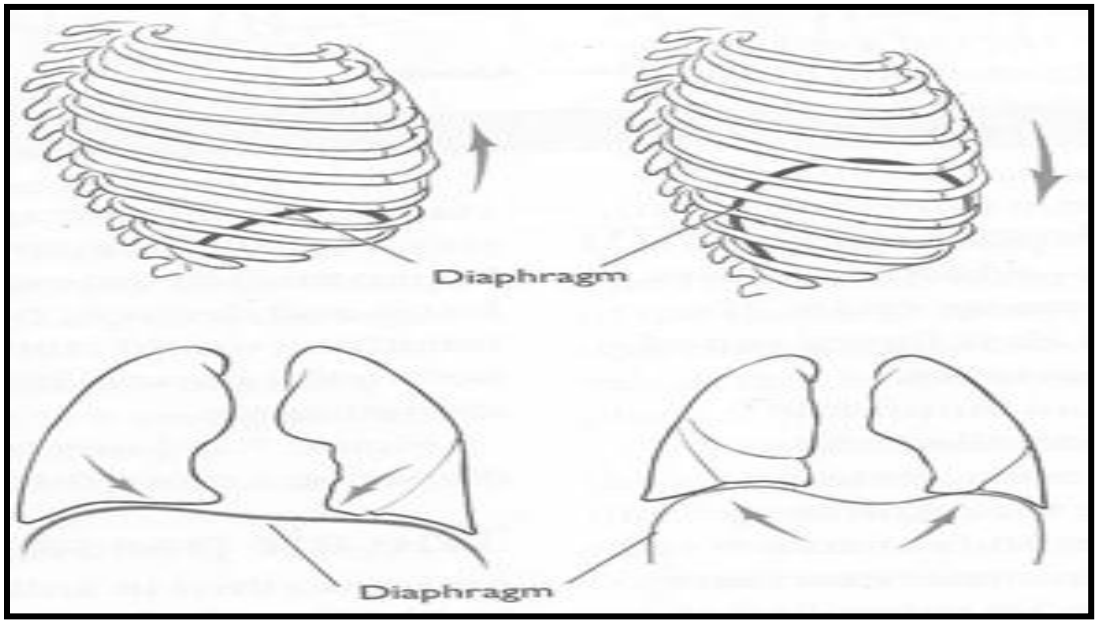
The gas exchange at the air sacs

- **Breathing in and out**

The lungs can be described as elastic; many chambered bags, suspended in the chest and connected with the outside through airways.

Moving the air in and out of the lungs is called breathing. The body does this automatically most of the time. The lungs are protected by the ribcage, which can move in and out. Below the lungs is a strong sheet of muscle called the diaphragm. This pulls the lungs down to suck in air.

The lungs are protected by the ribcage, which can move in and out. Below the lungs is a strong sheet of muscle called the diaphragm? This pulls the lungs down to suck in air.



The action of the diaphragm during breathing in and out

Air is drawn through these airways and into gas exchange areas of the lungs due to the actions of the diaphragm and other respiratory muscles. When these muscles contract, they make the cavity occupied by the lungs enlarge. Because the lungs are elastic in nature, they also expand, and one breathes in.

Activity 5.1

Do this activity.

Do NOT look at the correct answers. You may start now!

1. Complete the following crossword.

■	■	■	■	1	■	■	2	■	3				4	
5									■	■	■	■		■
■	■	■	■		■	■		■	■	■	6	■		■
7					■	■	8						■	9
■	■	■	■		■	■		■	■	■		■	■	
■	10						■	■	11					
■	■	■	■	■	■	■	12	■		■		■	■	
■	■	13		14							■	15	■	
16	■	■	■		■	■		■		■	17			■
18						■		■		■	■		■	■
	■	■	■		■	■	19							
20					■	■	■	■		■	■		■	■

Across

3. Alveolus.

5. Pumping chamber of the heart.

7. Produced by the respiratory system and the larynx

8. Connection between the respiratory and the cardiovascular system.

10. Voice box.

11. _____ dioxide

13. Surrounds an alveolus.

17. Colour of blood in an artery.

18. To breath in.

19. Found in blood.

20. With sternum, helps protect the heart.

Down

1. Blood vessel.

2. Carries oxygen.

4. What you breathe.

6. 4 chambered organ.

9. Where the air goes to.

11. Heart muscle.

12. Your breathing and circulation continue even when you _____.

14. Heat beat.

15. Red or white blood _____.

16. They protect the lungs.

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

- Human beings and animals all have to breathe in oxygen and breathe out carbon dioxide.
- All of the cells in the body need oxygen.
- When the cells respire they use up the oxygen and release carbon dioxide as waste gas.
- There is a close connection between the major job of the respiratory system and that of the cardiovascular system.
- The respiratory system consists of the nose, pharynx, larynx, bronchi and lungs.
- The respiratory system is responsible for breathing air into and out from the body and the exchange of gases between the blood and the lungs.
- Ribs and the diaphragm (a dome-shaped muscle which divides the chest from the abdomen), the air passages, from the nose down to the pharynx, trachea, bronchi and bronchioles and the left and right lungs, which contain alveoli (the air sacs) and the blood vessels supplying them.
- The lungs have a rich blood supply and the red blood cells pass very close to the alveoli.

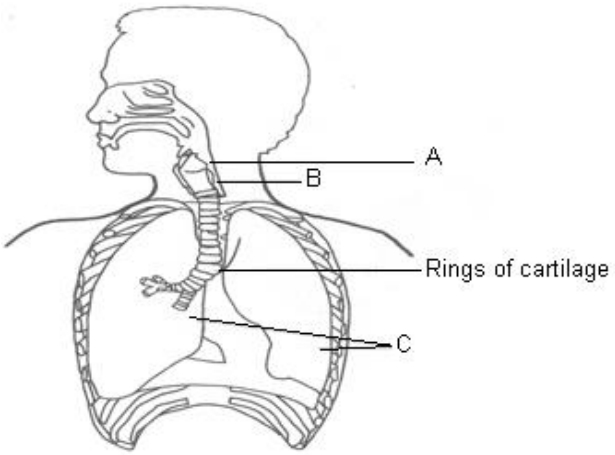
NOW DO PRACTICE EXERCISE 5 ON THE NEXT PAGE

Practice Exercise 5

The Practice Exercise consists of 3 short answer questions.

1. Refer to the diagram below. Write the correct word for the missing label from the list below.

List: ligament, wind pipe, tendon, artery, cartilage, larynx, vein, muscle, capillary, joint, bone, lungs



A. _____

B. _____

C. _____

2. Match the definition in Column B with the term in Column A to which it applies. (Use the letters in Column B to give your answers)

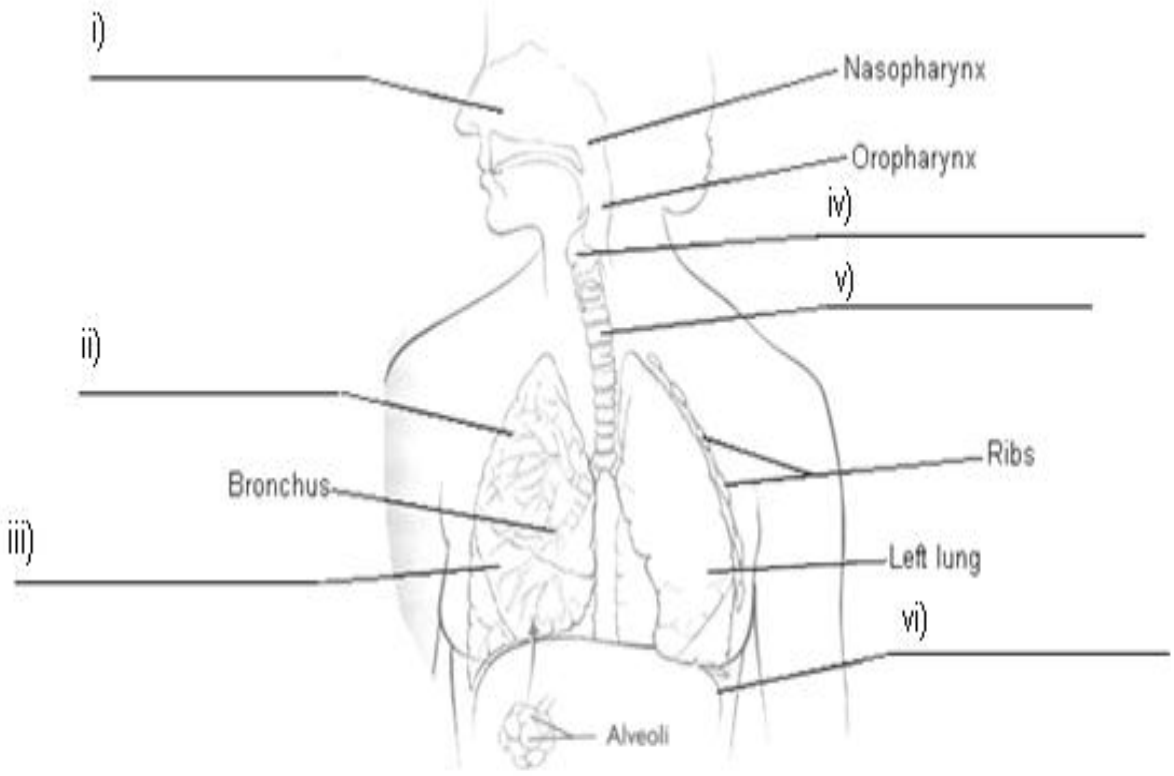
Column A

1. right atrium _____
2. diaphragm _____
3. systematic Circulation _____
4. aorta _____
5. bronchioles _____
6. trachea _____

Column B

(a) the main muscle involved in breathing.
(b) the major artery taking blood to the body.
(c) better known as windpipe.
(d) the chamber of the heart that receives blood from the body.
(e) the supply of blood to all parts of the body except the lungs.
(f) what the bronchus divides into.

3. Refer to the diagram below. Write the correct word for the missing label.



CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 1.

Answers to Activity 5.1

1. Complete the following crossword.

				1A			2B		3A	I	R	S	4A	C
5V	E	N	T	R	I	C	L	E					I	
				T			O				6H		R	
7V	O	I	C	E			8O	X	Y	G	E	N		9L
				R			D				A			U
	10L	A	R	Y	N	X			11C	A	R	B	O	N
							12S		A		T			G
		13C	A	14P	P	I	L	A	R	Y		15C		S
16R				U			E		D		17R	E	D	
18I	N	H	A	L	E		E		I			L		
B				S			19P	L	A	T	E	L	E	T
20S	P	I	N	E					C			S		

Reference

- Body Systems in Papua New Guinea, R. Jones, J. Miller
- Know your Body and Stay Healthy, S. Datta
- An Introduction to Health and Physical Education for Secondary Schools, P. Williams

Lesson 6: The Digestive System

Welcome to lesson 6 of unit 2. In the last lesson you learnt about the respiratory system. In this lesson you will learn about the digestive system.

Your Aims:

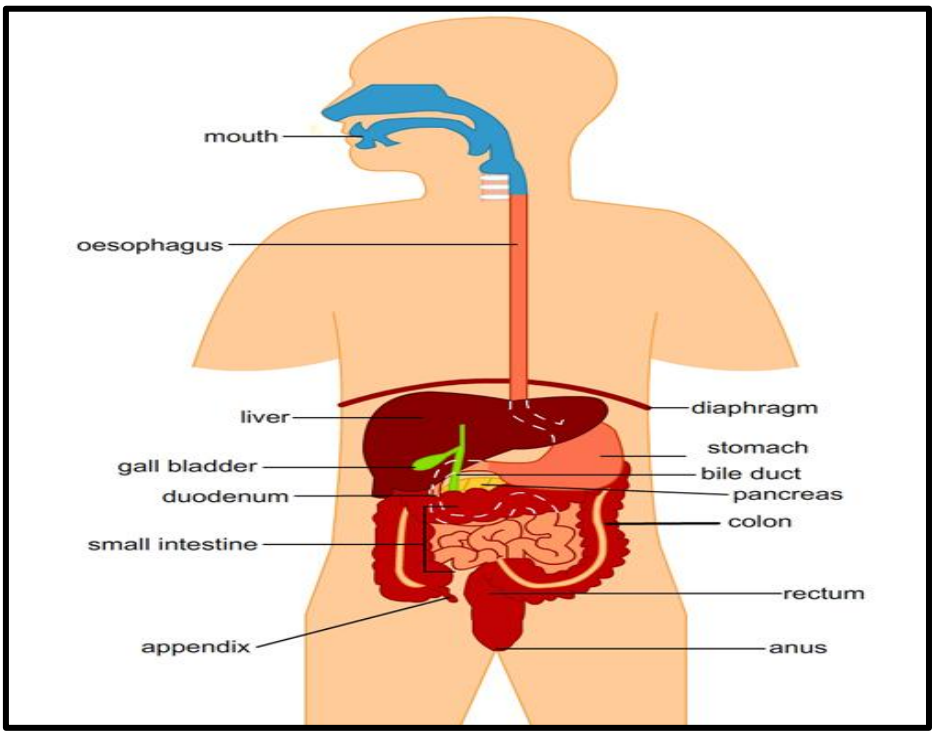
- define the digestive system
- identify the different parts of the digestive system
- explain the main functions of the digestive system

The Digestive System

Food supplies us with energy which is essential for all the activities that take place in body cells. Before the body can use the food, it is eaten, then is digested and absorbed. The digestive system breaks down the foods you eat into smaller components that are absorbed in the intestines and carried in the blood to all parts of the body. Those parts of the food which the body cannot use, or which are harmful, are excreted in the faeces (stool).

The digestive system is a combination of many individual organs that work together to convert the nutrients in food into chemicals that can be used by the body.

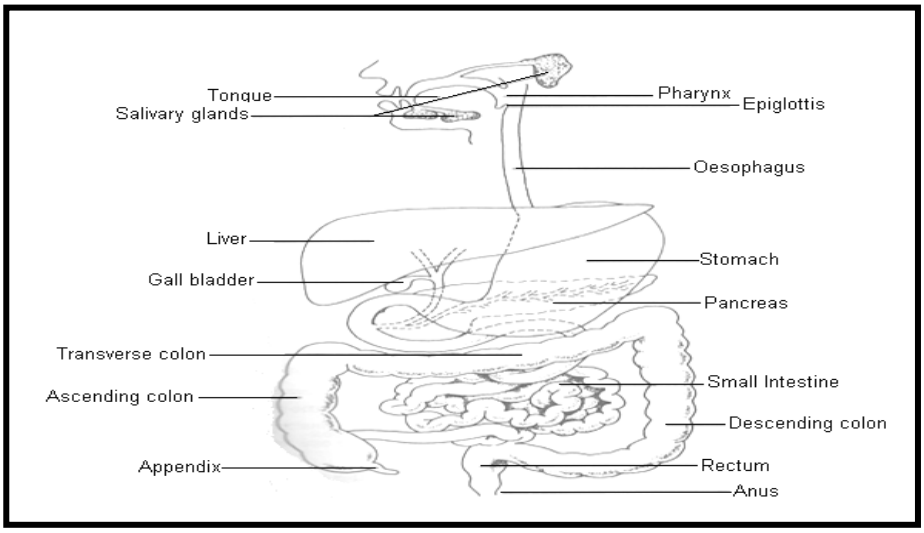
The digestive system consists of the alimentary canal and several other structures. The alimentary canal is a continuous hollow tube reaching from the mouth to the anus. Other structures associated with the alimentary canal are the teeth, tongue, salivary glands, liver, gallbladder, and pancreas.



The digestive system of the human body

Structure of the Digestive system

Food is taken into the mouth. Through swallowing, and a process called peristalsis, food is moved along the alimentary canal. In the stomach and small intestine, food is broken down into small particles when it is churned and mixed with digestive juices. Digested food substances pass through the walls of the small intestine, into the blood stream, and are transported to every cell in the body. Indigestible substances and wastes are passed out of the body.



The structure of the digestive system of the human body

The digestive system is a combination of many individual organs that work together to convert the nutrients in food into chemicals that can be used by the body.

Structure and Function of the Digestive System

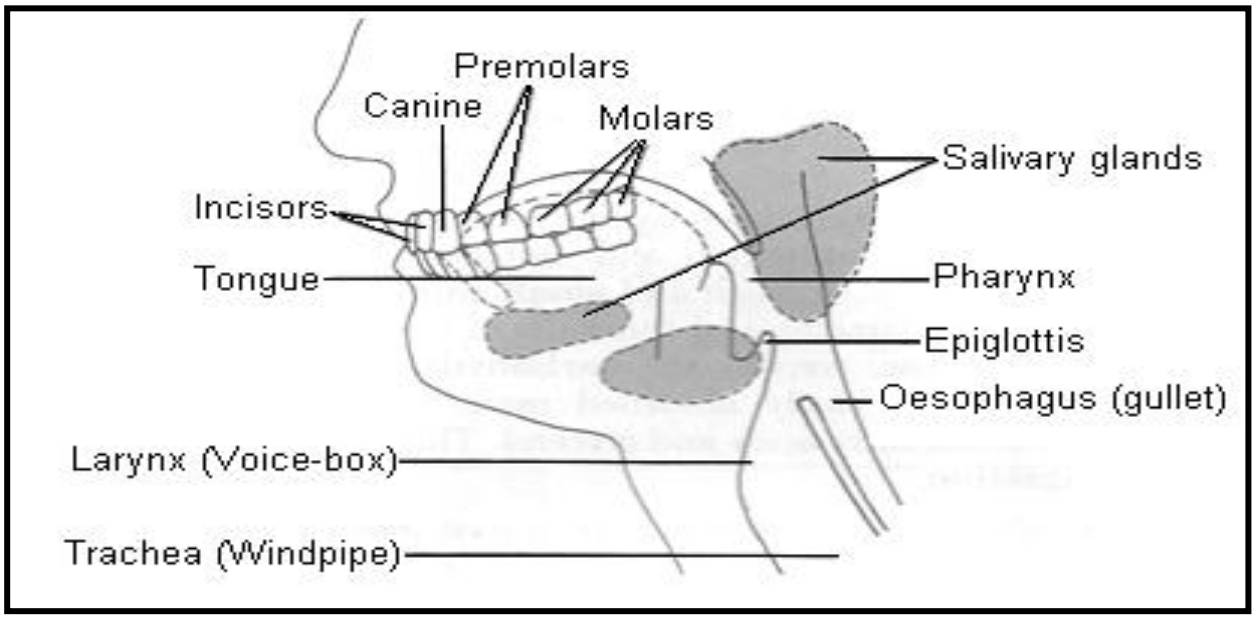
The alimentary canal which makes up the digestive system starts from the mouth, oesophagus, stomach, small intestines, detours to liver and pancreas, then finally to the large intestines.

Mouth➔ Oesophagus➔ Stomach➔ Small Intestine➔ Liver, Pancreas➔ Large intestine

- **Mouth**

The teeth tear and crush the food that is eaten. Throughout childhood, the human will lose the first set of teeth. These will be replaced by 32 adult teeth. If an adult loses his/her teeth they will not grow back, so it is very important to take good care of your teeth. Drinking sugary drinks and chewing betelnut damages teeth. Brush your teeth at least twice a day with fluoride tooth paste.

Saliva contains special chemicals which dissolve the food and help it to travel through the digestive system. The body makes one and a half litres of saliva a day. After chewing, the food is swallowed.



The structure of the mouth, salivary glands and down

- **Oesophagus**

The oesophagus is the tube that connects the mouth to the stomach. Food is swallowed and forced down the tube by muscles in the oesophagus (Peristalsis- muscle contraction in the oesophagus that assists the food down the food pipe). A special flap called the epiglottis stops the food from entering the lungs. Another valve stops the stomach acid from escaping up the oesophagus.

- **Stomach**

The stomach is a pouch which stores and helps to break down food. The stomach walls are made of thick elastic muscles. When the stomach is full it can hold almost four litres of liquid. The stomach contains digestive acids and chemicals which break down food that is eaten. For most people, the food that is eaten will spend about three hours in the stomach.

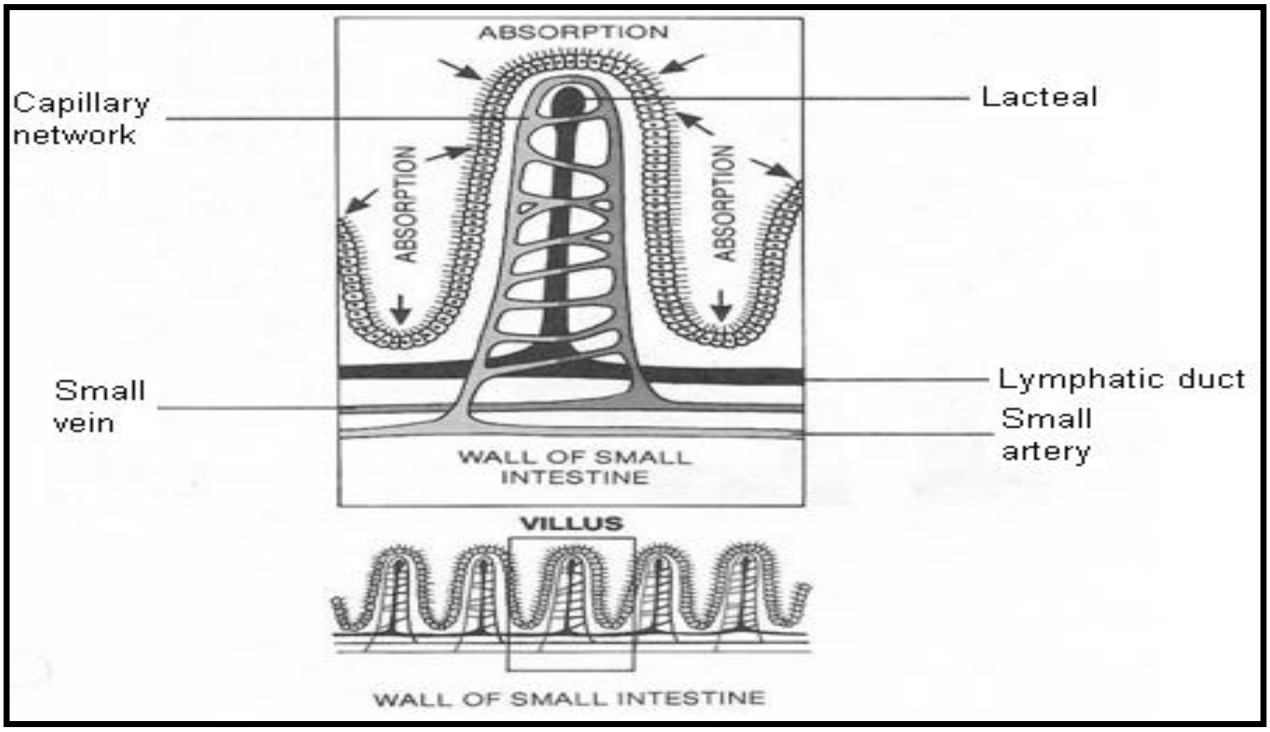
The stomach lining absorbs vitamins and other small molecules such as alcohol. These pass through the stomach lining and into the blood. When food leaves the stomach it has been broken down into a partly liquid form.

- **Small intestine**

Food travels from the stomach into the small intestine. The small intestine is a long muscular tube that is coiled up inside the body and is about four meters long. It is called the ‘small’ intestine because it is only about four centimetres wide. Muscles in the small intestine contract to squeeze food along.

This is where most of the digestion and absorption takes place. The small intestine produces different kinds of liquids to further break up food and helps absorb the food into the blood.

The lining of the small intestine is covered with small hair-like structures which improve absorption of different molecules.



The cross section of a villus in the wall of the small intestine

- **Liver and Pancreas**

Some of the food that is eaten requires special natural chemicals called enzymes to break it down. These chemicals can be found in different organs that are linked to the small intestine.

Food molecules travel through the blood from the small intestine to the liver and pancreas where they can be further broken down.

The liver produces liquid called bile. This liquid breaks down fats as food passes through the small intestine. The bile is stored in the gall bladder until it is needed. When it breaks down fats, some of the materials are returned to the small intestine.

