



ALPHA CHOICE INNOVATIVE ACADEMY

(International Secondary School)

4/6 Richard Okoroike Close, Praise Hill Estate, Arepo, Ogun State.

GRADE 8

SECOND TERM, 2022/2023 SESSION

BIOLOGY

MASTER NOTE

NAME:

SECOND TERM SYNOPSIS

WEEK

SKILL

1&2. HUMAN SKELETAL AND MUSCULAR SYSTEM.

3&4. DIGESTIVE SYSTEM

5&6. FAMILY LIFE EDUCATION

7&8. THE HUMAN RESPIRATORY SYSTEM.

9&10. THE HUMAN CIRCULATORY SYSTEM.

WEEKS 1&2: HUMAN SKELETAL AND MUSCULAR SYSTEM

OBJECTIVES:

At the end of this lesson; students should be able to:

1. Identify the parts responsible for movement in the body.
2. Highlight the major bone of the body.
3. Outline different types of joint.
4. Describe the work of muscles in the body.
5. Define the term joints.

PARTS OF BODY RESPONSIBLE FOR MOVEMENT

The parts of the body responsible for movement are bones, joints and muscles.

The body of an animal is built on supporting framework of bones called Skeletons.

In fact, the body of an animal consists of:

1. Bones called skeletons
2. Flesh called muscles
3. Fluid called blood

Skeletons are bony structures, which give animals rigidity, support and also protect delicate organs of the body. The Skeletal system is a combination of bones and muscles.

There are different kinds of bones and muscles and their interaction brings about movement. In higher animals like mammals, the limbs are made up of muscles and bones. The bones alone are useless, since they cannot move themselves, something has to make the bones to move and these are the muscles. The muscles are attached to bone by means of tough tissues called tendons.

Most lower organisms do not have limbs, yet they move by means of special organs for locomotion. Such special organs include:

- i. Pseudopodia- Locomotory organ for amoeba

- ii. Cilia- Locomotory organ for paramecium
- iii. Flagella- Locomotory organ for Euglena

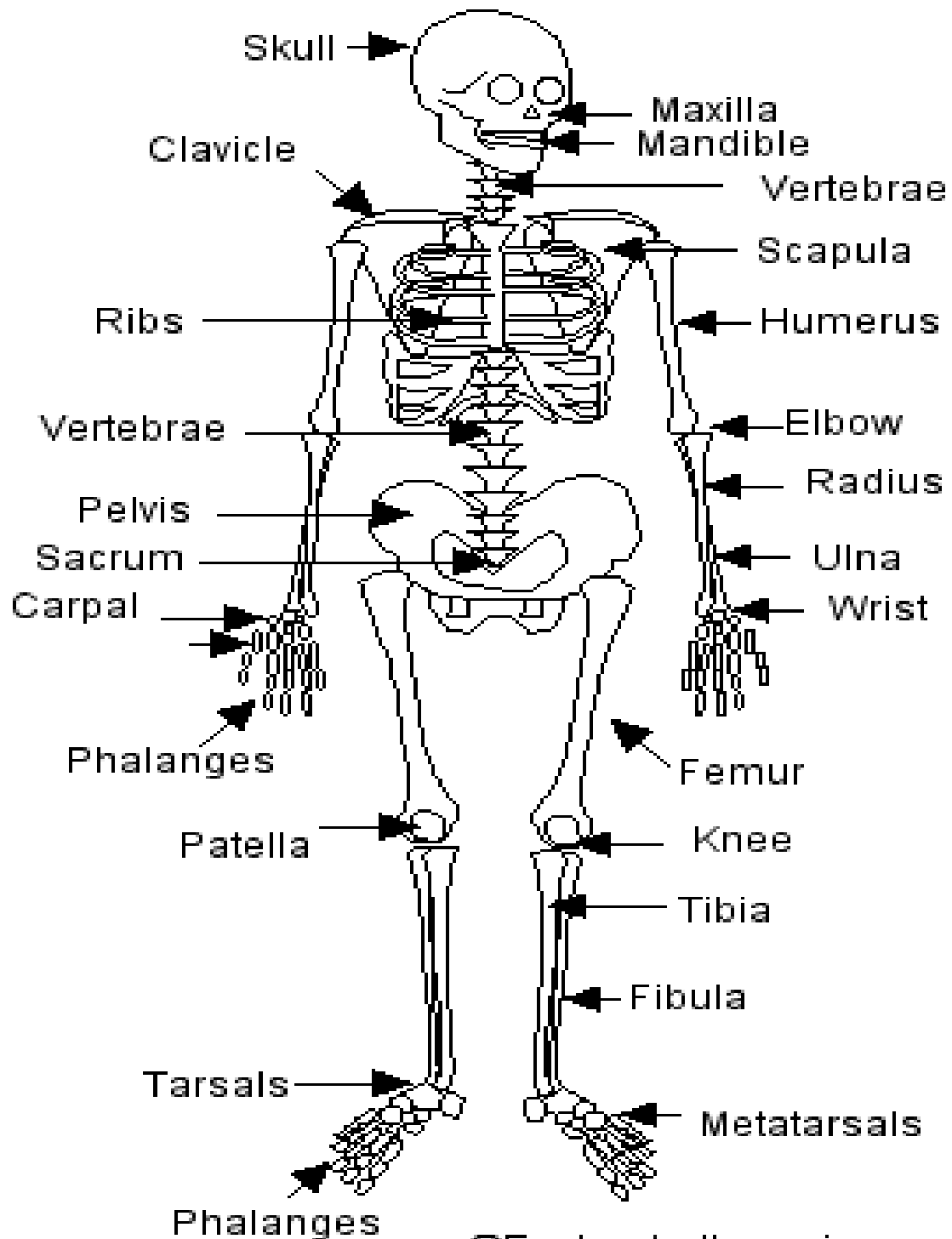
Some lower organisms are unable to move by means of any locomotory organ but are easily carried by wind or current, such organisms include:

- i. Bacteria
- ii. Viruses

In higher animals like mammals, the skeleton could be divided into two main groups:

- i. Axial Skeleton
- ii. Appendicular Skeleton

Human Skeleton



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AXIAL SKELETON

The Axial skeleton is made up of the skull and the vertebra, which include the spine and the chest plate. The Skull refers to the bones of the head and it protects the brain.

The vertebrae are otherwise referred to as backbones. These bones are placed end-to-end to form a hollow which the spinal cord passes. The vertebra therefore protects the spinal cord.

APPENDICULAR SKELETON

The appendicular skeleton is directly concerned with movement in animals. Movement takes place when the appendicular bones and