The pancreas is another small organ that produces enzymes that break down fats, proteins, carbohydrates and chime. The pancreas secretes the enzymes into the small intestine to help with digestion. A lot of the hard work to break down the food is actually done by millions of friendly bacteria who live in the intestines. The body gives them a safe and warm place to live.

You can sometimes smell the gases these helpful bacteria make as they are working, when you break wind (fart).

- **Large intestine**

After the small intestine, what is left of the food enters the large intestine. It is only about one and a half meters long but much wider than the small intestine.

The large intestine absorbs water from the food. Other waste products from the body enter the large intestine and these are mixed with any leftover or unwanted food to become concentrated faeces. In fact, the brown colour of the faeces is caused by the old dead red blood cells the body removes.

Faeces is stored in the rectum and then regularly passed from the body through the anus.

Processes in the Alimentary Canal

The three processes involved when food passes through the alimentary canal are digestion, absorption and elimination.

- **Digestion**

After food is taken into the mouth (ingested), chemical and mechanical digestion begins. Digestion is the process where food is broken down and made suitable for use by the body cells. Digestion is done in the mouth, stomach, and the duodenum.

- **Absorption**

Digestion through chemicals such as gastric and pancreatic juices and through mechanical movements like the churning action of the stomach is done to change all food into a form which can enter the blood and be carried to all body cells. Absorption is the passage of digested substances into the blood or lymph. While a few things, like some of the water, are absorbed in the stomach, most absorption takes place in the small intestine through the very thin walls of the villi.

Once the digested substances pass through the villi walls; they enter the blood or lymph for transportation to all body cells. Any undigested and unabsorbed substances plus 1-1.5 litres of water enter the large intestine. In the large intestine most of the remaining water is absorbed.

- **Elimination**

Faeces (stool) are stored in the last part of the large intestine, the rectum, until they are excreted from the body through the anus. Defecation is the process by which faeces are passed through the anus. Faeces consists of water, undigested food materials such as fibre, bacteria, and broken down bilirubin (bile pigment)- which gives faeces their brown colour. Mucus, secreted by the walls of the intestine, lubricates the passage of the faecal matter down the large intestine.

Activity 6.1

Do this activity.

Do NOT look at the correct answers. You may start now.

1. Answer the following in complete sentences.

a). What are peristalsis waves?

_____

_____

b) What is the main function of the large intestine?

_____

_____

2. Complete each sentence by filling in the missing word (s).

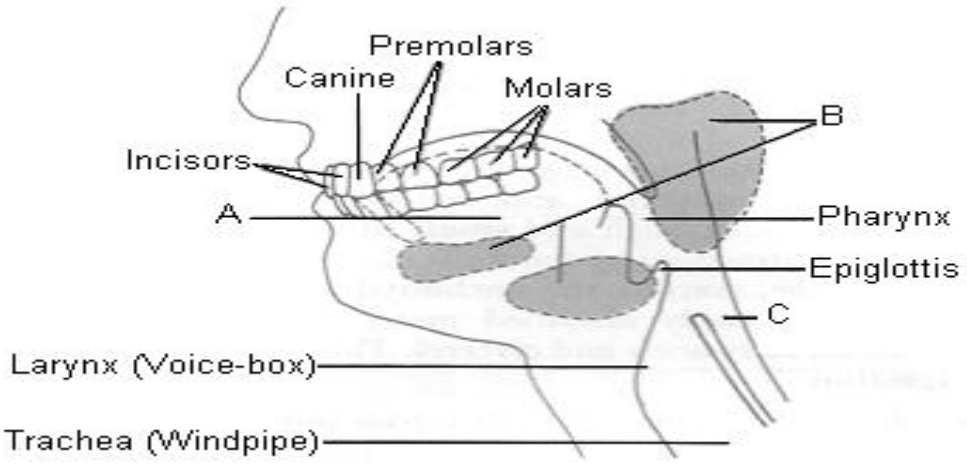
a. Food is absorbed through the _____in the small intestine.

b. The _____ closes off the larynx when one swallow.

3. Complete the flow chart of the alimentary canal below.

Mouth➔ _____➔ Stomach➔ _____➔ Liver, Pancreas ➔ _____

4. Write the correct word for the missing label on the diagram below.



A. _____ B. _____

C. _____

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

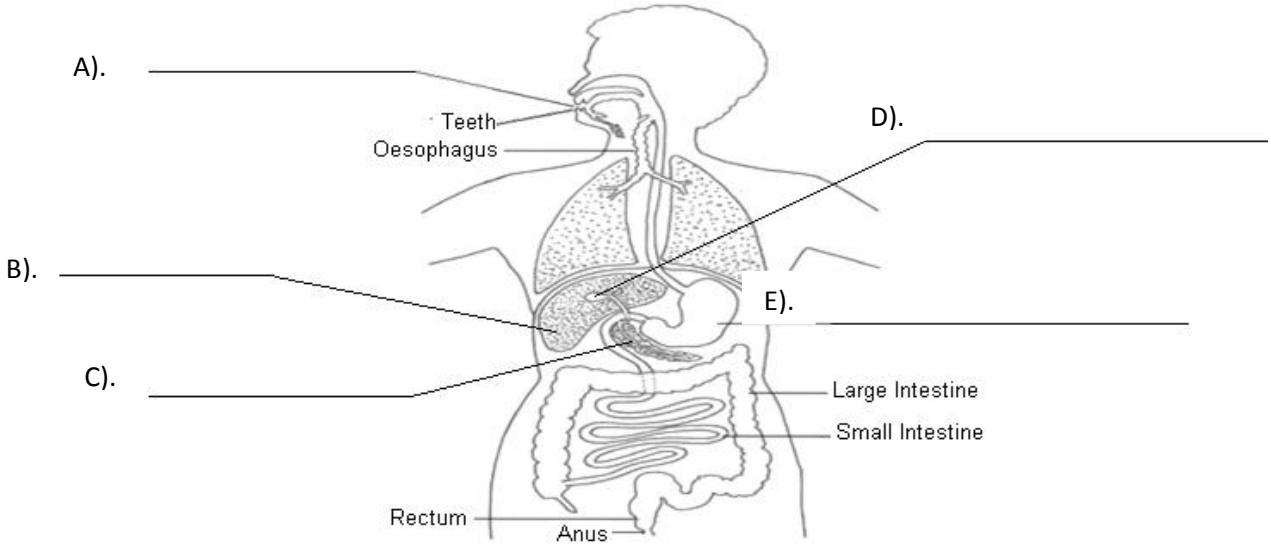
- The digestive system breaks down the foods you eat into smaller components that are absorbed in the intestines and carried in the blood to all parts of the body.
- The digestive system is a combination of many individual organs that work together to convert the nutrients in food into chemicals that can be used by the body.
- The alimentary canal is a continuous hollow tube reaching from the mouth to the anus. Other structures associated with the alimentary canal are the teeth, tongue, salivary glands, liver, gallbladder, and pancreas.
- The alimentary canal which makes up the digestive system starts from the mouth, oesophagus, stomach, small intestines, detours to liver and pancreas, then finally to the large intestines.
- The three processes involved when food passes through the alimentary canal are digestion, absorption and elimination.

NOW DO PRACTICE EXERCISE 6 ON THE NEXT PAGE

Practice Exercise 6

The Practice Exercise consists of 4 short answer questions.

1. Refer to the diagram below. Write the correct word for the missing label from the list below. List: ligament, mouth, tendon, liver, muscle sheath, pancreas, gall bladder, cartilage, muscle, nerve, joint, stomach, bone, bundles of muscle



2. List the organs in the digestive system according to the process it is involved in.

A. digestion

i). _____

ii). _____

iii). _____

B. absorption

i). _____

ii). _____

C. elimination

i). _____

ii). _____

3. Complete each sentenced by filling in the missing word(s).

a. The main part of the large intestine is the _____; it has three main divisions: the _____, the descending, and the _____.

b. An_____ in saliva begins the digestive process.

4. Match the description of a term with a word from the list of words below.

Small intestine, duodenum, stomach, colon, pancreas, gall bladder, enzyme, teeth,

_____ where the majority of the simple products in food are absorbed.

_____ these grinds food in the mouth.

_____ where bile comes from.

_____ part of the large intestine is the transverse _____.

_____ saliva contains this.

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 1.

Answers to Activity 6.1

1. Answer the following in complete sentences.

i). **What are peristalsis waves?**

Muscle contraction in the oesophagus that assists the food down the food pipe

ii) What is the main function of the large intestine?

Absorb water that has not been absorbed by the stomach and small intestine

2. Complete each sentence by filling in the missing word(s).

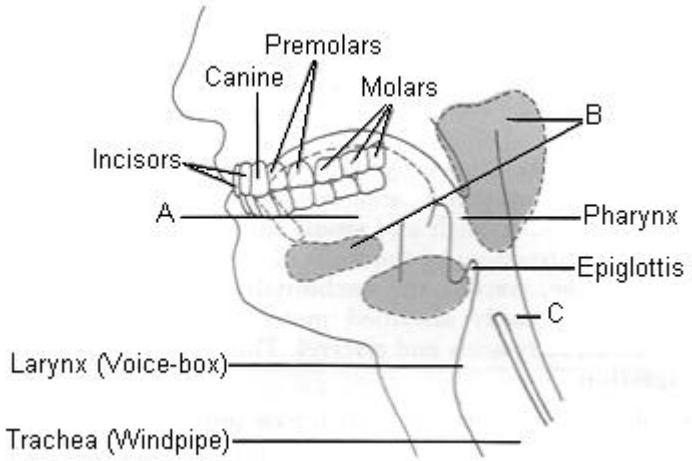
a. Food is absorbed through the villi in the small intestine.

b. The **epiglottis** closes off the larynx when one swallow.

3. Complete the flow chart of the alimentary canal below.

Mouth➔ **Oesophagus**➔ Stomach➔ **Small Intestine**➔ Liver, Pancreas ➔ **Large Intestine**

4. Write the correct word for the missing label on the diagram below.



A. tongue B. salivary glands C. oesophagus

Reference

Body Systems in Papua New Guinea, R. Jones, J. Miller

Know your Body and Stay Healthy, S. Datta

An Introduction to Health and Physical Education for Secondary Schools, P. Williams

Answers to Practice Exercises 1 - 6

Answers to Practice Exercise 1

1. By ruling a clean arrow match the organ that is associated with the body system.

Body System	Organ
Muscular System	heart
Respiratory System	large Intestine
Cardiovascular System	skull
Digestive System	biceps
Skeletal System	lung

2. Identify the body system

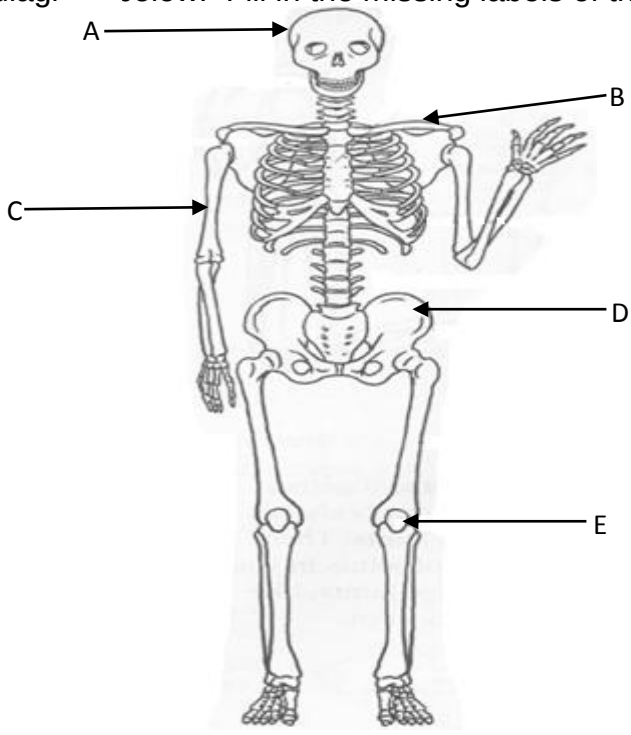
a) skeletal b) cardiovascular c) respiratory d) muscular

3. Match the word and definition by writing the Letter (A-D) of the word beside the correct definition.

Word		Definition
A. organ	**D**	basic units of a person's body
B. tissue	**B**	collection of cells which are joined together to perform a specific function in the body
C. body System	**A**	part of a system, made up of cells and tissues which allow it to perform particular functions
D. cell	**C**	group of organs that work together to perform specific functions

Answers to Practice Exercise 2

1. Refer to the diagram below. Fill in the missing labels of the skeleton diagram below.



A. skull **B.** clavicle **C.** humerus **D.** pelvic girdle

E. patella

2. List the functions of the human skeletal system.

a. . It gives rigidity and shape to the body.

b. It gives protection to delicate body organs by forming rigid, protective walls and cavities. For example the rib cage protects the heart and lungs.

c. It provides attachments for muscles, so that movement can be produced by your muscles at the joints.

d. It manufactures blood cells and store minerals that are needed for other body systems.

3. From the list of bones below arrange them as hinge or ball and socket joint.

List: knee, shoulder, elbow, wrist, hip

a. hinge joint

   knee, elbow and wrist

b. ball and socket joint

   shoulder and Hip

4. Write the name of the rubbery material that connects two bones.

Cartilage

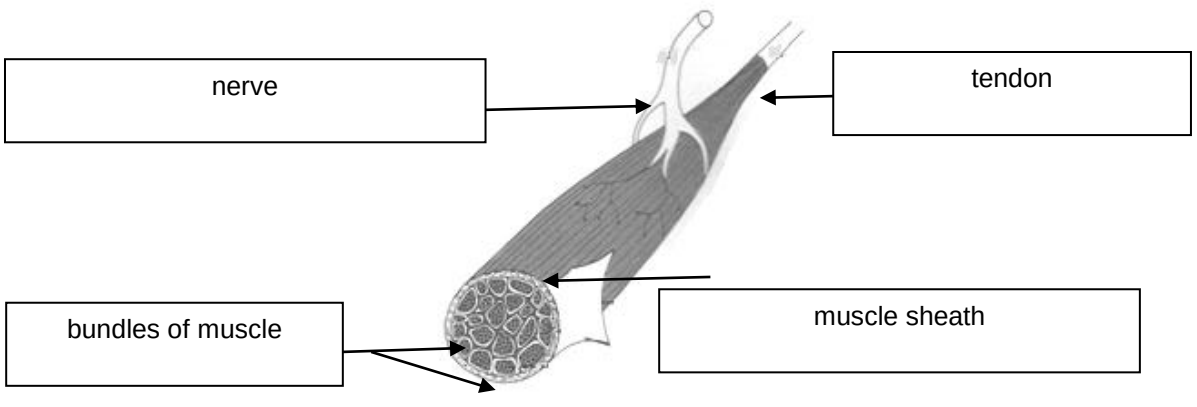
5. How many joints are present in the human skeletal system?

100

Answers to Practice Exercise 3

1. Refer to the diagram below. Write the correct word for the missing label from the list below.

List: ligament, tendon, muscle sheath, cartilage, muscle, nerve, joint, bone, bundles of muscle



2. Write the missing words with the correct word from the list below.

List: ligament, tendon, muscle sheath, fibres, cartilage, involuntary, muscle, cells, nerve, joint, bone, bundles of muscle, voluntary, brain

Muscles are made up of long **fibres** which are made up of millions of muscle **cells**. Some muscles need you to control them with your brain. These are called **voluntary** muscles. But there are some muscles which work without you having to think about them. These are called **involuntary** muscles. Muscles have many different **nerve** cells around them. These nerve cells connect the muscles to the **brain**.

3. List the three types of muscles.

a. cardiac muscle

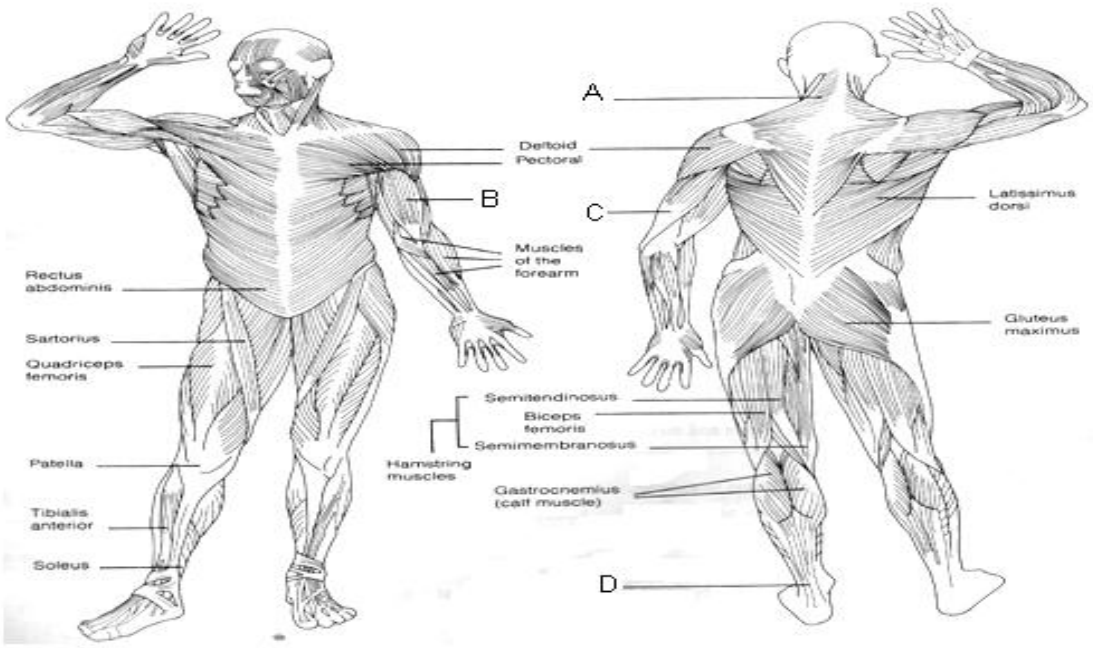
b. smooth muscle

c. skeletal muscle

4. Write the following muscles into the correct muscle type category.

a. heart muscles	cardiac muscle
b. stomach muscles	smooth muscle
c. leg muscles	skeletal muscle
d. hand muscles	skeletal muscle

5. Refer to the diagram below. Fill in the missing labels of the skeletal muscular diagram below.



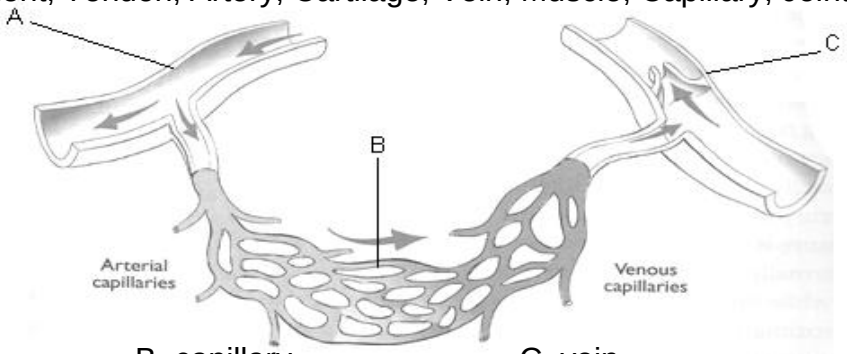
A. trapezius B. biceps

C. triceps D. achilles tendon

Answers to Practice Exercise 4

1. Refer to the diagram below. Write the correct word for the missing label from the list below.

List: Ligament, Tendon, Artery, Cartilage, Vein, Muscle, Capillary, Joint, Bone

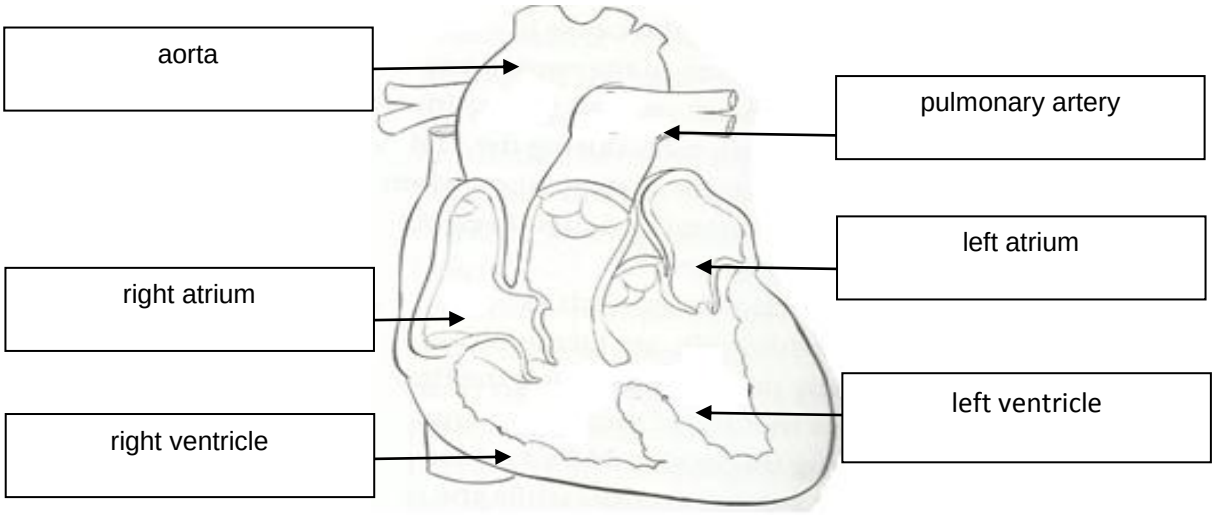


A. artery B. capillary C. vein

2. Fill in the spaces with the most appropriate term.

The cardiovascular system is composed of the **heart** which acts as a pump, and a series of hollow tubes known as **blood vessels**.

3. Refer to the diagram below. Write the correct word for the missing label.



4. Outline the difference between systole and diastole.

Systolic blood pressure, or systole, is a measurement of the outward pressure the blood exerts against the walls of an artery as the ventricles contract while diastole blood pressure or diastole is a measurement of the pressure the blood exerts against the walls of an artery as the ventricles relax.

5. List the three main characteristics of veins.

a. The veins except for the pulmonary vein carry blood back to the heart from the body.
b. The blood carried is reddish-blue in colour because it is low in oxygen and high in carbon dioxide.
c. Veins do not have a pulse.

Answers to Practice Exercise 5

1. Refer to the diagram below. Write the correct word for the missing label from the list below.
List: ligament, wind pipe, tendon, artery, cartilage, larynx, vein, muscle, capillary, joint, bone, lungs

A. windpipe
B. larynx
C. lungs

2. Matching items- match the definition in Column B with the term in Column A to which it applies. (Use the letters in Column B to give your answers)

Column A

1. right atrium	(d)
2. diaphragm	(a)
3. systematic Circulation	(e)
4. aorta	(b)
5. bronchioles	(f)
6. trachea	(c)

3. Refer to the diagram below. Write the correct word for the missing label.

i). nasal cavity	ii) bronchioles
iii) right lung	iv) larynx
v) trachea	vi) diaphragm

Answers to Practice Exercise 6

1. Refer to the diagram below. Write the correct word for the missing label from the list below. List: ligament, mouth, tendon, liver, muscle sheath, pancreas, gall bladder, cartilage, muscle, nerve, joint, stomach, bone, bundles of muscle

A. mouth	B. liver
C. pancreas	D. gall bladder
E. stomach	

2. List the organs in the digestive system according to the process it is involved in.

A. digestion
i). mouth
ii). stomach
iii). duodenum
B. absorption
i). small intestine
ii). large intestine
C. elimination
i). rectum
ii). anus

3. Complete each sentence by filling in the missing word(s).
a. The main part of the large intestine is the **colon**; it has three main divisions: the **ascending**, the descending, and the **transverse** .
b. An **enzyme** in saliva begins the digestive process.

4. Match the description of a term with a word from the list of words below.

Small intestine, duodenum, stomach, colon, pancreas, gall bladder, enzyme, teeth,

small intestine	where the majority of the simple products in food are absorbed.
teeth	these grinds food in the mouth.
gall bladder	where bile comes from.
colon	part of the large intestine is the transverse _____.
enzyme	saliva contains this.

TOPIC 2

FITNESS

In This Topic You Will Learn About:

- Self –Body care.
- Fitness components.
- Periodization for training.
- Fitness programme.

TOPIC 2: FITNESS

In this Topic, you will learn about Fitness. You will:

- Define personal hygiene.
- Identify ways to care for the body.
- Identify the components of fitness.
- Learn how to measure fitness levels.
- Identify different methods of fitness for different sports.
- Define periodization.
- Identify the aspects of fitness training.
- Identify the importance and benefits of training using periodization.
- Learn how draw up a physical fitness programme.
- Identify a particular sports and its structure.
- Identify the rules, skills and requirements towards fitness training.

In doing so, you will find out more about your daily body care in relation to your personal hygiene. You will explore and learn more about ways in which you can care for your body and enumerate healthy ideas, attitudes and habits in order to improve your personal hygiene. Also you will learn more about the measurement of your training in Health-related and sports-related fitness.

We hope you will enjoy this Topic.

Lesson 7: Body Care

Welcome to lesson 7 of unit 2. In the last lesson you learnt about the digestive system. In this lesson you will learn about body care.

Your Aims:

- define body care in terms of personal hygiene
- identify ways to care for the body

Health- Positive State of Well-being

Health is a positive state of physical and mental well-being. When you feel secure- by being physically healthy and free from disease, by feeling content, and by living in a comfortable and clean environment you are in a state of positive health.

Health is an important part of life. Good health is more than just the absence of physical illness. It involves feeling good about oneself and others and how well one can look after him/her-self. This state of active good health is called well-being. In order to achieve and maintain well-being you must lead an active, healthy lifestyle.

Your well-being is made up of your physical, mental, spiritual and social health. Your well-being depends on your choices and behaviour. You have a lot of control over your health. Look at the two rugby players. They keep a close watch on how they look after their body for high performance.

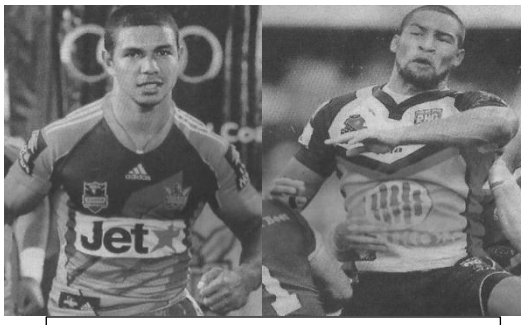


Figure 1 shows a feeling of physical of well-being.

A feeling of physical well-being is usually achieved by:

- eating wisely
- seeking medical help when you are ill
- getting enough sleep
- having time for relaxation
- being physically fit

Taking Care of the Body

The human body is a complex and marvellous organism. Even today people still do not understand all of its secrets. The body is often called a living machine because it consists of many parts, all with different functions. The proper functioning of the body depends on all the different parts working together in harmony.

Taking a good care of the body is simply keeping physically fit. People differ in their opinions about what keeping physically fit means. For some, it is being able to go about their everyday business without physical discomfort; for a top athlete, it is having a body tuned to peak performance. Not everyone is going to be or even want to be top athletes.

For many, taking care of the body or physical fitness for health means:
- **having the body systems work efficiently**
- **being able to move with ease and enjoyment**
- **being able to maintain physical activities for extended periods without becoming fatigue**

It has been medically proven that,(compared with people who do not take care of their body), people who take care of their body:

- have better-functioning body systems
- have less risk of heart disease
- have fewer ulcers
- have fewer muscular or joint aches
- develop fewer serious diseases
- recover faster from illness
- have a greater ability to cope with stress and emotional problems
- get tired less easily
- enjoy a greater variety of activities, many of which widen their circle of friends and enrich their lives

There are a number of things that you can do to take care of your body.

A. Diet

- Eat a balanced diet that includes a variety of foods each day, especially fresh fruit and vegetables.
- Always eat breakfast before you go to school so you can study properly.
- Occasionally, eat food that is greasy, very sweet or salty.

The basic nutrients or food groups are carbohydrates, fats, proteins, vitamins and fibre. Another way of classifying food is based on how the food is used by the body.

Food Group	Nutrients (Types of food)	Purpose or function
Energy Foods	Carbohydrates and Fats	Provide energy for work and play, and warmth
Growth Foods	Protein	For body building and repair
Protective Foods	Vitamins and Minerals	For protection from disease

Foods that contain carbohydrates and fat are energy foods, and carbohydrates can be divided into foods that contain starch and foods that contain sugar.

Carbohydrates		**Fats**
Starches	**Sugars**	
Sweet potato (kaukau) Taro Yam Cassava (tapioca) Sago Breadfruit Corn Banana Rice Bread Biscuits	Sugar Sugar cane Honey Sweet fruits Jam Syrup	Coconut cream Margarine Butter Dripping (grease) Oil- Coconut oil, Peanut oil, Pandanus oil Breast milk

Protein foods can come from animals or plants. Plant proteins are better for body building when different kinds are eaten at the same time.

Animal protein food	**Plant protein food**
Meat- fresh and tinned Fish- fresh and tinned Shellfish Crabs, prawns and crayfish Birds Insects- grubs and caterpillars Snakes Milk- powdered milk, tinned milk, breast milk Eggs Cheese	Beans- winged beans, lima beans, soya beans, broad beans, snake beans Peas Peanuts Pandanus nuts Other nuts- galip nuts, coconuts

Fresh fruits and vegetables containing vitamins and fibre are protective because they help the body to heal and repair itself.

Dark green leafy vegetables	**Red and yellow vegetable**
Pumpkin tips Aibika Watercress Ferns and other bush greens Long and short pitpit Green beans	Tomatoes Pumpkin Carrots
Citrus fruits	**Red and yellow fruits**
Oranges and mandarins (swit muli) Lemons (muli) Pomelo Grapefruit	Pawpaw Guava Mango Pineapple

B. Liquid Intake

- Drink plenty of water, especially when the weather is hot. This helps digestion and in getting rid of waste products.
- Drink sweet, fizzy drinks only occasionally.

When a person is working very hard or playing sports he/she loses fluid through sweating and increased breathing rate. Therefore, they must drink water during prolonged activity otherwise they will suffer from dehydration.

Water makes up 60 % of the body weight. You should drink about 5-6 medium-sized glasses of water every day.

Water provides:

- Provides the moisture necessary for all living tissue except the nails, hair and teeth.
- Helps the chemical reactions in the body.
- Dilutes and moistens food.
- Dilutes waste products and poisonous substances in the body.

Water is also known to form blood plasma, cell protoplasm and tissue fluid. It regulates body temperature and aids in the transport of nutrients and body waste.

C. Exercise

- Take some exercise every day. Walking, working in the garden and playing sport are all good exercise.
- Take some vigorous exercise several times a week so that you breathe faster and make your heart pump harder.

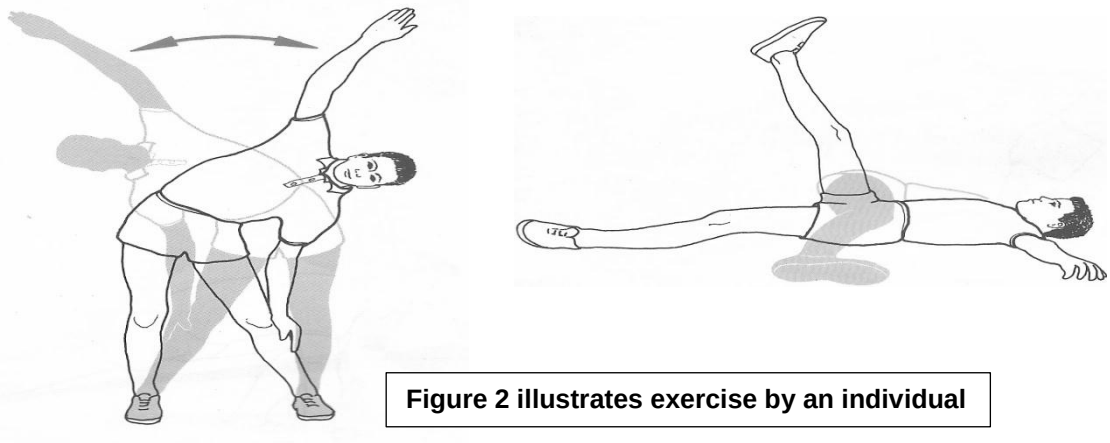


Figure 2 illustrates exercise by an individual

Exercise and improved fitness levels have an important influence on the functioning of all the body systems.

Here are the effects of exercise on the following body systems.

i). Cardiovascular System

- An increase in the size and strength of the heart
- An increase in the volume of blood pumped by the heart with each stroke
- A reduction in resting heart rate
- A reduction in heart rate during exercise
- An increase in the number and size of the blood vessels
- An increase in the coronary blood supply
- A reduction in the amount of fatty substances deposited in the arteries
- Maintenance of elasticity of the artery walls
- A reduction in blood pressure
- A greater aerobic endurance capacity
- A greater oxygen debt tolerance
- A lowering of the risk of heart disease

ii). Respiratory System

- An improvement in the efficiency of the muscles controlling inspiration and expiration
- An improvement in the conditioning of the respiratory system to supply oxygen and remove carbon dioxide with less effort
- Improved cooperative functioning with the cardiovascular system

iii). Skeletal System

- An increase in the size and strength of the muscle fibres
- An improvement in blood supply to the working muscle, in the efficiency with which they can use oxygen, and in the removal of carbon dioxide and other wastes produced by them
- As a result of the above, a greater ability to withstand muscle fatigue during exercise, and a faster recovery rate afterwards
- Improved posture and general appearance, as a result of better muscle tone and muscle strength
- Better circulation of the blood through the veins as a result of improved muscle tone
- Strengthening of the diaphragm and the muscles controlling the ribcage, which improves the functioning of the lungs in inspiration and expiration
- Prevention of loss of calcium from the bones
- Improvement of the body's flexibility through stretching of the muscles and ligaments about joints
- Assistance in the rehabilitating injured muscles, joints and bones

iv). Digestive System

- Exercise is a better way to lose weight than dieting because
  a) It is more enjoyable than dieting
  b) Moderate exercise can reduce your appetite naturally
  c) Regular exercise over a long period uses up stored body fat
- Exercise increases the tone and strength of the abdominal muscles, thereby aiding digestion in the stomach and intestines
- Exercise can also help eliminate constipation, improving the efficiency of bowel functioning
- A balanced and regular diet will provide the necessary energy requirements for participation in exercise programmes

- You should not exercise immediately after eating as the abdominal muscles are contracted during exercise, and this will interfere with the digestive functions of the walls of the stomach and intestines

D. Rest and Sleep

- Make sure you get enough sleep every night.
- If you are still growing, studying and playing sport then you need plenty of sleep. Most people need about eight hours every night.
- If you find it hard to get up in the morning, or feel tired and lazy, then you are probably not getting enough sleep.

Rest and sleep play a vital part in our lives. They allow the body to get on with the task of growth and development, restore energy supplies and revive you mentally.

Figure 3 illustrates rest and sleep in humans

The amount of sleep needed varies among individuals. However, age, level of activity, stage of development and emotional state are factors that influence sleep requirements.

E. Avoid Smoking, Betel nut and Drinking Alcohol

- Avoid smoking tobacco and marijuana, chewing Betel nut and drinking alcohol.
- All of these can cause harm to your body.

Smoking is one of the biggest health problems in the world today. When people smoke for a long time, then there can be serious effects on their health. Tobacco contains a drug called nicotine, which means that tobacco is a habit-forming substance or can cause addiction.

Betel nut is acidic and the lime is used to neutralise the acid which improves the taste in the mouth. Unfortunately, this combination can lead to cancer of the mouth, tongue or cheeks. The cancer usually begins as a small spot or sore, but it can grow large if the person continues to chew Betel nut.

Alcohol is absorbed directly from the stomach and affects the brain. Alcohol affects behaviour and has become a social problem as well as being a health problem. Heavy

drinkers can be violent and want to fight. Spending money on alcohol also means that there is not always enough money for important things like food, clothing and school fees.

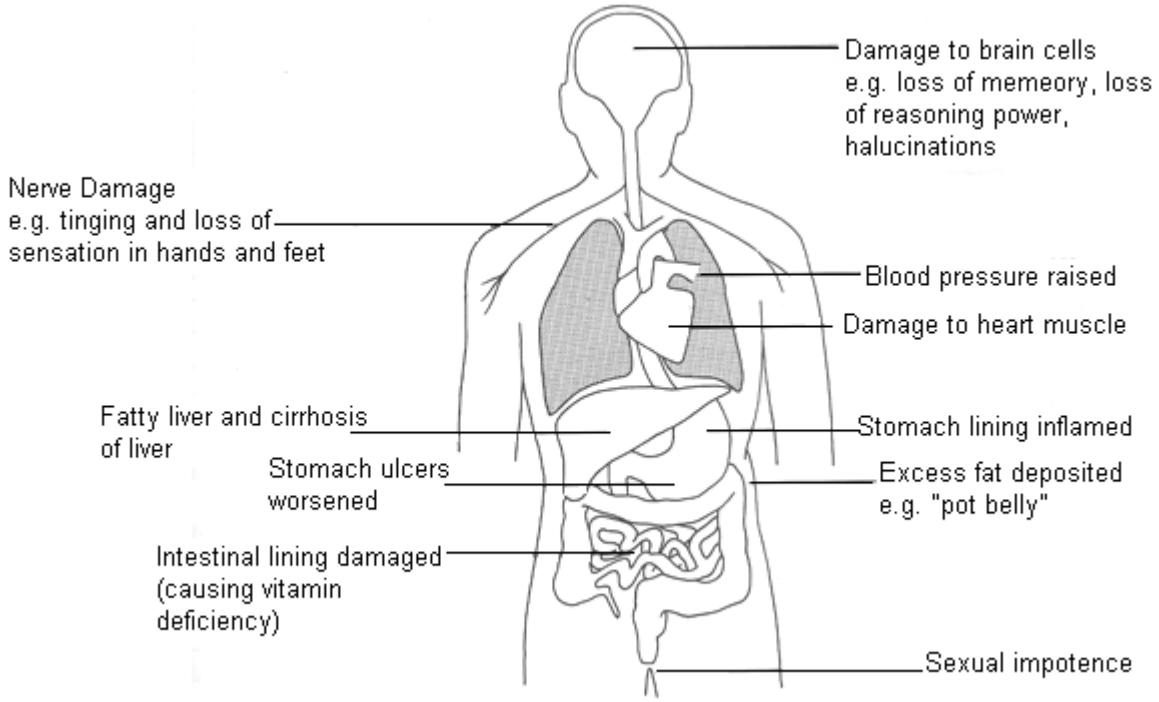


Figure 4 illustrates the long term effects of alcohol on the body

Activity 7.1

Do this activity.

Do NOT look at the correct answers. You may start now!

1. Refer to the list below.

Kaukau, Taro, Sweet fruits, Coconut cream, Honey, Yam, Margarine, Jam, Butter

Arrange the food according to what they contain mostly in them.

Starches	**Sugars**	**Fats**
_____	_____	_____
_____	_____	_____
_____	_____	_____

2. What is health?

_____

_____

3. Write the five things you can do to take care of your body.

a. _____

b. _____

c. _____

d. _____

e. _____

4. What is required to be watched closely in your diet in taking care of your body?

i). _____

ii). _____

iii). _____

5. List the 3 main effects of exercise on the respiratory system of the human body.

i). _____

ii). _____

iii). _____

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

- Good health is more than just the absence of physical illness. It involves feeling good about oneself and others and how well one can look after him/her-self.
- Taking a good care of the body is simply keeping physically fit.
- Taking care of the body involves good diet, proper liquid intake, resting, and exercise.
- The basic nutrients or food groups are carbohydrates, fats, proteins, vitamins and fibre.
- Water is known to form blood plasma, cell protoplasm and tissue fluid. It regulates body temperature and aids in the transport of nutrients and body waste.
- Exercise and improved fitness levels have an important influence on the functioning of all the body systems.
- Rest and sleep play a vital part in life. They allow the body to get on with the task of growth and development, restore energy supplies and revive you mentally.
- Avoid smoking tobacco and marijuana, chewing Betel nut and drinking alcohol.

NOW DO PRACTICE EXERCISE 7 ON THE NEXT PAGE

Practice Exercise 7

The Practice Exercise consists of 5 short answer questions.

1. Unscramble the letters to complete the following statements.

a. A regular exercise programme will not only produce LLGHSCPYAIIOO (_____) benefits but also improve your sense of LEWL-EGNIB(_____).

b. On e DTMAIMEEI (_____) effect of exercise is an increase in your heart rate.

c. With regular exercise, more oxygen gets to the working muscles because of the improved efficiency of the ETHAR (_____), GNUSL (_____) and ODLOB SSSEELV (_____).

2. List three reasons why exercise is a better way to lose weight than dieting

a. _____

b. _____

c. _____

3. Complete the table below.

Food Group	**Nutrients (Types of food)**	**Purpose or function**
A.	Carbohydrates and Fats	Provide energy for work and play, and warmth
Growth Foods	**B.**	For body building and repair
Protective Foods	Vitamins and Minerals	**C.**

4. List the 4 most important reasons why you should drink water every day

a. _____

b. _____

c. _____

d. _____

5. Complete the sentence below with the most appropriate word.

If you are still growing, studying and playing sport then you need plenty of sleep. Most people need about _____hours every night.

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 1.

Answers to Activity 7.1

1. Refer to the list below.
Kaukau, Taro, Sweet fruits, Coconut cream, Honey, Yam, Margarine, Jam, Butter

Write the food from the list into their correct food groups.

Starch	Sugars	Fats
Kaukau	Sweet fruits	Coconut cream
Taro	Honey	Margarine
Yam	Jam	Butter

2. What is Health?

Health is a positive state of physical and mental well-being.

3. Write the five things that you can watch or do to take care of your body.

a. Diet

b. Liquid intake

c. Exercise

d. Rest or sleep

e. Avoid Smoking, Betel nut and Drinking Alcohol

4. What is required to be watched closely in your diet when taking care of your body?

i). Eat a balanced diet that includes a variety of foods each day, especially fresh fruit and vegetables.
ii). Always eat breakfast before you go to school so you can study properly.

iii). occasionally, eat food that is greasy, very sweet or salty.

5. List the 3 main effects of exercise on the respiratory system of the human body.

i). An improvement in the efficiency of the muscles controlling inspiration and expiration
ii). An improvement in the conditioning of the respiratory system to supply oxygen and remove carbon dioxide with less effort
iii). Improved cooperative functioning with the cardiovascular system

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Lesson 8: Fitness Components

Welcome to lesson 8 of unit 2. In the last lesson you learnt about body care. In this lesson you will learn about fitness components.

Your Aims:

- identify the components of health-related fitness, and sports related fitness
- identify ways of measuring fitness levels
- identify different methods of fitness training

The Components of Health-Related Fitness

This is a general type of fitness that allows you to enjoy a healthy lifestyle. By improving these components, we support our general health, particularly the functions of our body systems.

The health-related components of fitness are:

- aerobic capacity
- muscular strength
- muscular endurance
- flexibility
- body composition

The Components of Sports Related Fitness

This refers to the high level of fitness needed to play competitive sport. For successful sports performance you need to develop a good level of fitness in all components, but you should concentrate on those fitness components needed most by your sport.

People who have adequate development of sport-related components perform better, both in individual games such as tennis, and team games such as netball, because their movements are skilful, smooth and controlled. These vary from sport to sport.

The sport-related components of fitness are:

- muscular power
- agility
- balance
- coordination
- speed

Measuring Fitness Levels

In order to determine your present state of fitness, you will have to measure some of your fitness capacities. It will tell you which fitness components need improvement, as well as which components should be maintained at current level. Identifying strengths and weaknesses in your present fitness levels will allow you to set realistic and attainable fitness goals for the future.

Fitness levels are measured by doing fitness tests. Fitness tests should be relevant and specific to the requirements of your chosen sport; the time you have available and the equipment and facilities that you are able to use in order to complete the tests.

The table below shows a personal fitness profile. A person taking the tests will have to complete each section accordingly.

Fitness test	**Fitness component**	**Month:**		**Month:**		**Month:**	
		Result	**Rating**	**Result**	**Rating**	**Result**	**Rating**
Curl-ups / Flexed-arm hang	Strength and muscular endurance						
Sit-and-reach	Flexibility						
50-metre sprint	Speed						
Vertical jump	Strength and power						
Basketball throw	Strength and power						
Push-ups	Strength and muscular endurance						
1.6 km run / The 12-minute run	Aerobic capacity						
Multi-stage (beep) test	Aerobic capacity						
Body Mass Index (BMI)	Body composition						
Shuttle run	Agility						
Grip	Strength						

Fitness test	**Fitness component**	**Month:**		**Month:**		**Month:**	
		Result	**Rating**	**Result**	**Rating**	**Result**	**Rating**
Stork stand	Balance						

Alternate hand-wall toss	Coordination						

From this set, you can choose the tests which are relevant and specific to your fitness needs. One of these is the Four Factor Fitness Test (FFFT).

The Four Factor Fitness Test

1. The 12-minute Run Test
2. Sit-up Test
3. Sit-and-reach Test
4. Flexed-arm hang

Different Methods of Fitness Training

To improve your fitness components for general fitness or a specific sport you need to use training methods. Each training method requires you to follow a special formula or rule to improve one or more of your fitness components. The training methods are:

- continuous training
  - interval training
    - circuit training
      - resistance (weight) training
        - flexibility callisthenics training
          - fartlek training

⇨ **Continuous training:** This method of training is designed to improve your aerobic (heart and lung) capacity and your muscular endurance. Continuous training is the most important training method for both health and sport-related fitness.

⇨ **Interval training:** The interval training method is designed to improve strength and power, agility and speed (anaerobic capacity). It is the best training method for improving your ability to play team sports such as netball, rugby, soccer, basketball, football or field hockey. Interval training is a form of training during which work intervals are followed by rest intervals.

⇨ **Circuit training:** This is an excellent training method because it can improve your body strength, muscular endurance, agility and aerobic capacity all at the same time. Circuit training usually consists of a series of 5 – 10 exercises arranged around your house, backyard, sports hall, weight training facility, or oval. You perform the exercises in order as fast as you can.

⇨ **Resistance (weight) training:** This training method is used to improve your strength and power or muscular endurance. Resistance training involves using either weights in a gymnasium or your own body weight to make your muscles work.

⇨ **Flexibility (callisthenics) training:** This training method is used to improve your joint and muscle flexibility. Any exercise that puts a muscle in a stretched position develops your flexibility.

⇨ **Fartlek training:** This method of training is used to develop both your aerobic and anaerobic capacities. It involves short bursts of speed interspersed throughout a continuous training session. For example; run 10 laps of an oval. On every second lap, sprint up the middle of the ground from goalpost to goalpost. With Fartlek training the overall distance of the session, the distances of the sprints and the length of recovery period can be chosen to suit the fitness analysis of any sport.

Activity 8.1

Now do the following activity

1) List down three important factors when planning a fitness test.

a. _____

b. _____

c. _____

2) John is a soccer player. He is a striker in his team. Name the five important fitness tests which he can take to improve his fitness level.

a. _____

b. _____

c. _____

d. _____

e. _____

3) Imagine that you are a coach of your village team.

a. Identify the sport your team is playing: _____

b. Now identify the fitness training method you think is the most important for your team: _____

c. Explain, why you have chosen this training method:

_____

_____

_____

_____

Summary

You have now come to the end of the lesson. In this lesson you have learned that;

1) Fitness is divided into parts called ‘fitness components’. The 10 fitness components are:
   - aerobic capacity/endurance
   - muscular strength
   - muscular endurance
   - flexibility
   - body composition
   - muscular power/anaerobic capacity
   - agility
   - balance
   - coordination
   - speed

2) Fitness is measured using fitness tests. These tests consist of several exercises which cover all the ‘fitness components’.

3) Fitness training methods are used to improve your fitness components for general fitness or a specific sport. The methods are:
   - continuous training
   - interval training
   - circuit training
   - resistance (weight) training
   - flexibility / callisthenics training
   - fartlek training

NOW DO PRACTICE EXERCISE 8 ON THE NEXT PAGE

Practice Exercise 8

The list below shows different types of sports played in PNG. Write the 3 most important fitness training methods for each of the following sports.

1) Rugby
   i) _____
   ii) _____
   iii) _____

2) Basketball
   i) _____
   ii) _____
   iii) _____

3) Volleyball
   i) _____
   ii) _____
   iii) _____

4) Netball
   i) _____
   ii) _____
   iii) _____

5) Cricket
   i) _____
   ii) _____
   iii) _____

Answers to Lesson Activities

Answers to Activity 8.1

1) a) Must be relevant and specific to your sport
b) The available time that you will have
c) Equipment and facilities you will use

2) Any 5 from this list are correct: Aerobic capacity / Muscular strength / Muscular endurance / Flexibility / Speed / Agility / Balance

3) No standard answer; *answers should show the specific sport, and the chosen training method.

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Lesson 9: Periodization for Training

Welcome to lesson 9 of unit 2. In the last lesson you learnt about fitness components. In this lesson you will learn about periodization for training.

Your Aims:

- discuss the importance of training using periodization
- identify the benefits of training using periodization

To promote long term training improvements and avoid over training, an overall training program can be split into specific periods, each with their own objectives and set of training parameters. This concept is called **periodization** and it is the most effective approach to planning strength training programs for sport.

The overall training program (usually taken as one year long) can be split into set periods and usually consist of the:

- Preparation Period (Pre-season)
- Competition Period (In-season)
- Transition Period (Off / closed-season)

By coordinating the different elements of a strength training program with the phases of a typical season, the athlete can reach a peak for the start of the competitive season and most important parts of year.

Just as an overall season is split into distinct periods or phases so is the development of sport-specific strength. As mentioned earlier, it makes sense to develop certain types of strength before others. Here are the phases, in order, of an overall strength training program (which also lasts a year) and how they should coincide with phases of a typical season above:

Phase 1 - Basic Strength

Training for many sports can have an unbalancing effect on the body's musculoskeletal system. One side of the body may become stronger than the other, agonists may be overly strong compared to antagonists and smaller muscle groups are often neglected. Left unchecked these imbalances can compound and may lead to chronic and acute injury.

A period of basic strength training should occur at the start of the preparation period (early pre-season). For less experienced athletes it may be necessary to start during the transition period (closed season).

Phase 2 - Maximum Strength / Hypertrophy.

Most athletes benefit from a period of maximal strength training. The length of this phase will vary depending on the sport. Strength and power athletes will spend more time in this phase compared to endurance athletes for example. If a period of hypertrophy training is required (i.e. football or rugby players) it usually occurs before maximal strength training (2).

Hypertrophy and maximal strength training programs usually occur midway through the preparation phase (pre-season).

Phase 3 - Conversion

Until this point strength training has been generic in nature. To be effective however, this general base of strength must converted into sport-specific power or muscular endurance or both. The conversion of maximal strength occurs late in the preparation phase and may continue into the start of the competitive season.

Phase 4 – Maintenance.

When strength training stops the benefits gained previously quickly diminish. In order to avoid this detraining effect a certain level of conditioning is required to maintain the gains made in the preparation phase.

Fortunately, the volume required to maintain strength is less than that required to build it. But with the onset of competitive matches and events, plus a greater emphasis on tactical and skill-based training, less time is available for strength conditioning and sufficient recovery. The maintenance phase occurs throughout the competitive season.

Phase 5 - Active Recovery.

Following a strenuous season, a break from structured training and the rigors of competition is crucial for physical and mental respite. This can mean a complete break from all types of strength training programs for several weeks. Any longer than 3-4 weeks however, and fitness, particularly strength and power, diminishes rapidly. The active recovery phase occurs in the transition period (off / closed season).

Here are two sport-specific examples of how the various phases of strength training may occur in an annual plan:

Strength Phases for a Basketball Player											
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Preparation period			Competition period							Transition	
Basic strength	Max strength	Convert to power	Maintain power							Active recovery / basic strength	

Strength Phases for a College Football Player (Lineman)											
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Preparation period					Competition					Transition	
Basic strength	Hypertrophy	Max strength	Convert to power		Maintain max strength and power					Active recovery / basic strength	

Strength Phases for a X-Country Skiier											
May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Preparation period								Competition		Transition	
Basic strength	Max strength	Convert to muscular endurance		Max strength	Convert to muscular endurance			Maintain muscular endurance		Active recovery / basic strength	

Some sports do not have one continuous season. Swimmers for example, may have two competitive phases during the year. Boxers may need to prepare for several bouts in a year - each bout being the competitive phase.

Strength Phases for a Distance Swimmer											
Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1st prep. period				1st comp. period		T	2nd prep. period		2nd comp. Period		T
BS	MS	SE	MS	SE	Maintain SE	BS	MS	SE	Maintain SE		AR / BS

BS = basic strength, MS = maximal strength, SE = strength endurance, AR = active recovery T = transition period

Strength Phases for a Boxer											
Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Preparation			F	T	Preparation		F	T	Preparation		F	T
BS	MS	Conv. to P	Maintain P and ME	AR / BS	MS	Conv. to P	Maintain P and ME	AR	MS	Conv. to P	Maintain P and ME	AR

BS = basic strength, MS = maximal strength, P = power, ME = muscular endurance, AR = active recovery, F - fight, T = transition phase

You will find more detailed strength training programs (covering the different types of strength) within this section of the site. See also the sport-specific sections for strength training programs designed specifically for that sport.

In other words, periodization is a way we organise a training program so that an athlete is at his or her best peak for an important event or competition. Periodization is important in sports because it organises the different types of fitness components such as flexibility, strength, endurance and speed into days of the week. Weeks are organised into three phases.

Shown below is an example of the training program using periodization

Periodization Table

	Phase 1								**Phase 2**		**Phase 3**	
	Wk 1	**Wk 2**	**Wk 3**	**Wk 4**	**Wk 5**	**Wk 6**	**Wk 7**	**Wk 8**	**Wk 9**	**Wk 10**	**Wk 11**	**Wk 12**
Monday	ST/F	ST/F	SE/F									
Tuesday	R	R	R	R								
Wednesday	E/F	ST/F	E/F	ST/F								
Thursday	R	R	R	R								
Friday	ST/F	SE/F	ST/F	SE/F								
Saturday	E/F	E/F	ST/F	SE/F								
Sunday	R	R	R	R								

KEY: S: Speed **E:** Endurance **SE:** Strength-Endurance **ST:** Strength **F:** Flexibility **R:** Rest

Phase 1 is the build-up phase where the average training load is kept to a level that prevents over-training

Phase 2 is a period of one or two weeks in which training is increased to the maximum level. Care needs to be taken to prevent injuries

Phase 3 is the reducing phase that occurs one or two weeks before an event. During this period there is a decrease in the amount of training and a decrease in the frequency of training.

Benefits of Training Using Periodization:

The benefits of training using periodization are varied depending on the type of sport, whether it is an individual sport or a team sport. The benefits are;

- that most fitness components are covered
- good rest periods
- can be changed due to other factors; such as weather
- training is aimed at achieving a positive result at the actual event
- it can prevent over-training

Activity 9.1

Now do the following activity

1.) List down two important factors of using periodization in training.

a. _____

b. _____

2.) List down three benefits of using periodization in training.

a. _____

b. _____

c. _____

Summary

You have now come to the end of the lesson. In this lesson you have learned that;

- Periodization is a method of organising an athlete or teams training program
- Periodization organises the different types of fitness components into training programs over a period of time
- Training using periodization is important to both an individual athlete and a team
- Training using periodization is beneficial as the rest of the periods gives the athlete and teams time for their body systems to repair and function efficiently

NOW DO PRACTICE EXERCISE 10 ON THE NEXT PAGE

Practice Exercise 9

Develop a periodization table for yourself or your team for an important sporting event.

The following points should be noted:

i) The sporting event will take place in 8 weeks' time
ii) You must indicate whether it is an individual sporting event or team sporting event
iii) Include the 3 phases in your program
iv) Fill in the periodization table

Periodization table for:								
	Phase 1				Phase 2		Phase 3	
	Wk.1	Wk.2	Wk.3	Wk.4	Wk.5	Wk.6	Wk.7	Wk.8
Mon								
Tue								
Wed								
Thu								
Fri								
Sat								
Sun								

Answers to Lesson Activities

Activity 9.1

1) a) It prepares the athlete or the team for an important event or competition
b) It covers the different types of fitness components

2) Accept any three of the answers from the list below

- That most fitness components are covered
- Good rest periods
- Can be changed due to other factors; such as weather
- Training is aimed at achieving a positive result at the actual event
- It can prevent over-training

Reference

- Personal Development Grade 9;Outcomes Edition; Kenneth Rouse
- Personal Development Grade 9, Student Book; Dianne Mcinnes
- On Your Marks; Health, Physical Education and Sport Education for Junior Secondary Students; Peter Wright

Lesson 10: Fitness Programme

Welcome to lesson 10 of unit 2. In the last lesson you learnt about periodization for training. In this lesson you will learn about fitness programme.

Your Aims:

- identify aspects of fitness training
- identify a physical fitness programme
- identify particular sports and its structure, rules skills and requirements towards fitness training.

As discussed in lessons 8 & 9, fitness generally allows you to enjoy a healthy lifestyle. In our case, we will focus more on the health and sport related fitness.

The health related fitness focuses more on improving these components which supports our general health, particularly the functioning of our body systems.

The health-related components of fitness are:

- aerobic capacity
- muscular strength
- muscular endurance
- flexibility
- body composition

This sport related fitness refers to the high level of fitness needed to play competitive sport. For successful sports performance you need to develop a good level of fitness in all components in whatever sporting code.

As shown previously, people who have adequate development of sport-related components perform better, both in individual games as well as team games.

The sport-related components of fitness are:

- muscular power
- agility
- balance
- coordination
- speed

As discussed lesson 8, in order to determine your present state of fitness, you will have to measure some of your fitness capacities. It will tell you which fitness components need improvement, as well as which components should be maintained at current level. Identifying strengths and weaknesses in your present fitness levels will allow you to set realistic and attainable fitness goals for the future.

Fitness levels are measured by doing fitness tests. Fitness tests should be relevant and specific to the requirements of your chosen sport; the time you have available and the equipment and facilities that you are able to use in order to complete the tests.

The table below shows a personal fitness profile. A person taking the tests will have to complete each section accordingly.

Fitness test	**Fitness component**	**Month:**		**Month:**		**Month:**	
		Result	**Rating**	**Result**	**Rating**	**Result**	**Rating**
Curl-ups / Flexed-arm hang	Strength and muscular endurance						
Sit-and-reach	Flexibility						
50-metre sprint	Speed						
Vertical jump	Strength and power						
Basketball throw	Strength and power						
Push-ups	Strength and muscular endurance						
1.6 km run / The 12-minute run	Aerobic capacity						
Multi-stage (beep) test	Aerobic capacity						
Body Mass Index (BMI)	Body composition						
Shuttle run	Agility						
Grip	Strength						

Fitness test	Fitness component	Month:		Month:		Month:	
		Result	Rating	Result	Rating	Result	Rating
Stork stand	Balance						
Alternate hand-wall toss	Coordination						

From this set, you can choose the tests which are relevant and specific to your fitness needs. One of these is the Four Factor Fitness Test (FFFT).

The Four Factor Fitness Test

5. The 12-minute Run Test
6. Sit-up Test
7. Sit-and-reach Test
8. Flexed-arm hang

Again in lesson 8 you looked at how to improve your fitness components for general fitness or a specific sport you need to use what are called training methods. Each training method requires you to follow a special formula or rule to improve one or more of your fitness components. The training methods are:

- continuous training
  - interval training
    - circuit training
      - resistance (weight) training
        - flexibility callisthenics training
          - fartlek training

Activity 10.1

In this activity, you will need to refer to lesson 8 to answer the following questions.

1. What is the difference between continuous and interval training?

   _____
   _____
   _____
   _____

2. What is the difference between Circuits and resistance training?

   _____
   _____
   _____
   _____

3. What is the difference between flexibility callisthenics and fartlek training?

_____
_____
_____
_____

Now let us go further into an actual fitness training program.

One such program is discussed in lesson 9 the Periodization training program.

Periodization is a way we organise a training program so that an athlete is at his or her best peak for an important event or competition. Periodization is important in sports because it organises the different types of fitness components such as flexibility, strength, endurance and speed into days of the week. Weeks are organised into three phases.

Shown below is an example of the training program using periodization.

Periodization Table

	Phase 1								**Phase 2**		**Phase 3**	
	Wk 1	**Wk 2**	**Wk 3**	**Wk 4**	**Wk 5**	**Wk 6**	**Wk 7**	**Wk 8**	**Wk 9**	**Wk 10**	**Wk 11**	**Wk 12**
Monday	ST/F	ST/F	SE/F									
Tuesday	R	R	R	R								
Wednesday	E/F	ST/F	E/F	ST/F								
Thursday	R	R	R	R								
Friday	ST/F	SE/F	ST/F	SE/F								
Saturday	E/F	E/F	ST/F	SE/F								
Sunday	R	R	R	R								

KEY: S: Speed **E:** Endurance **SE:** Strength-Endurance **ST:** Strength **F:** Flexibility **R:** Rest

Phase 1 is the build-up phase where the average training load is kept to a level that prevents over-training
Phase 2 is a period of one or two weeks in which training is increased to the maximum level. Care needs to be taken to prevent injuries
Phase 3 is the reducing phase that occurs one or two weeks before an event. During this period there is a decrease in the amount of training and a decrease in the frequency of training.

Summary

You have now come to the end of the lesson. In this lesson you have learned that;

Fitness is divided into parts called 'fitness components'.
The 10 fitness components are:

- aerobic capacity/endurance
- muscular strength
- muscular endurance
- flexibility
- body composition
- muscular power/anaerobic capacity
- agility
- balance
- coordination
- speed

Fitness is measured using fitness tests. These tests consist of several exercises which cover all the 'fitness components'.

Fitness training methods are used to improve your fitness components for general fitness or a specific sport. The methods are:

- continuous training
- interval training
- circuit training
- resistance (weight) training
- flexibility / callisthenics training
- fartlek training

Periodization is a way we organise a training program so that an athlete is at his or her best peak for an important event or competition. Periodization is important in sports because it organises the different types of fitness components such as flexibility, strength, endurance and speed into days of the week. Weeks are organised into three phases.

NOW DO PRACTICE EXERCISE 10 ON THE NEXT PAGE

Practice Exercise 10

 In this exercise, you will need to refer to the above periodization table to answer the following questions.

1. Now develop a sport-specific example of how the various phases of strength training may occur in a three months plan. Use the above examples to design your training plan. ***(Do this activity in the space below)***

2) Use the table below to develop your periodization training program for the National Rugby League (NRL). The NRL session starts in the month of March and ends in the month of October each year.

Strength Phases for a Basketball Player											
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Preparation period			Competition period							Transition	
Basic strength	Max strength	Convert to power	Maintain power							Active recovery / basic strength	

(Do this activity in the space below)

Answers to Lesson Activities

Activity 10.1

In this activity, you will need to refer to lesson 8 to answer the following questions.

1. What is the difference between continuous and interval training?

   Continuous training: The continuous training method is designed to improve the aerobic (heart and lung) capacity and the muscular endurance. Continuous training is the most important training method for both health and sport-related fitness. On the other hand, the interval training method is designed to improve strength and power, agility and speed (anaerobic capacity). It is the best training method for improving your ability to play team sports such as netball, rugby, soccer, basketball, football or field hockey. Interval training is a form of training during which work intervals are followed by rest intervals.

2. What is the difference between Circuits and resistance training?

   Circuit training: The circuits training method can improve the body strength, muscular endurance, agility and aerobic capacity all at the same time. Circuit training usually consists of a series of 5 – 10 exercises arranged around your house, backyard, sports hall, weight training facility, or oval. You perform the exercises in order as fast as you can. However, the resistance training method is used to improve the strength and power or muscular endurance. Resistance training involves using either weights in a gymnasium or own body weight to make your muscles work.

3. What is the difference between flexibility callisthenics and fartlek training?
   The Flexibility (callisthenics) training method is used to improve the joint and muscle flexibility. Any exercise that puts a muscle in a stretched position develops your flexibility. Nonetheless, the Fartlek training method of training is used to develop both your aerobic and anaerobic capacities. It involves short bursts of speed interspersed throughout a continuous training session. For example; run 10 laps of an oval. On every second lap, sprint up the middle of the ground from goalpost to goalpost. With Fartlek training the overall distance of the session, the distances of the sprints and the length of recovery period can be chosen to suit the fitness analysis of any sport.

Reference

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Inside & Out – A Health and Physical Education Textbook, Second Edition; Peter Wright

Health and Physical Education 1, 3rd Edition; Damien Davis, Tania Hamilton, Kim Bastone-Cook, Michelle Bradford

Health and Physical Education 2, 3rd Edition; Damien Davis, Tania Hamilton, Kim Bastone-Cook, Michelle Bradford

Jump into PDHPE 2, Third Edition; Michelle Nemec, Darryl Buchanan, Andrew Watt, Ben Dawe

On Your Marks; Health, Physical Education and Sport Education for Junior Secondary Students; Peter Wright

http://www.sport-fitness-advisor.com/strengthtrainingprograms.html

Answers to Practice Exercises 7 - 10

Answers to Practice Exercise 7

1. Unscramble the letters to complete the following statements.

a. A regular exercise programme will not only produce LLGHSCPYAIIOO (psychological) benefits but also improve your sense of LEWL- EGNIB (well-being).

b. One DTMAIMEEI (immediate) effect of exercise is an increase in your heart rate.

c. With regular exercise, more oxygen gets to the working muscles because of the improved efficiency of the ETHAR (heart), GNUSL (lungs) and ODLOB SSSEELV (blood vessels).

2. List three reasons why exercise is a better way to lose weight than dieting

a) It is more enjoyable than dieting
b) Moderate exercise can reduce your appetite naturally
c) Regular exercise over a long period uses up stored body fat

3. Complete the table below.

Food Group	Nutrients (Types of food)	Purpose or function
A. Energy Foods	Carbohydrates and Fats	Provide energy for work and play, and warmth
Growth Foods	**B. Proteins**	For body building and repair
Protective Foods	Vitamins and Minerals	**C. Protection from diseases**

4. List the 4 most important reasons why you should drink water every day

a). Water provides the moisture necessary for all living tissue except the nails, hair and teeth.

b). Water helps the chemical reactions in the body.

c). Water dilutes and moistens food.

d). Water dilutes waste products and poisonous substances in the body.

5. Complete the sentence below with the most appropriate word.

If you are still growing, studying and playing sport then you need plenty of sleep. Most people need about eight hours every night.

Answers to Practice Exercise 8

Accept any 3 of the stated answers from the list for each sport.

1) Rugby :
- Muscular strength
- Aerobic capacity
- Speed
- Agility
- Flexibility

2) Basketball:
- Muscular power
- Aerobic capacity
- Agility
- Speed
- Flexibility

3) Volleyball:
- Muscular power
- Aerobic capacity
- Agility
- Balance
- Coordination

4) Netball:
- Agility
- Muscular power
- Muscular strength
- Speed
- Muscular endurance

5) Cricket:
- Muscular power
- Agility
- Aerobic capacity
- Speed
- Flexibility

Answers to Practice Exercise 9

No standard answers. Accept students' answers which should contain variety of fitness components and rest periods.

Answers to Practice Exercise 10

1) Sample of what the periodization training program.

Periodization Table

	Phase 1								**Phase 2**		**Phase 3**	
	Wk 1	**Wk 2**	**Wk 3**	**Wk 4**	**Wk 5**	**Wk 6**	**Wk 7**	**Wk 8**	**Wk 9**	**Wk 10**	**Wk 11**	**Wk 12**
Monday	ST/F	ST/F	SE/F									
Tuesday	R	R	R	R								
Wednesday	E/F	ST/F	E/F	ST/F								
Thursday	R	R	R	R								
Friday	ST/F	SE/F	ST/F	SE/F								
Saturday	E/F	E/F	ST/F	SE/F								
Sunday	R	R	R	R								

KEY: S: Speed **E:** Endurance **SE:** Strength-Endurance **ST:** Strength **F:** Flexibility **R:** Rest

Phase 1 is the build-up phase where the average training load is kept to a level that prevents over-training.

Phase 2 is a period of one or two weeks in which training is increased to the maximum level. Care needs to be taken to prevent injuries.

Phase 3 is the reducing phase that occurs one or two weeks before an event. During this period there is a decrease in the amount of training and a decrease in the frequency of training.

TOPIC 3

Prevention and Care of Sports Injuries.

In This Topic You Will Learn About:

- Sports injuries.
- Causes of Sports injuries.
- Prevention of sports injuries.
- Treatment for sports injuries.

TOPIC 3: Prevention and Care of Sports Injuries

In this Topic, you will learn about Prevention and care of sports injuries. You will:

- Define sports injuries.
- Identify different types of sports injuries.
- Identify the causes of sports injuries.
- Differentiate between individual factors and situational factors in sports injuries.
- Identify the basic prevention measures used to avoid injuries in sports.
- Identify a particular sports injury and apply the prevention measures.
- Identify the treatment of common sports injuries including first aid.
- Discover the steps in treating common sports injuries.

In doing so, you will find out more about prevention and care of sports injuries. You be able list and describe different types of sports injuries and can give an example of a sports- related injury that can result to permanent disability or death.

We hope you will enjoy this Topic.

Lesson 11: Sports Injuries

Welcome to lesson 11 of unit 2. In the last lesson you learnt about fitness programme. In this lesson you will learn about sports injuries.

Your Aims:

- define sports injuries
- identify different types of sports injuries

Sports Injuries

"Sports injuries" are injuries that happen when playing sports or exercising. Some injuries are from accidents, while others result from poor training practices or improper gear. Not warming up or stretching enough before you play or exercise can also lead to injuries. People can also get injured when they are physically or mentally unwell.

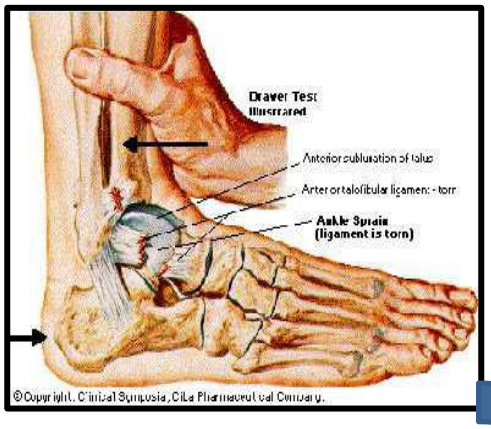
Common Sports Injuries

The most common sports injuries include cramps, cuts and grazes, blisters, stiffness and soreness, bleeding and nose bleed, swollen muscles and fractures, and the following**:**

TYPE OF SPORT INJURY	DEFINITION
1. Sprains and Strains	(a) Sprain is a stretch or tear of a ligament, which is the connective tissue that joins bones together in your body. (b) Strain is a stretch or tear of a muscle or tendon. Tendons connect your muscles to your bones.
2. Knee Injuries or Anterior Cruciate Ligament (ACL)	ACL is one of the four major ligaments critical to the stability of the knee joint. Its primary purpose is to restrain forward motion of the shinbone. An ACL injury occurs when this ligament is torn.
3. Shin bone injuries (Shin Splints)	The periosteum is a membrane that surrounds bone. Shin Splints are an inflammation of the periosteum encasing the shinbone and are the result of strenuous athletic activity.
4. Tendon Injuries (Bursitis and or Tendonitis)	Bursitis is an inflammation of a bursa sac. Bursa sacs are located between bone and skin. They allow the skin to slide over bony prominences in the body, such as the knee, shoulder, and elbow. When a bursa sac becomes irritated and inflamed, it causes pain and discomfort in the nearby joints. Tendonitis is an inflammation or irritation of a tendon.
5. Tennis elbow injuries (lateral epicondylitis)	An inflammation of the tendons attached to the elbow.
6. Dislocation	When a bone moves out of its proper position in a joint.

‘

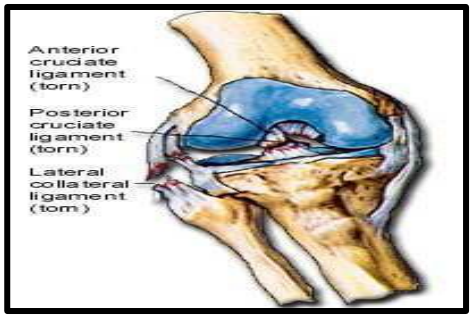
• ***Sprains and strains***.



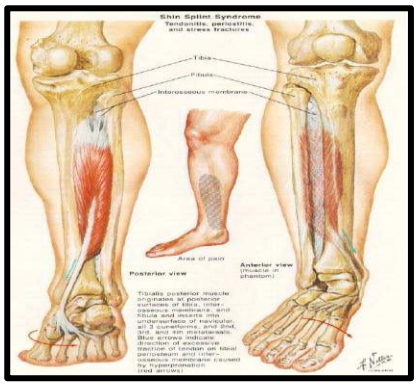
Symptom:
Pain, discomfort, tenderness
and possible swelling in the affected area.

• ***Knee injuries***.

Symptom:
Pain, swelling or a 'popping' sound heard around the knee, and instability of the knee joint.



• ***Shin bone injuries***.

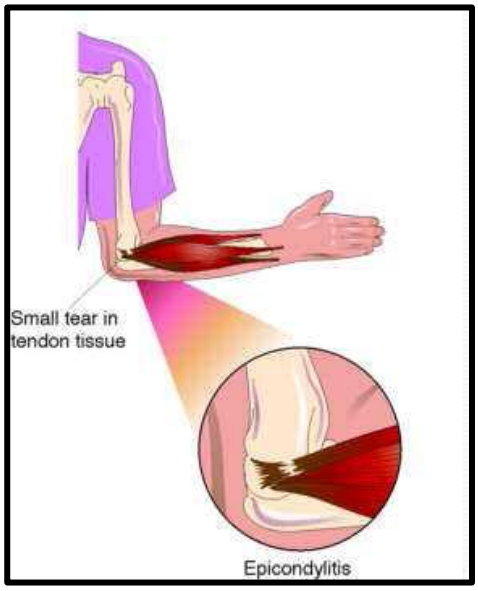


Symptom:
Pain, discomfort and the
Inability to walk

• ***Tendon injuries***.

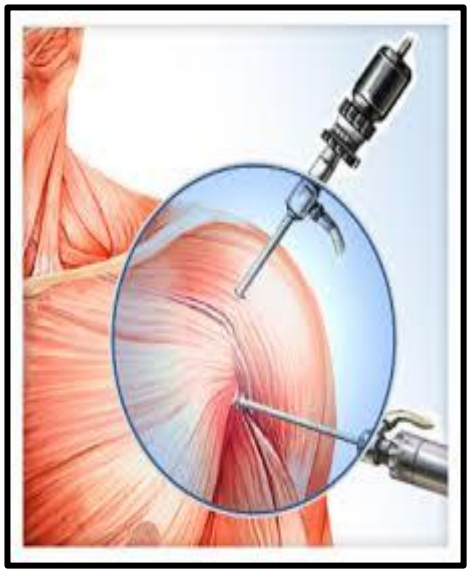
Symptom:
Pain, tenderness, redness and stiffness in the joint near the affected area,

• ***Tennis elbow injuries.***



Symptom:
Pain and discomfort around the bony part of the elbow possibly travelling area.

• ***Dislocation.***



Symptom:
Pain and discomfort around the bony part and joint of the affected to the forearm and the hand.

Activity 11.1

This activity will help you identify and describe the different types of sports injuries.

Answer these questions.

1. Define sports injuries.

   _____
   _____
   _____
   _____

2. Differentiate between ‘sprains and strains’.

   _____
   _____
   _____
   _____
   _____

3. What is ACL and how does it occur?

   _____
   _____
   _____
   _____

4. Describe the symptom of a tendon injury.

_____
_____
_____

What's the Difference Between an Acute and a Chronic Injury?

All internal sports injuries are divided into two categories namely: acute and chronic injuries.

(a) *Acute injuries* occur suddenly when playing or exercising. Sprained ankles, strained backs, and fractured hands are acute injuries. Signs of an acute injury include:

- Sudden, severe pain.
- Swelling.
- Not being able to place weight on a leg, knee, ankle, or foot.
- An arm, elbow, wrist, hand, or finger that is very tender.
- Not being able to move a joint as normal.
- Extreme leg or arm weakness.
- A bone or joint that is visibly out of place.

(b) *Chronic injuries* happen after you play a sport or exercise for a long time. Signs of a chronic injury include:

- Pain when you play.
- Pain when you exercise.
- A dull ache when you rest.
- Swelling.

Activity 11.2

Write a short sentence to answer each of the following questions.

1. Explain the importance of studying the topic “Sports Injuries”.

_____
_____
_____

2. Explain the difference between Acute and Chronic injuries?

_____
_____
_____
_____

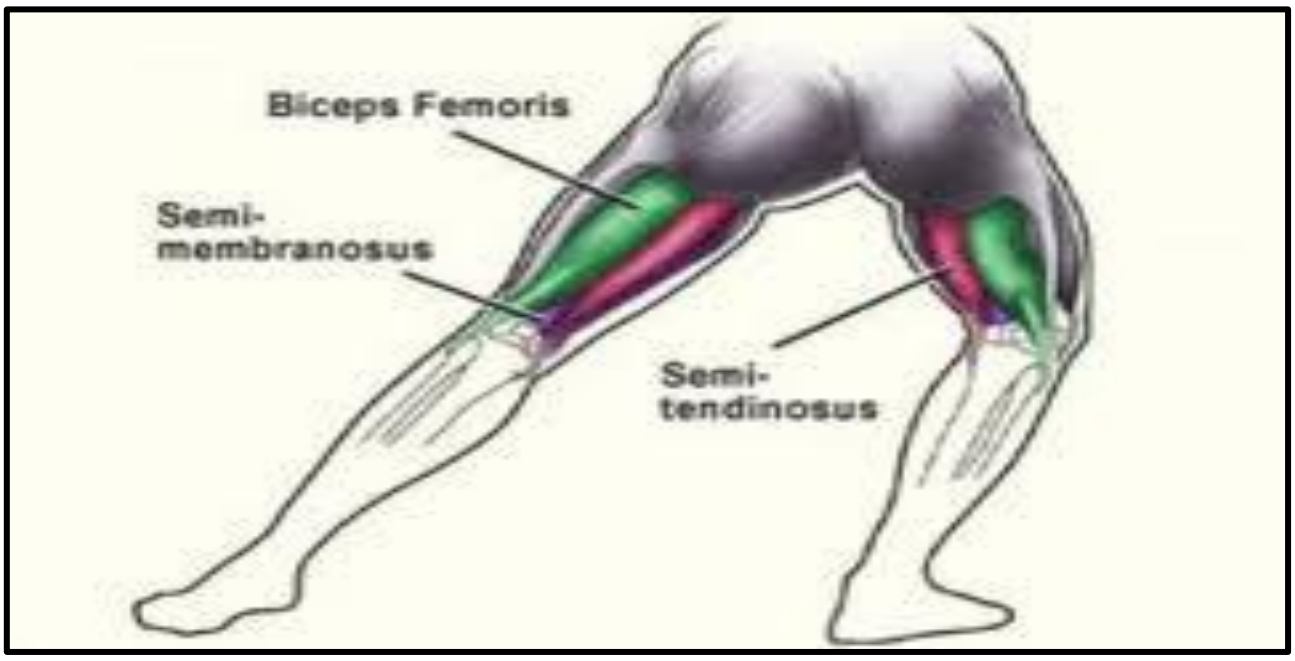
3. List the symptoms you would have if you twisted your wrist while touch football.

_____
_____
_____

What is the hamstring?

The hamstring is a group of muscles in the back of your thighs that help provide motion to the knees and hips. You can injure your hamstring if you pull or tear these muscles.

An injury to the hamstring can be caused by rapid acceleration activities when running or initiating running activities. Hamstring injuries are common in sports such as soccer, football and track.



An illustration of the hamstring

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

- Sports injuries are injuries that happen when playing sports or exercising. Some are from accidents. Others can result from poor training practices or improper gear.
- Some people get injured when they are not in proper condition. Not warming up or stretching enough before you play or exercise can also lead to injuries.
- Internal factors are further divided into Acute and Chronic injuries.
- The hamstring is a group of muscles in the back of your thigh that help provide motion to the knee and hip.

NOW DO PRACTICE EXERCISE 11 ON THE NEXT PAGE

Practice Exercise 11

The Practice Exercise consists of short answers.

You may start Practice Exercise 11

1. Swollen muscles and fractures are examples of common injuries encountered in sports. Write a brief explanation of each of these injuries by defining the injury, explaining its cause and describing its symptom.

   (a) Swollen muscles:

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

   (b) Fractures:

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

2. (a) Define the word hamstring.

   _____
   _____
   _____
   _____

(b) Which two joints does the hamstring provide motion to?

_____
_____
_____

(c) Biceps femoris, semi-membranous and semi-tendinosus are the three muscles that make up the hamstring. If I were to tear one or more of these three muscles, what kind of injury am I likely to have?

_____
_____
_____

3. Name two sporting events where you could likely injure your:

a) ankle

i)_____ii)_____

b) elbow

i)_____ii)_____

c) knee

i)_____ii)_____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 3.

Answers to Lesson Activities

Answers Activity 11.1

1. Sports injuries are injuries that happen when playing sports or exercising. Some are from accidents. Others can result from poor training practices or improper gear. Some people get injured when they are not in proper condition.

2. Sprain is a stretch or tear of a ligament, which is the connective tissue that joins bones together in your body. Strain is a stretch or tear of a muscle or tendon. Tendons connect your muscles to your bones.

3. ACL is Anterior Cruciate Ligament and it is one of the four major ligaments critical to the stability of the knee joint. Its primary purpose is to restrain forward motion of the shinbone. An ACL injury occurs when this ligament is torn. Individual answers may vary.

4. Pain, swelling or a 'popping' sound heard around the knee, and instability of the knee joint.

Answers to Activity 11.2

1. Individual answers may vary. No standard answers.

2. (a) Internal factors causing sports injuries are those that are directly involving the body while external factors are to do with things outside of the body that cause injuries such as balls, footwear, goalposts, etc.

(b) Acute injuries occur suddenly when playing or exercising while chronic injuries happen after you play a sport or exercise for a long time.

References

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Lesson 12: Causes of Sports Injuries

Welcome to lesson 12 of unit 2. In the last lesson you learnt about sports injuries. In this lesson you will learn about causes of sports injuries.

Your Aims:

- identify causes of sports injuries
- identify the difference between individual and situational factors in sports injuries

What Causes Sports Injuries

As discussed in lesson 11, sports injuries are injuries that happen when playing sports or exercising. These injuries can be from:

- accidents that happen during the game or sport
- poor training practices in preparation for the particular sport
- improper sporting gear or clothes worn for the sport is inappropriate
- no proper warm up or stretching before the game

Common Sports Injuries

The most common sports injuries include cramps, cuts and grazes, blisters, stiffness and soreness, bleeding and nose bleed, swollen muscles and fractures or broken bones.

Myths Regarding Sports Injuries

It is important to understand that any physical injury during sports is caused by any one of the points listed above. No injury is caused by ‘black magic’ or sorcery. It is only a traditional myth that people have to defend their reason for losing a game. There is no evidence to proof that a team won the game because they used ‘black magic’. At the same time you can become emotionally injured in sports especially when you lose or your team loses a game.

Activity 12.1

This activity will require you to go back to lesson 11 to help you match the type of injury to the relevant definition.

Match each type of sports injury with its corresponding definition by writing the number of the type of sports injury in the definition box.

TYPE OF SPORT INJURY	DEFINITION
1. Sprains and Strains	(i) Bursitis is an inflammation of a bursa sac. Bursa sacs are located between bone and skin. They allow the skin to slide over bony prominences in the body, such as the knee, shoulder, and elbow. When a bursa sac becomes irritated and inflamed, it causes pain and discomfort in the nearby joints. Tendonitis is an inflammation or irritation of a tendon.
2. Knee Injuries or Anterior Cruciate Ligament (ACL)	(ii) An inflammation of the tendons attached to the elbow.
3. Shin bone injuries (Shin Splints)	(iii) Sprain is a stretch or tear of a ligament, which is the connective tissue that joins bones together in your body. Strain is a stretch or tear of a muscle or tendon. Tendons connect your muscles to your bones.
4. Tendon Injuries (Bursitis and or Tendonitis)	(iv) When a bone moves out of its proper position in a joint.
5. Tennis elbow injuries (lateral epicondylitis)	(v) The periosteum is a membrane that surrounds bone. Shin Splints are an inflammation of the periosteum encasing the shinbone and are the result of strenuous athletic activity.
6. Dislocation	(vi) ACL is one of the four major ligaments critical to the stability of the knee joint. Its primary purpose is to restrain forward motion of the shinbone. An ACL injury occurs when this ligament is torn.

Common Reasons for Sports Injuries

In the above case we looked at some common sports injuries we find in sporting codes today. Now we are going to talk about the common reasons why sports injuries are bound to happen.

A multitude of situations can result in a sports-related injury. Being aware of the risk factors goes a long way in preventing them. Strengthening your muscles, getting proper rest and working at the proper pace are essential to staying healthy. A look at the causes of the most common sports injuries**,** paints a clear picture of the main or common reasons why injuries are likely to happen. These reasons include:

- overuse

Overuse or repetitive movements may be the number-one cause of sports injuries. Runners, swimmers and tennis players are particularly susceptible to overuse injuries, including tennis elbow, tendinitis, shin splints and shoulder impingement.

- stops and twists

Sports that incorporate quick stopping and twisting motions including basketball, gymnastics and soccer see a high number of knee and ankle injuries. Ankle sprains occur when an athlete rolls his foot and stretches the surrounding ligaments. The stabilizing muscles and cushioning cartilage around your knee, shoulder and other joints are prone to tearing from an uncontrolled twist or a sudden stop.

- falls

Any athlete can fall in the midst of an activity. In addition to the obvious breaks that can occur from a fall, wrist sprains are common. Your natural instinct when falling is to put your hands down to break your fall. Your wrists bear your weight, which can easily stretch or tear a ligament.

- improper equipment

If you use a weight or a racquet too heavy for you, lower back or arm pain may follow. Ill-fitting helmets and shoes may also cause injuries. A runner may experience an injury if he wears shoes that do not provide enough support. Plantar fasciitis, the inflammation of your arch's shock absorber, is common when shoes do not fit properly or provide proper support.

- new or increased activity

Starting a new activity or increasing your level of activity too quickly can also result in plantar fasciitis or lower back pain. If you have begun a new exercise or sport, previously unused muscles may be employed or you may increase the work of other muscles. A cramp is a common result of this.

- fatigue

Tired muscles are a common cause of muscle pulls. Resting between activities is essential to preventing muscle pulls.

- Poor Warm up

Your elementary school gym teacher probably told you how important it is to stretch before any athletic endeavour, and he was right. Muscle cramping and pulls are often the result of jumping into an activity without properly easing the muscles into it. Warming up delivers blood and oxygen to the various muscles, allowing them to work more efficiently.

- Impact

Hard impacts are another culprit behind injuries such as shin splints and plantar fasciitis. Hard surfaces cause a more jarring impact on an athlete's feet, legs, hips and back.

- Unilateral Movements

Lower-back pain plagues some golfers and tennis players, among others. Because these activities require certain movements by only one side of the body, you are working muscles on one side without doing equal work on the other. This can result in weaker muscles on the less active side, the most common cause of lower back pain.

- Technique or Posture

Neck pain, including spasms and pulls, is often the result of something as simple as moving your head awkwardly to see a ball or an opponent. Cyclists may experience neck pain after riding with racing handlebars. The position you must take to use the handlebars and still see where you're going tightens the neck muscles, causing a spasm.

As shown above, sports injuries are most commonly caused by poor training methods; structural abnormalities; weakness in muscles, tendons, ligaments; and unsafe exercising environments. The most common cause of injury is poor training.

Factors that can contribute to Sports Injuries

Factors that contribute to injuries in sports can be identified as:

- internal/individual and
- external/situational

Individual factors that cause injures are created by how the player moves while in play. Situational factors are those injures that are caused by external factors, for example, a player falls over because the field has an uneven surface. Common factors that can contribute to injuries in sports and physical activities are shown in the table below.

INTERNAL/INDIVIDUAL FACTORS	**EXTERNAL/SITUATIONAL FACTORS**
• Acute factors (sudden onset) – muscle imbalance, lack of control, twisting and turning movements.	• Competition environment – goal posts, backboard, playing surface, lighting, surrounding hazards.
• Chronic factors (gradual onset) – overuse, poor recovery of acute injury and continued use.	• Human – body contact with other players.
	• Equipment – ball, stick, footwear, snowboard, etc.

Activity 12.2

This activity will help you identify and describe the different types of sports injuries.

Answer these questions.

1. List three causes of sports injuries.
   (a)_____
   (b)_____(
   c)_____

2. What are some of the common sports injuries? Name five of them
   (a)_____
   (b)_____
   (c)_____
   (d)_____
   (e)_____

3. Give two reasons why injures are likely to take place in sports
   a) _____
   b) _____

4. In your own words explain the difference between internal/individual factors and external/situational factors
   _____
   _____
   _____
   _____

Summary

You have now come to the end of the lesson. In this lesson you have learned

- Causes of sports injuries include accidents, poor training, improper sporting gear and the lack of no proper warm up
- The most common sports injuries include cramps, cuts and grazes, blisters, stiffness and soreness, bleeding and nose bleed, swollen muscles and fractures or broken bones.
- There are many kinds of sports injuries which result from external or internal factors.
- Internal factors are further divided into Acute and Chronic injuries
- All physical injury during sports is caused by any one of the points listed above. No injury is caused by ‘black magic’ or sorcery.

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NOW DO PRACTICE EXERCISE 12 ON THE NEXT PAGE

Practice Exercise 12

The Practice Exercise consists of short answers.

You may start Practice Exercise 12

1. In a short paragraph explain <u>how</u> an injury can result from:

   (a) an accident

   _____
   _____
   _____
   _____
   _____

   (b) not wearing the right sporting outfit

   _____
   _____
   _____
   _____
   _____
   _____

2. Explain how acute factors differ from chronic factors.

   _____
   _____
   _____
   _____
   _____

3. Describe what you would do to help people especially on a local sporting area understand that ‘black magic’ is only a myth.

   _____
   _____
   _____
   _____
   _____

4 . Explain how you could injure yourself or someone if you were to:

(a) throw a ball

_____

_____

(b) jump up to shoot a basket in basketball

_____

_____

(c) dive to pick up the volleyball

_____

_____

(d) turn quickly with the ball (soccer)

_____

_____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 3.

Answers to Lesson Activities

Answers Activity 12.1

1. Sports injuries are injuries that happen when playing sports or exercising. Some are from accidents. Others can result from poor training practices or improper gear. Some people get injured when they are not in proper condition.

2. Sprain is a stretch or tear of a ligament, which is the connective tissue that joins bones together in your body. Strain is a stretch or tear of a muscle or tendon. Tendons connect your muscles to your bones.

3. ACL is Anterior Cruciate Ligament and it is one of the four major ligaments critical to the stability of the knee joint. Its primary purpose is to restrain forward motion of the shinbone. An ACL injury occurs when this ligament is torn. Individual answers may vary.

4. Too much training, overuse of lower leg muscles and incorrect shoes.

5. Pain, swelling or a 'popping' sound heard around the knee, and instability of the knee joint.

Answers to Activity 12.2

1. Any three of these:
   a) accidents that happen during the game or sport
   b) poor training practices in preparation for the particular sport
   c) improper sporting gear or clothes worn for the sport is inappropriate
   d) no proper warm up or stretching before the game

2. Any five of these:
   a) cramps b) cuts and grazes c) blisters d) stiffness and soreness
   e) bleeding and nose bleed f) swollen muscles and fractures

3. Any two of these
   a) over use b)stops and twists c) falls d) improper equipment
   e) fatigue f) new or improper increased activity g) poor warmup
   h) impact i) unilateral movements k) technique or posture

4. Individual factors that cause injures are created by how the player moves while in play, while situational factors are those injures that are caused by external factors,

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Lesson 13: Prevention of Sports Injuries

Welcome to lesson 13 of unit 2. In the last lesson you learnt about causes of sports injuries. In this lesson you will learn about prevention of sports injuries.

Your Aims:

- identify the basic preventative measures used to avoid injuries in sports
- identify a particular sports injury and apply the prevention measures

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What are preventive measures?

The term **'preventive measures',** refers to ways or methods that are taken to keep or stop something else from happening. Usually that 'something' is of negative consequences. In sports, a preventive measure would be a cause of action/s used to avoid an injury or poor sportsmanship. A main preventive measure in sports is the use of proper sporting or protective gear that is appropriate for that particular sport. For example, in softball, a player must wear a helmet when batting the ball in order to protect head injure should the ball hit his head.

Preventing Sports Injuries

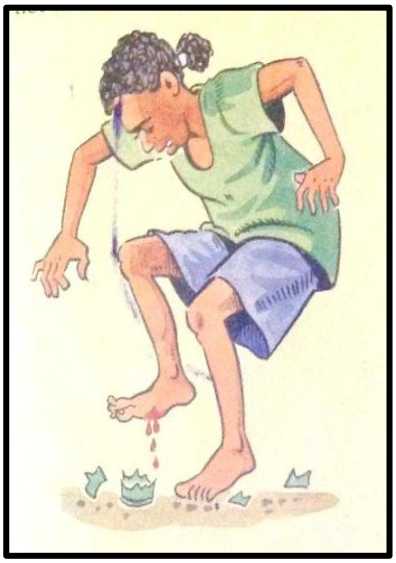
Prevention of injuries is paramount in sport. Apart from the pain of injury, there is the disappointment of missing teams and not being able to perform at one's best. Injury also places other burdens on a sporting club as well as the individual. For example, a sporting club may not be able to field a team if members in that team are injured. In addition, a team may not be able to find a good substitute to replace the injured player or you may be forfeited if you are injured and unable to play.

PREVENTION IS BETTER THAN CURE!

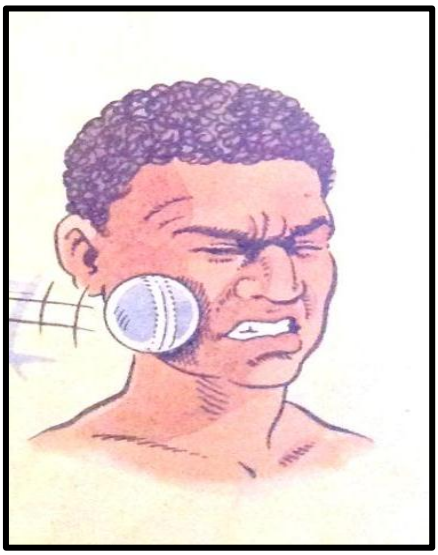
Ways of preventing sports injuries

There are measures and ways that players and officials can apply in order to prevent injuries in sports. These preventive measures can be done before, after or during the game.

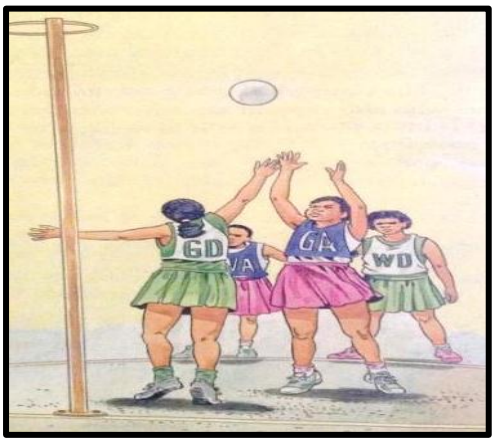
• ***Remove sharp objects in the area where you are playing.***



• ***Wear correct safety equipment/ sporting gear to protect yourself***

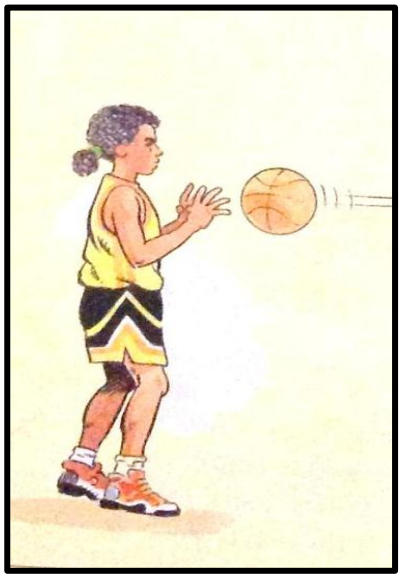


• ***Follow the rules and safety procedures of the game***



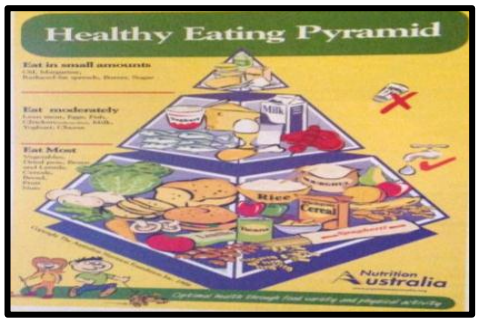
• ***Assess the environment (playing area and weather conditions).***

• ***Always attend training.***



• ***Always warm-up and cool-down.***

• ***Always eat a balance diet***



Activity 13.1

Answer the following questions.

1. Define ‘preventative measures’.

_____

_____

_____

_____

2. Below is a way of preventing an injury in sports. Name this preventative measure.

_____

3. Why should protective equipment or gear be worn during a game?

_____

_____

_____

_____

4. List at least two sports that require the safety equipment described in the following table.

Protective equipment	**Illustrations of the Equipment and Description**	**Sports needing this equipment**
Head guards		a) _____ b) _____
Helmet		a) _____ b) _____
Mouth guard		a) _____ b) _____

Groin protector		a) _____ b) _____
Shin pads		a) _____ b) _____
Gloves		a) _____ b) _____
Knee pads		a) _____ b) _____
Goggles		a) _____ b) _____

Preventing injuries

To be a responsible player or coach, you need to be familiar with the safety aspects of performance to prevent injuries. Never take risks or try to be silly while playing or officiating sports. In sports players should**:**

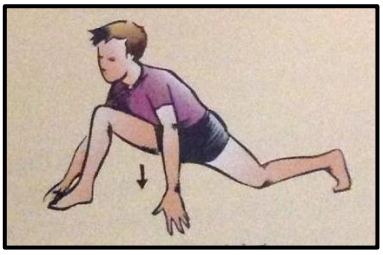
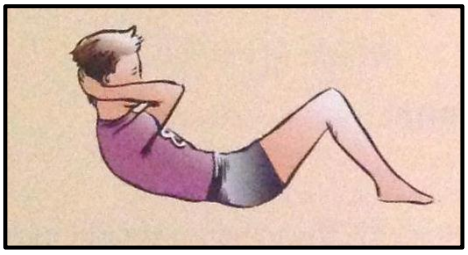
- warm-up with stretching exercises before play and cool-down afterwards.
- use correct techniques.
- make sure they are fit.
- check that the facilities and equipment are in good conditions.
- drink plenty of water
- have sufficient rest
- play or compete at their own level of height, weight and maturity
- ensure loose accessories, for example jewellery, are removed
- keep nails short and tie back long hair
- act if you foresee danger; it is better to be safe than sorry, even if sometimes accidents are narrowly missed and your concern is seen to be an overreaction

- demand discipline on and off the field or court at all times

Additional preventative measures to consider:

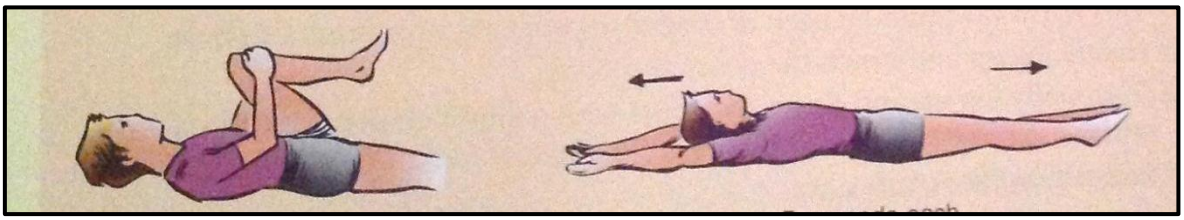
- if you are sick, do not go for practice or the game. Your reaction time will be slower, which will make your chances of injury greater
- if you have an infectious disease such as cold, it is wise not to play so that you do not pass the disease to other players
- a player who is bleeding or has blood on their uniform must leave the ground for immediate medical attention. They must ensure that the bleeding is stopped, the wound dressed and that there is no blood on their uniform before they return to the playing arena

Warm-up and cool-down

Warming up at the start of the session and cooling down at the end helps to prepare people for physical exercise, prevent injuries during exercise and avoid muscle stiffness afterwards.

During exercise, the body has to work hard to adapt to the increased demands being made upon its various systems. It is essential to prepare the body for these increased demands. Warming up makes the body less susceptible to injury and can also have a beneficial effect on performance, particularly at the start of a session or competition.



Activity 13.2

Write a short sentence to answer each of the following questions

1. Explain the importance of warming-up and cooling-down exercises.

_____
_____
_____
_____

2. Why is it important for discipline to prevail at all times in sports?

_____
_____
_____
_____

3. Explain why we must drink plenty of water before playing.

_____
_____
_____
_____

4. What happens to the body during an exercise?

_____
_____
_____
_____

Summary

You have now come to the end of the lesson. In this lesson you have learned:

- P**reventive measures** refer to ways or methods taken to keep or stop something else from happening.
- It is important to take precautions because if we are not too careful we can injure ourselves.
- Warm-up and cool-down exercises are just as important because they help to prepare us for physical activities and so prevent injuries.
- Protective equipment differs from sport to sport depending on the kind of sport played and where it is played.
- Preventative measures are measures we take to protect ourselves and others from getting in harms ways.

NOW DO PRACTICE EXERCISE 13 ON THE NEXT PAGE

Practice Exercise 13

The Practice Exercise consists of short answers.

You may start Practice Exercise 13

1. Select two parts of the body that you think are most likely to get injured and explain your answer.

_____

_____

_____

_____

_____

_____

_____

2. Do you believe there should be laws or sports rules to make it compulsory for people to wear necessary protective equipment in sports? Explain your answer.

_____

_____

_____

_____

_____

_____

_____

3. Give an explanation for the usage of each of the protective equipment listed below.

Eg: Head guard – protects your head from head injuries

Protective equipment	Explain its use
1. Sports shoes	
2. Gloves	
3. Elbow pads	
4. Shin pads	
5. Helmet	

4. For each of the following explain what preventive measures in sports you should take when you:

(a) have a bad cold or flu

_____
_____

(b) sustain a bleeding nose while playing

_____
_____

(c) do not have the correct protective gear for the game

_____
_____

(d) finish a sporting game that would involve a lot of running. Eg. Soccer or rugby

_____
_____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 3.

Answers to Lesson Activities

Answers to Activity 13.1

1. P**reventive measures** refer to ways or methods taken to keep or stop something else from happening.
2. Strapping.
3. Protective equipment or gear is worn during sports to protect players from getting injured.
4. Individual answers may vary.

Answers to Activity 13.2

1. Warm-up and cool-down exercises are just as important because they help to prepare us for physical activities and so prevent injuries.
2. Individual answers may vary. No standard answers.
3. To avoid dehydration of the body.
4. It is essential to prepare the body for these increased demands. Warming up makes the body less susceptible to injury and can also have a beneficial effect on performance, particularly at the start of a session or competition.

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Lesson 14: Treatment of Sports Injuries

Welcome to lesson 14 of unit 2. In the last lesson you learnt about prevention of sports injuries. In this lesson you will learn about treatment of sports injuries.

Your Aims:

- identify the treatment of common sports injuries including first aid
- identify the steps in treating common sports injuries

Sports Injury Treatment

Participating in a variety of sports is fun and healthy for children and adults. However, it is critical that before you participate in any sport, you are aware of the precautions you need to take in order to prevent injuries. Warming up, strengthening your muscles and cooling down after any type of exercise are excellent ways of preventing sports injuries. Unfortunately, even when taking these and other precautions, injuries still occur.

The RICE method of treatment

For most injuries, treatment often begins with the RICE method before other forms of treatment can be done on the injured person.
Rest – rest the injured
Ice – ice the injury
Compression – compression to reduce swelling
Elevation - raise the injured body part

Raise injured foot

Treatment for the Different Sports Injuries

Here is a list of some of the more common sports injuries and treatments.

TYPE OF SPORT INJURY	TREATMENT
1. Sprains and Strains	(a) The first step in treating a sprain or strain is with R.I.C.E. Recovery time depends on your age, health, and the severity of the sprain or strain.
2. Knee Injuries or Anterior Cruciate Ligament (ACL)	(a) Ice the knee to decrease inflammation and pain. Ice should be applied for at least 20 minutes, 2-3 times daily. (b) Rest until the swelling disappears. Begin physical therapy to regain as much of the normal range of motion as possible.
3. Shin bone injuries (Shin Splints)	(a) Rest. Avoid "overusing" leg muscles that are in pain. (b) Ice the shin to decrease inflammation and pain. Ice should be applied for at least 20 minutes, 2-3 times daily. (c) Gently stretch and massage the affected area.
	(a) R.I.C.E and anti-inflammatory medications are the first

4. Tendon Injuries (Bursitis and or Tendonitis)	steps to decrease the inflammation and swelling. (b) Gently stretch and massage the affected area.
5. Tennis elbow injuries (lateral epicondylitis)	(a) Avoid doing any activity that causes pain and discomfort. Modify movements to avoid discomfort. Wearing an elbow splint may help to reduce pain and allow the muscles and tendons to rest and heal. (b) Ice the elbow to decrease inflammation and pain. Ice should be applied for at least 20 minutes, 2-3 times daily. Anti-inflammatory medications can also be taken to decrease inflammation and pain. (c) Gently stretch and strengthen the muscles and tendons around the elbow, forearm, and wrist.

Treatment for minor injuries

1. Cramps

***massage* cramped area**

A cramp is a sudden, tight and intense pain caused by a muscle locked in spasm. A muscle cramp can cause a slight twitch or severe pain.
Treatment:

- Stop the activity that causes the cramp
- Gently stretch and massage the cramping muscle by holding the joint in a stretched position until the cramp stops

2. Cuts and grazes

A fall or a slide on the ground causes outer layers of the skin to rub or peel off.
Treatment:

- gently wash the affected area with water, soap and disinfectant
- apply some antiseptic cream to kill any remaining germ
- cover the cut or graze

3. Blisters

A blister is a fluid-filled sac on the surface of the skin, usually on the hands or feet.
Treatment:

- clean the blister with rubbing alcohol or antibiotic
- sterilise a needle over a flame until the tip glows red, allow it to cool, and then pick a small hole in the edge of the blister
- drain the fluid by applying gentle pressure
- apply some antibiotic ointment on the blister and cover with a bandage

4. Stiffness and soreness

They can occur 24 to 48 hours after you begin a new activity. This is a normal response as your muscles are adapting to the new movements. Over time, this will lead to greater muscle strength and endurance, and the same activity will no longer result in pain.
Treatment:

- gently massage affected area with oil and drink a lot of fluid

5. Concussion

This may result from a fall when the head strikes against an object or a moving object falls on the head. If a person is hit on the head, keep them quiet, and get a qualified health worker as soon as possible. Do not try to do anything because with any blow to the head, whether or not unconsciousness occurs, bleeding into the brain can occur.

6. Bleeding

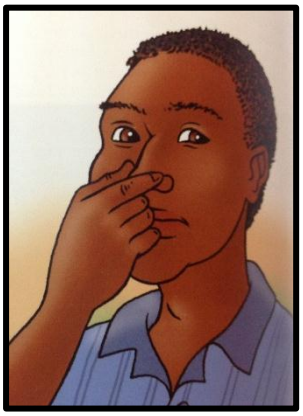
Some diseases can be caught from contact with blood of an affected person. It is best for you not to touch any person's blood because if you have any scratches, small cuts or grazes on your hands and arms, their germs can get into your body. However, if you have to treat, you need to take the following precautions. Wear gloves or put hand into a plastic bag.
Treatment:

- use a clean cloth or padding to stop bleeding by applying pressure on the affected area
- when bleeding stops, clean and dress the cut

7. Nose bleed

If you have a nose bleed, follow these steps.
Treatment:

- sit with your head forward, looking down at the ground
- pinch the soft part of the nose together for about 10 minutes
- although your nose will probably feel blocked, and you will want to blow the blood out, try not to sniff or blow your nose for at least 30 minutes



Pinch nose to stop bleeding

Activity 14.1

Answer these questions.

1. What would you do if you have a:
   (a) cramp?

   (b) graze?

   (c) bleeding nose?

2. If during a game of basketball your friend fell and is bleeding, how would you treat that injury?

3. What do you need to drain a blister?

4. What is RICE?

5. How would you treat sprains and strains?

6. What is a concussion?

Basic First Aid

The following serious injuries beginning with **ABCDEF** can be prevented.
Airways blocked in anyway
Breathing problems
Circulation problems with any blood loss
Decreased level of consciousness
Exposure to the weather
Fractures of major bones and spinal injuries

First aid is about using your own common sense to help injured people without doing harm to them or yourself. If possible, wash your hands before you help, so that dirt and germs on your hands do not get into the wound. Washing after helping cleans any blood or germs that got onto your hands. Wearing plastic gloves or putting a plastic bag over your hands can protect them too. If you have a cut cover it with a waterproof dressing before performing any first aid on an injured person.

DRABC – basic life support flowchart
If you need to help an injured person, follow the DRABC action plan.
Danger
Response
Airways
Breathing
Compression

If you cannot stop the bleeding and you cannot send someone to get help, leave the injured person, go for help, but get back as soon as you can.

Danger

Check your danger, risks or hazards to yourself, the injured person or anyone nearby. Always ensure the safety of everyone in the area.

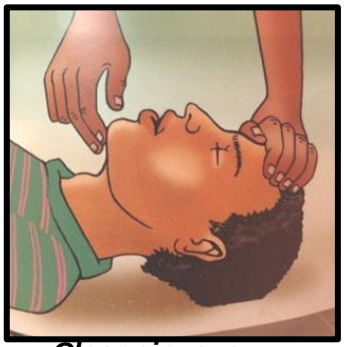
Response

Check if the injured person is unconscious by shouting, ‘Can you hear me? Open your eyes’, and gently shaking the shoulder. If there is no response, shout for help then follow the ABC (airways, breathing, compression) procedure below.

Airways

Open the airways by placing one hand on the injured person’s forehead and gently tilting the head back. Check the mouth for anything that may be blocking it, then lift the chin using two fingers.

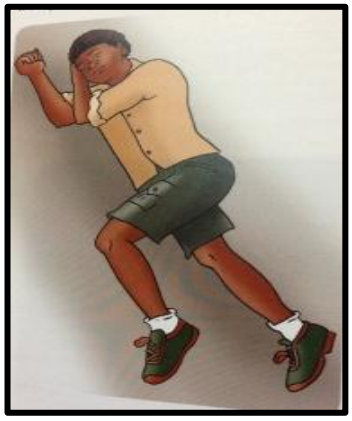
Look for signs of life and movement. No signs of life would mean the injured person is not moving, unconscious, unresponsive and not breathing normally.



Clear airways

Breathing

If the person is breathing, support the head and neck, then carefully place the person in the 'recovery position'.



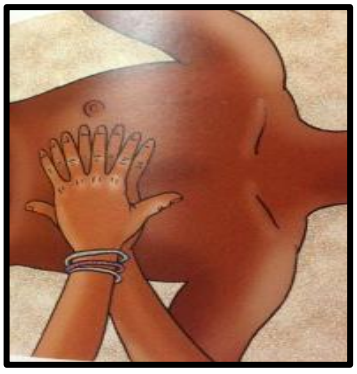
What you do when an injured player is not breathing

If the person is not breathing properly, follow these steps.

1. Kneel beside the injured person's head; lift their chin and tilt their head back, opening their mouth.
2. Using thumb and index finger pinch their nose closed.
3. Take a breath, and place your lips over the injured person's mouth, ensuring good seal.
4. Blow steadily into their mouth for about one second.
5. Watch for their chest to rise.
6. Keep the person's head and chin tilted while you take your mouth away.
7. Watch for their chest to fall.
8. Listen and feel for signs of air being expelled from their chest.
9. Repeat steps 3 to 8.
10. Check if the injured person is breathing, moving and responding.

Compression

Give 30 compressions at the rate of almost 2 compressions per second, follow by two breaths. For a person over one year old, use the following procedure.



Apply compression

1. Put your hands in the centre of the person's chest between the nipples.
2. Place one hand on top of the other.
3. Push down 30 times.
4. Continue with two breaths, then 30 pushes until a health worker arrives or the person starts moving.

For a baby under one year of age, use two fingers (index and middle) <u>not</u> one hand – <u>not</u> your whole hand.

Activity 14.2

Write a short sentence to answer each of the following questions.

1. Define first aid.

_____
_____
_____
_____

2. What do the following initials stand for?
(a) ABCDEF

_____
_____
_____
_____

(b) DRABC

_____
_____
_____
_____

(c) CPR

_____
_____
_____
_____

3. Describe the steps involved in the CPR or compression process.

_____
_____
_____
_____
_____

4. Why should you look after your own health when you are helping someone who is hurt?

_____
_____
_____
_____

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

- First aid is the brief or first help given to an injured before help arrives or the person is taken to the hospital.
- For most injuries, treatment often begins with the RICE method before other forms of treatment can be done on the injured person.
- If you need to help an injured person, follow the DRABC (danger-response-airways-breathing-compression) action plan .
- For a baby under one year of age, use two fingers (index and middle) not one hand – not your whole hand.
- It is best for you not to touch any person's blood because if you have any scratches, small cuts or grazes on your hands and arms, their germs can get into your body. Before you help, make sure to put on a glove or a plastic bag for protection sake.

NOW DO PRACTICE EXERCISE 14 ON THE NEXT PAGE

Practice Exercise 14

The Practice Exercise consists of short answers.

You may start Practice Exercise14

1. Write a brief explanation of each of the following key terms to show that you understand the meaning of each term.

a)Cramp

_____
_____
_____

b) Bleeding:

_____
_____
_____

c) Danger:

_____
_____
_____

d) Response:

_____
_____
_____

e) Airways:

_____
_____
_____

f) Breathing:

_____
_____
_____

g) Compression:

_____
_____
_____

2. Describe the steps involved in treating a knee injury.

_____
_____
_____
_____
_____
_____

3. What can you do if there is no one except you to go for help when someone is hurt?

_____
_____
_____
_____

4. Explain why you think it is important to wear gloves when helping an injured player who is bleeding?

_____
_____
_____
_____
_____
_____

CHECK YOUR WORK. ANSWERS ARE AT THE END OF TOPIC 3.

Answers to Lesson Activities

Answers to Activity 14.1

1 (a) Cramp treatment:
- Stop the activity that causes the cramp
- Gently stretch and massage the cramping muscle by holding the joint in a stretched position until the cramp stops.

1 (b) Graze treatment:
- Gently wash the affected area with water, soap and disinfectant.
- Apply some antiseptic cream to kill any remaining germ.
- Cover the cut or graze.

1 (c) Nose bleeding treatment:
- Sit with your head forward, looking down at the ground.
- Pinch the soft part of the nose together for about 10 minutes.
- Although your nose will probably feel blocked, and you will want to blow the blood out, try not to sniff or blow your nose for at least 30 minutes.

2. Bleeding treatment:
(a) Use a clean cloth or padding to stop bleeding by applying pressure on the affected area.
(b) When bleeding stops, clean the cut and dress.

3. Blister treatment: Clean the blister with rubbing alcohol or antibiotic.
(a) Sterilise a needle over a flame until the tip glows red, allow it to cool, and then pick a small hole in the edge of the blister.
(b) Drain the fluid by applying gentle pressure.
(c) Apply some antibiotic ointment on the blister and cover with a bandage.
(d)

4. **R**est – rest the injured
Ice – ice the injury
Compression – compression to reduce swelling
Elevation - elevate the injured body part

5. Sprains and strains treatment: The first step in treating a sprain or strain is with R.I.C.E. Recovery time depends on your age, health, and the severity of the sprain or strain.

6. Concussions may result from a fall when the head strikes against an object or a moving object falls on the head.

Answers to Activity 14.2

1. First aid is the brief or first help given to an injury before help arrives or the person is taken to the hospital.

2 (a)	2 (b)	2 (c)
Airways blocked in anyway **B**reathing problems **C**irculation problems with any blood loss **D**ecreased level of consciousness **E**xposure to the weather **F**ractures of major bones and spinal injuries	**D**anger **R**esponse **A**irways **B**reathing **C**ompression	**C**ardio **P**ulmonary **R**esuscitation

3. The steps involved in the CPR process are;
   a. Put your hands in the centre of the person's chest between the nipples.
   b. Place one hand on top of the other.
   c. Push down 30 times.
   d. Continue with two breaths, then 30 pushes until a health worker arrives or the person starts moving.

4. Individual answers may vary. No standard answers.

5. If there is no one except you to go for help when someone is hurt, leave the injured person, go for help, but get back as soon as you can.

References

www.ntu.edu.sg MINDEP – Sports Injuries (PDF)

www.niams.nih.gov - Sports injuries (PDF)

Damien McInnis, Personal Development, Grade 9 Student Book, P. 116 - 124

Answers to Practice Exercises 11 - 14

Answers to Practice Exercise 11

1. (a) Individual answers may vary. No standard answers.
1. (b) Individual answers may vary. No standard answers.

2. (a) The hamstring is the group of muscles in the back of your thigh that help provide motion to two joints – knee and hip.
2. (b) Knee and hip.
2. (c) – Thigh injury
- Hamstring injury

3. Individual answers may vary. Standard answers may include:
(a) i) running ii) basketball
b) i) jumping ii) volleyball
(c) i) rugby ii) soccer

Answers to Practice Exercise 12

1. Individual answers may vary. No standard answers.
2. Acute factors those that contribute to injuries
3. Individual answers may vary.
4. Individual answers may vary.

Answers to Practice Exercise 13

1. Individual answers may vary. No standard answers.
2. Individual answers may vary. No standard answers.
3. Individual answers may vary. No standard answers.
4. Guided answers may include:

a) should not play so as to avoid others getting the flu
b) leave the area of play and not return until bleeding stops and a changed uniform
c) not to play or borrow some else's who is not playing
d) need to cool down

Answers to Practise exercise 14

1. Individual answers may vary. No standard answers.
2. Knee injury treatment:

(a) Ice the knee to decrease inflammation and pain. Ice should be applied for at least 20 minutes, 2-3 times daily.
(b) Rest until the swelling disappears. Begin physical therapy to regain as much of the normal range of motion as possible.

3. Individual answers may vary. No standard answers.
4. Individual answers may vary. No standard answers.

TOPIC 4

FRAMEWORK FOR SPORTS AND FITNESS

In This Topic You Will Learn About:

- Sports structure.
- Teamwork and Fair play.
- Skills Development and application.

TOPIC 4: Framework for Sports and Fitness

In this Topic, you will learn about Framework for sports and fitness. You will:

- Identify a brief history of sports and fitness.
- Define sports structure.
- Identify different aspects of sports structure.
- Identify the importance of teamwork and cooperation.
- Discover behaviours that demonstrate positive attitudes.
- Identify the skills required of a sport and fitness activity.
- Identify fitness activities in the community.
- Identify how to involve in organized fitness activities, sports and competition.

.

In doing so, you will find out more about how sports and fitness started in the past and different sports structures. You will also find out how a particular sports contributes to the overall fitness and the importance of a teamwork and cooperation in a sporting game or organization.

We hope you will enjoy this Topic.

Lesson 15: Sports Structure

Welcome to lesson 15 of unit 2. In the last lesson you learnt about treatment of sports injuries. In this lesson you will learn about sports structure.

Your Aims:

- identify a brief history of sport & fitness
- identify and define sport structure
- identify different aspects of sport structure.

Roles of Sport in Society.

Sports play a very big role in developing individuals both physically and mentally, in our society today. A social understanding of sport helps us to understand the world in which we live in. One simple, question is how did sport come this far today?

History of sport

The **history of sports** probably extends as far back as the military training days. This is to prove them fit and useful for army requirements, where the best were chosen to serve and fight for the power in command. Team sports in the like manner, had most probably been developed to train and prove the capability to fight and work together as a team (army).

The history of sport can teach us a great deal about social changes and about the nature of sport itself. Sport involves the development and exercise of basic human skills, in parallel with them being exercised for their usefulness. It also shows how society has changed its beliefs and therefore changes in rules.

Looking at the historical perspective of sport, it is as old as human existence. For example, painting in caves in France suggested sprinting and wrestling existed round 17,300 years ago. Cave paintings in Mongolia dating back to Neolithic age of 7000 BC show a wrestling match surrounded by crowds. Rock art found in Libya shows swimming and archery around 6000BC. Cave paintings in Japan show sumo wrestling.

Monuments to the Pharaohs dating to around 2000 BC, indicate that a number of sports, including wrestling, weightlifting, long jump, swimming, rowing, flying, shooting, fishing and athletics, as well as various kinds of ball games, were well developed and regulated in ancient Egypt.

Of the many evidences found around the world, it was predicted that sports was first instituted formally in Greece with the first Olympia recorded in 776 BC. At the same time, around the world, there were other sports played. For instance, an entire village competed with each other in rough, and sometimes violent, ballgames in England, etc.

The modern sports came to prominence in 1891 in Europe as shown by some historians. European colonialism certainly helped spread particular games around the world,

especially cricket, football of various sorts, bowling in a number of forms, hockey and tennis, and many winter sports, that were originally Europe dominated.

Regardless of game origins, the Industrial revolution and mass production brought increased leisure which allowed more time to engage in playing or observing (and gambling upon) spectator sport.

With the arrival of mass media and global communication, professionalism became widespread in sports, and this promoted sports popularity in general. With the increasing values placed on those who won also came the increased desire to cheat.

Some of the most common ways of cheating today involve the use of performance-enhancing drugs such as steroids. The uses of these drugs have always been disputed with establishment of agencies to monitor professional athletes and ensure fair play in the sport.

 **Activity 15.1**

Answer the following questions.

1. In what year was Olympia first recorded?

   `

   _____

2. Which country has paintings that suggest that sprinting and wrestling existed about 17,300 years ago?

   _____

3. Which two types of media brings sports to the level of professional games?

   a)_____

   b)_____

4. Explain how sports is related and linked to Military.

   _____

   _____

   _____

   _____

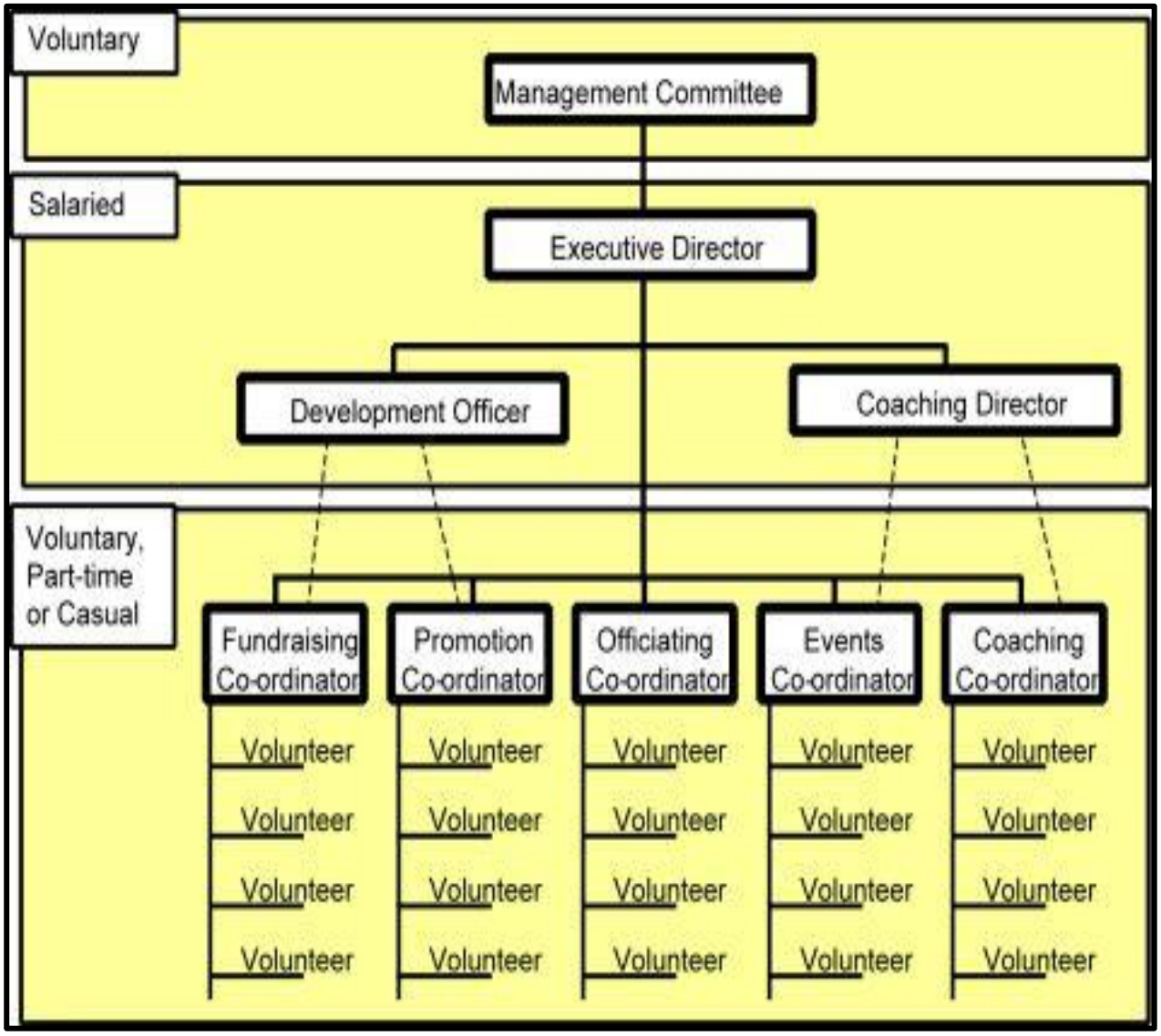
   _____

   _____

What is Sport Structure – Sporting organization?

The term **'structure'** is defined as: 'the way in which parts of a system or object are arranged or organized' therefore, when we talk about sport structure, we are talking about how the sport is organized to meet its aims, and goals, etc. It is organized into specific job roles and responsibilities to undertake work to accomplish the organization's mission and objectives. Because of the structure, different people take on the different roles and responsibilities.

Look at a structure of a sporting organization below.



The above diagram shows that there are three important layers of this structure.

- The top layer of the structure is the Management Committee (or Board of Management). This is the body of people who have the fundamental authority within the organization. All people who are part of the management committee are elected and the key positions are President, Vice-President, Secretary and Treasurer. It is common for all persons on the management committee to be volunteers. This means that is they are not paid to do the work they do.

- The next layer is the salaried officer of the organization. In the above diagram there are only three people who are salaried (i.e. paid for the work they do) and they are the Executive Director, Development Officer and Coaching Director. This is just an example. Many smaller non-profit sport organizations have not enough funds to be able to employ anyone. Other sport organizations which are much larger may have a great many employees. Although the management committee has ultimate authority, it is the salaried officers that carry out most of the important work, and that is why they are paid.
-
- The lowest layer in the above diagram is the many people who perform voluntary roles. These voluntary roles may involve just 2-3 hours of work per week. In a sport organization, this level of the organization structure would include people who coach and officiate, raise funds for the organization, help with the events, look after the club's facilities and run the club's canteen.

Aspects of Sports Structure

It is important to understand that the manner, in which work is divided up amongst the people of the organization, is purely random. There will be differences between similar organizations. Different organization structures suit different types of organizations. The organization structure of a non-profit organization can be very different to a for-profit organization.

There is no perfect solution to developing an organization structure. There is always change and therefore organization management must review the structure of the organization and make the changes when and where necessary.

Some factors that have influence on organization structure are listed below.

The mission of the organization	An organization with a mission to provide service will be structured differently to an organization that exists primarily to sell products. An organization that is a non-profit organization will be structured differently to an organization that is a for-profit business.
The priorities of the organization	Managing an organization is about dealing with the problem that there is always too much to do and too few staff to carry out the work. Management must determine which tasks are most important and assign personnel to them. Therefore the organization structure will depend on what decisions have been made by management with respect to priorities.
Goals and objectives to be achieved	Statements of "Goals" and "Objectives" represent what the organization wants to achieve. They change from time to time as a result of the changing environment in which the organization lives. As Goals and Objectives change so will the organization’s structure.

Available people	Generally the human resources of any organization are the key factor determining success. With enough good people, organizations can achieve all that is desired. However finding good people is often very difficult, especially when you need them as volunteers (unpaid) in non-profit organizations. It is often the case that priorities, goals and objectives and funding are determined according to what "good people" can be found,
Financial resources available	Organizations cannot solve problems by simply employing more people, there is more to it. The number of paid people in an organization is limited by the availability of funding. Even when organizations rely on volunteers, the need for money is still there.

Activity 15.2

Answer the following questions below.

1. What is the difference between a sport structure of a non-profit sport organization and a profit organization?

   _____
   _____
   _____
   _____

2. Which group forms the top layer of the sport structure in a non-profit sport organization?

   _____
   _____
   _____
   _____

3. Which level or group are not paid or on some form of wages? And why is it so?

   _____
   _____
   _____
   _____

Team Sporting Codes as Part of Structure

Below is a table showing some of the team sporting codes we have in PNG and the number of players in each code.

Sport	Soccer	Basketball	Netball	Softball	Volleyball	Rugby	Australian

Code							Rules
No of Players	11	5	7	9	6	15	18

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

- We learnt that sport started very early when army training helps the solider to prove themselves fit and useful to the force.
- Later, different people around the world developed their own sports.
- Another contributing factor in the development of sport is the introduction of industrial revolution and mass production.
- The latest development is that when sport becomes a professional game where people/player becomes professional and they earn money just by playing.
- Sport structure also developed and changed over time to what we now have such as non-profit and profit oriented structures in sport organization.
- We also have people working on voluntary basis while at the same time we have people working on pay/wages. More or less the operation of the organization depended on the goals and objective of the organization.

NOW DO PRACTICE EXERCISE 15 ON THE NEXT PAGE

Practice Exercise 15

1. Why do the soldiers undergo sport and fitness training?

   _____
   _____

2. List the sports found during Pharaoh's time around 2000BC?

   _____
   _____

3. The first Olympic game was recorded in what year and which country?

   _____
   _____

4. What is voluntary role in sport?

   _____
   _____

5. What is the key factor of any sporting organization? Explain why.

   _____
   _____
   _____
   _____

ANSWERS TO ACTIVITES

Answers to Activity 15.1

1. 776 BC
2. France
3. Mass media and global communication
4. It is through the team game allow army to learn to work together as a team and depend on each other support to successfully win the battle.

Answers to Activity 15.2

Answer the following questions below.

1. There is a huge difference between the two because non-profit organization has less funding/money and so employs less people while the profit organization has more funds and so recruited more workers.
2. The top layer of the structure is the Management Committee (or Board of Management).

3. The top level and the lowest level are the ones not on any form of pay. They volunteer their services to the club to help with other necessary activities needed to keep the club/organization running.

References

Kenneth Rouse, Personal Development, Outcomes Edition for PNG, Book 1, P. 22 – 31

Damien Davis, Tania Hamilton, Kim Bastone-Cook, Michelle Bradford, Health and Physical Education 2, P. 194 – 195

Pamela A. Norman, Home Economics for PNG book 2, P 80

Lesson 16: Teamwork and Fair play

Welcome to lesson 16 of unit 2. In the last lesson you learnt about sports structure. In this lesson you will learn about teamwork and fair play.

Your Aims:

- identify the importance of teamwork and cooperation
- identify behaviours that demonstrate positive attitudes
- identify how to manage conflicts in sports or fitness activities

The Importance of Teamwork

An important factor of good sportsmanship, especially in a team sport, is teamwork. **Teamwork** is the cooperative effort of a team of players to achieve their goal. As members of a team, you and your team mates will be relying on each other to achieve what you aim to do as a team. This means you will help and encourage each other as you play the game. As a team you may have roles or positions to play in the game. All these roles have to unite and work together.

Teamwork in sports can go further in building trust and confidence in yourself as well as your peers. Your can trust others to do what they are tasked to do and at the same time be confident that they too trust that you will play your part and cooperate with them. Teamwork does not create harmony and peace only in sports but also in a workplace or community.

The Values of Fair Play

In sport, many people are motivated by their desire to win. This can be positive, provided they also show respect, for example towards opponents and officials, and behave in a sporting manner or manner accepted by all. In the same way, we encourage students to appreciate the importance of fair play. Simply taking part in a fair game has many rewards.

For example, those who play fairly will be respected not just as good sports people but as fair people in general.
A good sports person should therefore try to:

- set and maintain standards of fair play at all times
- lead by example
- emphasize the importance of participation
- be consistent in his/her approach and treat all players equally
- praise sporting behaviour as well as effort and performance
- play by the rules, accept decisions and, if they are not playing fairly should explain his/her behaviour if is unacceptable
- not to accept unfair play
- avoid accepting prize money as rewards or as a means of bribery or payment of wrong doing.
- go by the rules and regulation set by the sporting code.

All societies in the world are governed by a set of rules that have been decided upon by the society as a whole, their elected representatives, or the rulers of that society. These rules, known as the laws of the land, are necessary so that chaos does not happen.

In many instances, sport serves as a small scale version of society. It is necessary to have guidelines, rules, or regulations of the way a sport is to be played. These rules are workable but become less flexible as sport moves from recreational physical activity to formal structures, such as sports leagues. That is it became professional. It is essential that all teams involved at similar levels play by the same set of regulations. Even at the elite or professional level, however, opportunities must be available to change the rules of sport, whether by popular demand, for safety reasons, or for spectator and participant appeal.

The rules of sport, like the rules of society, are meant to satisfy the needs of the participants and spectators, and must be seen to be fair, equitable, and judicious; that is, they must include a set of consequences/penalties for a different level of misbehaviours or deviant behaviour.

Acceptable Sporting Behaviour

Acceptable sporting behaviour in this case reflects good sportsmanship, as it pertains to ethical. Behaviour, fair play, and respect for the sport, the participants, and the spectators. Elite athletes have become societal role models, whether or not they wish to carry this burden. In recent years, because of increased and instant media attention, the behaviour of these athletes has come under society's microscope, as well as on the playing field, for every aspect of their lives. As a result, elite athletes seriously influence the moral and ethical development of children and youth of many societies.

Sport can also build character and personal qualities, such as courage, integrity, and the capacity to commit to a goal or purpose, as well as values such as a sense of responsibility to others, respect for others, self-discipline, a sense of fair play and fair dealing, and honesty.

For these reasons it is important that parents and others, and particularly coaches have a good understanding of the positive values that the sporting experience is able to promote. Pointing out and rewarding the positive behaviours while discouraging the negative ones is every adult's responsibility. Coaches and parents are role models too.

 **Activity 16.1**

Answer the following Questions

1. Name 4 sporting games that require a team of players to take part.

   a) _____ b) _____

   c) _____ d) _____

2. Define:

a) teamwork

_____

b) fair play

_____

c) cooperation

_____

3. Explain why we need to encourage people to appreciate the importance of fair play

_____

_____

_____

_____

_____

Character versus Sports Ethic

More often than not, the assumption is made that having a good character also presents the dominant sport ethic. In other words, the athletes' behaviours are consistent with the behavioural norms that are commended and praised by the sporting culture. Individual character and the prevailing sports ethic may, however, counter each other. Athletes who demonstrate and endorse the sports ethic are rewarded, while those who rebel find it difficult to be a part of the accepted society.

When athletes are exposed to various ethical dilemmas or problems in sport over a period of time, they may eventually adopt unethical behaviours that are expected of them (e.g. rugby players may be expected to fight or to take penalties for their team). The behaviours are often reinforced and appreciated by the fans and media. Although the behaviours are accepted within the limited world of sport, they are often not acceptable in the world outside of sport. The newspapers and television are full of examples of athletes who have difficulty keeping the line clearly drawn between the world of sport and the world outside of sport.

Here are some examples of behaviour that display positive attitudes.

EXAMPLES

Athletes' behaviours may be consistent with our norms of sporting culture but may not reflect good character when they**:**

Sports Culture	Bad Behaviour … by
• strive for excellence	cheating (e.g., using drugs, making dishonest line calls, tampering with equipment)
• strive for excellence	training to exhaustion and playing in pain
• show love and respect for the game	gloating (eg. after a goal or a try)

• demonstrate being a team player	risk -taking or demonstrating violence and aggression (e.g., Fighting, swearing, stick smashing)

Deviant or Unacceptable Behaviour in Sport

The term deviant behaviour describes actions or behaviours that take place in sport that are outside expected or acceptable limits. This definition helps distinguish between behaviours that are governed within the rules of the sport and those that may be questioned, reviewed, or acted upon by the parent sport organization (e.g., National Rugby League) or by the judicial system. Deviant behaviour in sport may include the following:

- **Rule breaking**

When rules are broken unintentionally during competition, or when rules are broken intentionally but the results are not severe, game officials make a ruling. Organizational or judicial intervention may become necessary when the rules are broken intentionally or result in great harm. The penalties or sanctions imposed against the perpetrators range from heavy fines to lifetime bans in the sport, and, in some cases, result in criminal charges.

- **Emotional involvement**

Different levels of emotional involvement could also be considered deviant behaviour. In many countries, sporting events have evolved into avenues for emotional release and relief. Generally, the more important the event is, the greater the emotional expression becomes, whether it be joy, anger, wonderment, or sadness. Often the emotions are irrational and, in many instances, lead to violence, usually between opposing team spectators, but sometimes between opponents, athletes, and spectators, or even game officials. In any case, these actions are immature and antisocial, and are definitely not acceptable.

- **Off-Field violence in sport**

Sports that involve body contact of any kind also involve violent acts. It has been suggested, although not proven, that watching or being involved in violent acts in sports may lead to deviant behaviour outside the sport venue. Is it possible that people who use physical intimidation and violence in sport are likely to exhibit these behaviours when faced with situations of conflict outside of sport?

- **Performance enhancement**

Although performance-enhancing substances have been used for hundreds of years, this issue is becoming more prevalent in sport today. Athletes use many substances such as anabolic steroids, stimulants, over-the-counter drugs, vitamins, amino-acid supplements, health foods, and natural herbs to gain an advantage over their competitors. Not all substances are illegal, but many are.

Does Sport Build Character?

In sports, the term **character** refers to the quality of conduct and respect that become part of the personality of a person. The character of an individual can be developed through sports if he/she:

- abides by the sports' code of ethics
- practices fair play
- complies with the rules and regulations of the sport
- shows respect for the game, for others and for him/herself

How a person is socialized as a child determines, to a large extent, what the person values, and this includes the elements of trustworthiness, honesty, respect, responsibility, fairness, and caring.

When athletes behave in a manner that is inconsistent with the way they normally behave it is said that they are acting "out of character."

Activity 16.2

The fundamental nature of positive sporting behaviour is a commitment to compete within the believe and spirit of the rules, to treat the game itself and all participants with respect, and to be gracious in both victory and defeat. For many sport participants and spectators, the dilemma is to know what is cheating or what just a part of the game is. Here are 10 scenarios that test your attitude toward sporting behaviours. Identify each of the behaviours described in the scenarios below as one of the following:

C – Cheating
P – Part of the Game

Be prepared to support your choices.

Scenarios	**C**	**P**
1. To get a needed time out, a coach instructs a soccer player to fake an injury.		
2. After every score, a basketball player taunts/mocks the defender in an effort to "psyche him or her out of the game."		
3. To gain an edge, a golfer illegally alters equipment.		
4. A baseball coach instructs a pitcher to throw the ball at the other team's best batter's head to brush the batter back from the plate.		
5. To motivate players, a coach uses foul language and insults.		
6. In basketball, a player commits a deliberate foul to stop the clock in the final minute of play.		
7. In soccer, a coach teaches players to grab and hold shirts illegally without being detected.		
8. In volleyball, a player says nothing after a referee erroneously says the player never touched the ball.		
9. To set a new scoring record, a football team facing a badly overmatched opponent runs up the score to 96-7.		
10. In baseball, a fielder traps the ball against the ground, but tries to convince the umpire that he or she caught it cleanly.		

Managing Conflicts in Sport

The officiating environment can be challenging and potentially unfriendly. Dealing with conflicts can be tough for a confident official, let alone an inexperienced one. Good officiating relies on dealing with conflicts, professionally and positively.

Conflicts are likely to arise in a number of situations. These include:

- disagreement from participants over a penalty/infringement
- perceived bias shown by the official in the eyes of participants/coaches
- frustration shown by participants as a result of their level of performance or the competition result
- misunderstanding of instructions or rulings from an official
- sledging or (provoking negative reaction) between participants

Minimizing conflict

There are occasions when conflicts in the sporting environment are unavoidable, however developing strategies to minimize conflicts from arising is vital. If you control a game, the following tips may help.

- Prevention is always better than cure. If action is taken early in the game, a conflict is less likely to occur.
- Make competitors aware of your presence by reacting immediately to rule infringements (when appropriate).
- Remain objective, no matter what prior knowledge of participants/teams an official has.
- Be definite and firm with decisions and communication.
- Look sharp and act sharp - this will gain respect as an official.
- Don’t take criticisms personally. Remember that coaches and participants are seeing the game from a different perspective to the officials.
- At the beginning of the competition, provide structure and guidance, but also start a dialogue with the participants.
- Acknowledge the participant’s abilities and experience, and invite constructive viewpoints from some participants.
- Speak clearly and firmly in heated situations. This will indicate confidence in managing the situation.
- Keep cool if the situation starts to get a bit heated.

Before we go any further, let us do the activity below to see how much teamwork and fair play.

Activity 16.3

Match the key terms to their definitions provided in the opposite column.

Key Term	Definition
1. conflict	a. an argument or a situation in which people do not have the same opinion
2. fair play	b. something that you want and plan to do
3. disagreement	c. the principles on which future behavior is based
4. listen	d. when someone does not understand something correctly
5. intention	e. to act or work together for a particular purpose, or to be helpful by doing what someone asks you to do
6. misunderstanding	f. a game, competition or activity needing physical effort and skill that is played or done according to rules, for enjoyment and/or as a job
7. open mind	g. an active disagreement between people with opposing opinions or principles
8. ground rules	h. to give attention to someone or something in order to hear them
9. cooperate	i. when players or teams play according to the rules and no one has an unfair advantage
10. sport	j. to wait until you know all the facts before forming an opinion or making a judgment

Summary

You have now come to the end of the lesson. In this lesson you have learned that:

- An important factor of good sportsmanship, especially in a team sport, is teamwork.
- Teamwork is the cooperative effort of a team of players to achieve their goal.
- All players are encouraged to appreciate the importance of fair play
- Conflicts occur if players do not follow the rules and regulations of the game
- Common reactions to conflict are; physical violence, verbal abuse, withdrawal, silence or explosion
- All players, officials and spectators should know how to manage conflicts in sports

NOW DO PRACTICE EXERCISE 16 ON THE NEXT PAGE

Practice Exercise 16

\The Practice Exercise consists of short answers.

You may start Practice Exercise 16

1. In your own words, discuss what fair play is.

_____
_____
_____
_____
_____
_____

2. Discuss a situation where you show respect for the game. Your own story.

_____
_____
_____
_____
_____
_____

3. Discuss a situation where you show self-respect in a game. Your own story.

_____
_____
_____
_____
_____
_____

4. Discuss a situation where balance competition is achieved.

_____
_____
_____
_____
_____
_____

5. If you were officiating a game, list the steps you would take in order to minimize or resolve the conflict.

_____
_____
_____
_____
_____
_____
_____
_____

ANSWERS TO ACTIVITIES

Answer to Activity 16.1

1. Individual students' answers will vary
2. a) Teamwork - the cooperative effort of a team of players to achieve their goal.
   b) Fair play – good behaviour, following the rules of play and code of ethics
   c) Cooperation – actively helping others, more in a positive way

Answers to Activity 16.2

Scenarios	**C**	**P**
1. To get a needed time out, a coach instructs a soccer player to fake an injury.	√	
2. After every score, a basketball player taunts the defender in an effort to "psyche him or her out."	√	
3. To gain an edge, a golfer illegally alters equipment.	√	
4. A baseball coach instructs a pitcher to throw the ball at the other team's best batter's head to brush the batter back from the plate.	√	
5. To motivate player s, a coach uses foul language and insults.	√	
6. In basketball, a player commits a deliberate foul to stop the clock in the final minute of play.	√	
7. In soccer, a coach teaches players to grab and hold shirts illegally without being detected.	√	
1. In volleyball, a player says nothing after a referee erroneously says the player never touched the ball.	√	
9. To set a new scoring record, a football team facing a badly overmatched opponent runs up the score to 96-7.	√	
10. In baseball, a fielder traps the ball against the ground, but tries to convince the umpire that he or she caught it cleanly.	√	

Answers to Activity 16.3:

1. G, 2. I, 3. A, 4. H, 5. B, 6. D, 7. J, 8. C, 9. E, 10. F

Reference

www.csmonitor.com/.../Sports-to-Share-teaches-**teamwork**-**fair**-**play**-and- tolerance

Lesson 17: Skills Development and Application

Welcome to lesson 17 of unit 2. In the last lesson you learnt about teamwork and fair play. In this lesson you will learn about skills development and application.

Your Aims:

- identify the skills required of a sport or fitness activity
- identify fitness activities in the community
- identify how to involve in organized fitness activities, sport or competition

Skills Development

When we talk about **skills development** in sports, it is important to start with some basic skills. These skills are not only necessary for children but rather they are vital for anyone of any age who is new to sports or who wants to venture into sports.

Many sports and games have a combination of basic skills. Combining these skills can be complex and if you force yourself to try games that are too difficult for you, you are likely to injure yourself and may lose confidence and enthusiasm. Therefore, you should always learn the basic skills before attempting to play various sports. Basic skills provide you with the foundation for learning and playing more traditional games.

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Basic sporting skills can be grouped into the following categories:

- running and jumping, which includes dodging, chasing, hopping and skipping
- throwing and catching, which includes bouncing a ball
- hitting and kicking (a ball)

Here we will look at how these skills relate to different sports, for example throwing and catching skills will help students when they are introduced to sports such as netball' rugby, and basketball etc. In developing the skills in each of these groups, there are a number of stages that a new player will need to go through. The final stage indicates the point at which you should be ready to move on to more advanced skills, which will prepare you for specific sports. .

- **Running and jumping skills**

Running and jumping skills provide essential grounding for track and field athletic events, for example sprints, hurdles, long jump and high jump. However, many sports require these types of athletic skills too, for example jumping up for a catch, marking players, finding free space, reaching the ball before it bounces twice. These skills are also very effective in developing a base of fitness. They can improve endurance, strength and speed, and develop general co-ordination and movement of the body.

- **Throwing and catching skills**

Throwing and catching skills help to develop timing and balance. These skills are essential for invasive games such as basketball, netball, handball and rugby. They are necessary grounding for cricket, soft ball, volleyball and throwing skills such as javelin and shot put.

- **Hitting and kicking skills**

Hitting (or striking) and kicking skills help to develop timing and balance. Throwing and catching games, and running and jumping games, will help students develop their hitting/striking and kicking skills. Hitting/striking skills are essential for hockey, volleyball, , cricket and softball. Kicking skills are necessary for football and rugby.

Activity 17.1

Answer each of the questions in at-least two to three sentences.

1. Why is it important that we start with skill training before actually playing a game?
   _____
   _____
   _____

2. Of the skills discussed above, which one is more important?
   _____
   _____
   _____

3. What is the difference between sports and fitness?
   _____
   _____
   _____

Invasive Games

Invasive games are grouped together because they all involve two competing teams who have to defend their own territory and goal, and attack their opponent's territory and goal.

The aim of invasive games is to score a goal or a try. Since invasive games have the same aim, they also require many of the same skills. That is why it is helpful to learn the skills for these games together.

.

The skills and tactics needed, for example, to pass the ball or dodge a defender, can be transferred to many different games. The skills needed to play invasive games include throwing, catching, running, kicking and hitting. The activities help you to develop these skills and build on the basic sports skills.

In invasive games, players have different responsibilities within teams, and in some games they have restrictions on where they are allowed to play. Invasive games require individual skills such as scoring goals, as well as a strong emphasis on team play and tactics. Mini

games should be trialed first before a full game. This is because you have more opportunity in mini games to practice the skills because there are generally less people involved in a smaller playing area. As a result, they are far more likely to enjoy the games and improve their skills and tactics.

The three types of invasive games:

- goal-throwing games where a goal is scored by throwing the ball; these games include basketball, netball and handball. Activities include moving and passing, throwing, etc..
- goal-striking games where a goal is scored by striking the ball without using the arms; these games include football and hockey
- try-scoring games where a try rather than a goal is scored by carrying the ball over a line, rather than striking or throwing it into a goal; these games include rugby, union, etc.

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- **Goal-throwing games**

There are two types of goal-throwing games. The first is when the person with the ball is restricted in terms of movement. For example for netball, you are only allowed to take one step, from your landing foot, before you throw the ball; you are not allowed to run or dribble with the ball. The second type allows movement with the ball. For example, in basketball you are allowed to dribble the ball. Activities include: moving and passing, dribbling, shooting and catching the rebound, shooting and defending, etc..

- **Goal-striking games**

Goal-striking games are used to help students learn the fundamental skills of sports such as hockey and football. Most of these games and skill exercises can be done either using the foot or a stick. Activities include: head goal, passing and intercepting, dribbling and dodging player, shooting and defending, dribbling-shooting and defending, etc.

- **Try-scoring games**

In try-scoring games, a try is scored by placing the ball over the line your opponents are defending. Skills include running, passing and kicking. Activities include: running and chasing, running and dodging, running and passing, running-passing-try-scoring.

Net Games

Net games can ‘be played individually or with a partner (for example 1 versus 1 or 2 versus 2 in tennis) and can be team games (for example volleyball). The term net can be used to describe any type of court division. The games are played on a court, which determines the boundary of where the ball may land, and involve skills such as hitting, running and jumping.

The scoring systems differ according to the game. Learning the basic skills is important, but these games are also tactical and elements such as attack and defense need to be introduced.

Net games can be divided into two main sections:

- individual net games, which include tennis, table tennis and badminton
- team net games, which include volleyball.

Students need to learn some general skills before they can play more specific games related to the sport. These will then prepare them for learning and playing the mini and full versions of the sport. The metric measurements for the pitch and equipment are the official ones stipulated in the rules for each sport.

- **Team net games**

In team net games, such as volleyball, the ball is not allowed to bounce. Hands are used to hit or pass the ball and more than two players can make up a team. Players may pass the ball between them before sending it over the net (up to three touches are allowed in volleyball). It include activities like: volley throws, serving, digging and volleying, sets and strikes, working in 4s, 3 versus 3 volleyball, etc..

Batting and fielding Games

Batting and fielding games are played in teams, where one team bats while the other one fields. These games involve skills such as hitting, running, throwing and catching. Individual skills and team tactics are important in these games.

This area is divided into three main sections:
• batting games develop mainly batting and running skills
• fielding games develop mainly catching and throwing skills
• combining batting and fielding games for example tee ball, cricket, and softball.

The first two sections above develop the skills that you need to play batting and fielding games. The last section covers the rules for both its mini and full versions.

- **Batting games**

Batting games involve striking the ball with a bat and running to score runs or points. They help students to develop batting skills, including the direction and speed of the ball, and running skills, including quick turns. The games in this section combine running and batting skills. Activities include: running , batting for cricket, batting for distance. ,

- **Fielding games**

Fielding games help students to develop throwing and catching skills. They encourage teamwork and communication between fielders. Activities include: bowling and wicket keeping, pitching, backstop and fielding, non-stop cricket, and or combining batting and fielding games which includes games such as tee ball, softball, and cricket combine batting and fielding games.

Activity 17.2

Match the name of each game to its given description

Names of games: batting game, net game, gold-striking game, invasive game, goal throwing game, fielding game

Names of game	Description of game
1. _____	a. activities include: moving and passing, dribbling, shooting and catching the rebound, shooting and defending, etc..
2. _____	b. The games are played on a court, which determines the boundary of where the ball may land, and involve skills such as hitting, running and jumping.
3. _____	c. involve striking the ball with a bat and running to score runs or points.
4. _____	d. activities include: bowling and wicket keeping, Pitching, backstop and fielding, non-stop cricket, and or combining batting and fielding games which includes games such as tee ball, softball, and cricket combine batting and fielding games
5. _____	e. activities include: head goal, passing and intercepting, dribbling and dodging player, shooting and defending, dribbling-shooting and defending, etc.
6. _____	f. the game involve two teams who have to defend their own territory and goal, and attack their opponent's territory and goal

Athletics

Athletics involves many varied physical activities. Unlike some other games, athletic events can be measured very objectively, for example, start and finish time, distance thrown. The skills are very technical and require consistent practice for improvements to happen. Athletics requires all the elements of fitness, although some activities will be more dependent on certain components. For example long distance running requires more stamina than short distance sprints.

Athletic skills are a good foundation for all sports. They can be broken down into:

* field activities - throwing, for example shot put
* field activities-jumping, for example long jump
* track activities, for example the 100 m sprint

Exercises for each of the above are covered in stages, leading to competition and rules for the relevant events. The metric measurements given for the pitch and equipment are the official ones stipulated in the rules of each sport.

- **Field activities - throwing**

Throwing a shot, as far as possible requires a combination of strength and speed. Technique is important as the angle and speed of release largely influence distance. Balance is also important in achieving maximum power and release at the right moment. Activities include: putting action, foot positioning, foot & putting action, putting the shot.

- **Field activities - jumping**

Jumping requires a combination of speed in the run-up, accuracy in reaching the correct take-off position and power to gain maximum height or distance. Technique is very important. Activities include: the approach, the takeoff, the flight and the landing, short run and jump,

- **Track activities**

Track activities involve running and this can be combined with jumping for some events, for example hurdles. Sprint running requires speed combined with strength (power) in order to cover a short distance very quickly. Long distance running requires more stamina. Activities include: tatting, staring & increasing speed, maintaining speed, running drills.

Application

In sports, players will have to apply the learned skills in order to perform competently. These sporting skills can be acquired fully if the players take quality time to train hard and well. Application of these skills can be done by way of training as a player and by organizing sporting events

Organizing Sports Events

Sports can be enjoyed without the need to keep score or have a champion. However, human are competitive by nature. If a person is offered the challenges of competition, it can help the person to further his/her sporting and personal development. Competition presents human with pressures such as keeping control during poor performance, sustaining motivation and coping with controversial decisions. These skills can not only be improved and used in sport, but also transferred and used in many other situations, such as getting on with others and joining in school activities. Some people fear losing while others do not.

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- **Preparation**

Any event needs preparation and its success largely depends on the effort put in beforehand. There are many factors you need to consider when organizing sports or games and the type you choose will depend on these. For example, you might have:
large or small numbers of players

- beginners, improvers or a mix of abilities
- recreational or more serious competitors
- a range of ages
- individuals or teams
- limited access to facilities or equipment
- limited help.

There are other questions you should ask yourself before taking on the responsibility of organizing a competition. For example:

- what is the minimum and maximum number of competitions for each person?
- where can you hold the competition — is there enough space?
- can everyone get to the venue?
- what equipment do you need?
- how important is it for teams/individuals to be evenly matched?
- do you need helpers - if so, who will help you?
- what will be the rules for the competitions?
- how will you arrange the matches?

Whether you are organizing an event within the school or an open tournament, you need to confirm your access to sites, equipment and helpers/officials. If you are recruiting helpers, make sure you explain exactly what they will need to do. Only then will you be able to judge if they are willing and able to help.

At this stage, you can decide what sort of competition is appropriate and start to plan.
Plans will vary according to the type of event you are organizing. You will need to come up with a way to keep your records.

- **Type of events**

Competitions may range from a simple friendly match between two teams within your group, to a multi-sports all-day competition for different age groups. The nature of the different types of events will help you to decide which is the most appropriate.

- **Knock-out competitions**

Many competitions are of a knock-out form. The disadvantage of this format is that after one match 50 per cent of teams or players are out of the tournament. If you do run a competition of this nature, you might consider running a second knock-out competition for first round losers. This ensures every team/player has at least two matches.

You should structure the draw so the strongest teams/players do not play each other in the first round. This is called seeding. For example, the following teams are seeded 1—4 respectively: Yellows, Greys, Blues and Greens. The other teams/players can then be drawn out of a hat to decide who they should play. In cases where numbers are uneven (those that are not 4, 8, 16, 32, and so on), you may have to give certain teams/players a bye, which means they go through to the next round without having to play. It is best to spread the byes evenly throughout the draw and give them in rank order to the seeded players. So the Yellows would have a bye into the second round. The order of the matches is referred to as the order of play, and is done according to the availability of players/teams, umpires, pitches and equipment

- **Round-robin competitions**

Round-robin competitions are very popular in sport because everyone can play an equal number of matches and no one is out in the first round. There can be a number of teams/players in a group, all of whom play each other. If there are many entries or you want to find an eventual winner of the event, you can put people into a number of groups and then run a knock-out event for the winners of each group (and if time allows for those who finish second and third in their group).

Alternatively, if there are two groups, the top two scorers in each group could go through to a semi-final; the winner of Group 1 plays the runner-up of Group 2, while the winner of Group 2 plays the runner-up of Group 1. The winners will then go through to the final, where they will compete for first and second place. It is advisable if there is more than one group to seed the better teams/players so they are spread evenly among the groups (unless you are running an A and B event; the A for the better players and the B for the weaker ones). In the following example, the seeded teams are:

1 Team A Group 1
2 Team A Group 2
3 Team B Group 2
4 Team B Group 1.

This helps to balance the groups in terms of standard and prevent a situation where good teams or players do not go through to further stages because all the best players are in their group. Always have a results card to fill in the scores.

- **Leagues and fixtures**

If you want to arrange competitions with other teams in your area, for example one school versus another, you may wish to organize a league where teams play against each other over a period of time. The format may be knock out or round-robin.
Alternatively you may arrange some friendly fixtures, which are one-off competitions on a certain day

You can run these according to age or ability, for example, U 1 2 and U 1 6 leagues/fixtures. If you are organizing a league, it may be best to set up a small committee of people to help you, for example, a representative from the other teams. Whichever format you decide will need organization.

- **On the day of the competition**

Most of the organization for matches or competition can be done prior to the event.
The following checklist shows you the sort of things you need to consider to help the event run smoothly. On the day of the competition, you should ensure:

• all the equipment is ready and in working order
• you have access to first aid support
• you display a timetable of matches so students and umpires/officials know when they are needed
• a captain is appointed for each team
• captains/helpers hand in results immediately
• results are displayed so everyone can follow the progress of the competition
• you treat all teams/competitors fairly, for example giving teams equal rest times, equal numbers of matches
• teams can be identified, for example by colour of kit, shirts on/off
• you arrive in plenty of time to check if the facilities are prepared and safe
• students are met and told where to go
• helpers know what to do and where to go
• students know where they can get some water
• any spectators are out of danger
• people know where to go if they need help
• there are procedures in case of bad weather or teams failing to turn up

• encourage the students to play fairly and to enjoy taking part.

Activity 17.3

Discuss the following in at least 2 sentences each

1. What is the difference between field activities and track activities?

_____
_____
_____

2. What is knock-out competition?

_____
_____
_____

3. What is round-robin competition?

_____
_____
_____

As Baron Pierre de Coubertin, founder of the modern Olympic Games, stated:

'The important thing in sport is not to win but to take part; just as the important thing in life is not the triumph but the struggle. The essential thing is not to have conquered but to have fought well.

Summary

You have come to the end of lesson 17, here are some of the main points we have covered in this lesson.

- Sporting skills have to be learnt before you start playing
- Sporting skills are categorized according to the kind and type of sport you are to play
- Similar sporting skills are can be used for athletics as well as ball games
- Sporting activities can be organized even though it may not be an easy task to do.
- There are different typesof sporting events that you can organize
- Winning is not the only aspect of taking part in a competition

NOW GO ON TO THE PRACTICE EXERCISE 17

Practice Exercise 17

 Answer the following question below:

1. List the skills required for a long distance runner.

_____
_____
_____
_____
_____

2. List the skills required for a long jumper.

_____
_____
_____
_____
_____

Answer these questions in two or three sentences.

3. Why is it important to play mini-game first before the full-game?

_____
_____
_____
_____
_____

4. What is it that human always want to win in competition?

_____
_____
_____
_____
_____

5. In your own words, explain the quote by Baron Pierre de Coubertin, founder of the modern Olympic Games

_____
_____
_____
_____
_____

Answers to the Activities

Answers to Activity 17.1

Answer the questions in at-least two to three sentences each.

1. Why is it important that we start with skill training before going into actual game?

It is important to prepare people for physical exercise, prevent injuries during exercise/game and avoid muscle stiffness afterwards. During games, the body has to work hard to adapt to the increased demands being made upon its various systems. It is essential to prepare the body for these increased demands.
Learning skills makes the body less susceptible to injury and can also have a beneficial effect on performance, particularly at the start of a session or competition. It provides the foundation for learning more traditional games.

2. Of the skills discussed above, which one is more important?
All the skills are important because when you engage in a game, various skills come into play thus enables you to perform various acts or body moments, posture/stances properly. For example, Running and jumping skills provide essential grounding for track and field athletic events, for example sprints,

3. What is the difference between sports and fitness?
Sport is a game, competition or activity needing physical effort and skill that is played or done according to rules, for enjoyment and/or as a job while fitness is the condition of being physically strong and healthy.

Answers to Activity 17.2

Match the name of each game to its description given.

Names of game	Description of game
1. Goal throwing game	a. Activities include: moving and passing, dribbling, shooting and catching the rebound, shooting and defending, etc..
2. Net game	b. The games are played on a court, which determines the boundary of where the ball may land, and involve skills such as hitting, running and jumping.
3. Batting games	c. involve striking the ball with a bat and running to score runs or points.
4. Fielding game	d. Activities include: Bowling and wicket keeping, Pitching, backstop and fielding, , Non-stop cricket, and or Combining batting and fielding games which includes games such as teeball, softball, and cricket combine batting and fielding games
5. Goal-striking games	e. Activities include: head goal, passing and intercepting, dribbling and dodging player, shooting and defending, dribbling-shooting and defending, etc.
6. Invasive game	f. the game involve two teams who have to defend

	their own territory and goal, and attach their opponent's territory and goal

Answers to Activity 17.3
Discuss the following in at least 2 sentences each

1. What is the difference between field activities and track activities?

   Basically, field activities requires a combination of strength and speed. Technique is important as the angle and speed of release largely influence distance. Balance is also important in achieving maximum power and release at the right moment a combination of speed in the run-up, accuracy in reaching the correct take-off position and power to gain maximum height or distance. On the other hand, field activities involve running and this can be combined with jumping for some events.

2. What is knock-out competition?

   A knock-out competition is a competition where-by the competing teams are defeated off the competition so that they can no longer take part in it. In most case after one match 50 per cent of teams or players are out of the tournament. Only the winning team has another opportunity to play one more game.

3. What is round-robin competition?

   Round-robin competitions is where everyone can play an equal number of matches and no one is out in the first round. There can be a number of teams/players in a group, all of whom play each other. If there are many entries or you want to find an eventual winner of the event, you can put people into a number of groups and then run a knock-out event for the winners of each group.

Reference

Health & Physical Education – Damien Davis

www.wgcoaching.com/**sports-skills/**

Answers to Practice Exercises 15 - 17

Answers to Practice Exercise 15

1. That is to keep them fit in their: physical, psychological, emotional and teamwork.
2. Wrestling, weightlifting, long jump, swimming, rowing, flying, shooting, fishing and athletics
3. The year is 776 BC in Greece
4. This is where the person who offered his service to help the club will not be paid for his services.
5. The key factor is human resources. Answers may vary

Answers to Practice Exercise 16

1. The meaning of fair play covers four elements of fair play:

a. Respect for the game (including officials)
b. Respect for others (i.e., teammates, coaches, opponents)
c. Self-respect
d. Balanced competition

** Note that there is another element that factors into these four: maintaining self-control at all times.

Respect for the game. The student show how he/she showed respect for the game. For example, listen to the game officials and discuss but with respect to their views because they are the authorities. More, state your ideas in a polite way and accept their views.

Respect for teammates, coaches and opponents:
Don't let your teammates and coaches down: prepare adequately for competition, try your hardest, encourage teammates and support an honest effort by them. Give your opponent an appropriate challenge; avoid "trash talk", arguments and violence.

Self-respect – Show/display a true sportsmanship with honesty and admit your mistakes. Be mindful of theirs around you and not you alone in the game.
Balance competition- Play a fair game and treat every team/player equal. Avoiding discriminating or disadvantage other team/players.

2. This means approach the game in a way that is fun and allows you to give your best performance. It means respecting the officials and the role they have to play. Respect for the game means playing by the rules, but also going further and playing by the spirit of the rules and the game.

3. Respect for oneself:
Prepare physically and mentally for participation in a way that will be healthy and safe. This means being in satisfactory physical condition and being mentally prepared to do the best you can, regardless of the outcome. Athletes with a sense of self-respect do not use performance-enhancing substances. It also means

standing up for your rights or dignity if an opponent, teammate or coach treats you in a way that makes you feel uncomfortable.

4. Balanced competition:
   Competition is an essential part of sport, yet too much emphasis on winning can have a number of negative effects on young athletes:

   Get fun out of the game;
   Not putting undue stress on players;
   Emphasis on fair and good game than winning;
   Emphasis on enjoyment and respect of all.

Every person and team will have a different way of approaching competition, but the desire to win should not interfere with a commitment to fair play. Seeking victory at any cost defeats the true meaning of competition.

Answers Practice Exercise 17

Answer the following question below:

1. List the skills required for a long distance runner/athletics.
   - varied physical activities
   - Start and finish, timing, distance running
   - stamina

2. List the skills required for a long jumper.
   - Varied physical activities
   - a combination of speed in the run-up,
   - accuracy in reaching the correct take-off position
   - power to gain maximum height or distance.

Answer these questions in two or three sentences.

3. **Why is it important to play mini-game first before the full-game?**
   It is important because it gives you more opportunity to practice the skills because there are generally less people involved in a smaller playing area. As a result they are far more likely to enjoy the games and improve their skills. – Practice makes perfect.

4. **Why it is that human always wanted to win in competition?**
   Because humans have an in-build drive for competition. They want to complete with each other to see who is best or better. Not many people accept defeat. Others don't want to let their love ones, down so they struggle to win. Therefore human are always competitive against or among each other.

5. **In your own words, explain the quote by Baron Pierre de Coubertin, founder of the modern Olympic Games.**
   That is taking part in sport is more important than winning. It is not about the victory but the effort or struggled you put. The important thing is not about overpowering the other but rather it is about you putting up a good, clean and fair performance.

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SUBJECT AND GRADE TO STUDY

Grades 7 & 8

- English
- Mathematics
- Science
- Social Science
- Making a Living
- Personal Development

Grades 9 & 10

- English
- Formal Mathematics
- Practical Mathematics
- Science
- Social Science
- Commerce
- Design and Technology- Computing
- Personal Development

Grades 11 & 12

- English
- Formal Mathematics
- Practical Mathematics
- Science
- Social Science
- Business Studies
- ICT
- Personal Development

REMEMBER:

In each grade, you must study English, Formal Mathematics, Science and Social Science. Commerce and Practical Math are optional. Your Provincial Coordinator or Supervisor will give you more information regarding each subject.

Certificate in Matriculation

CORE COURSES

- Basic English
- English 1
- English 2
- Basic Maths
- Maths 1
- Maths 2
- History of Science & Technology

OPTIONAL COURSES

Science Streams: Biology

Chemistry, Physics and Social Science Streams: Geography, Introduction to Economics and Asia and the Modern World

REMEMBER:

You must successfully complete 8 courses: 5 compulsory and 3 optional

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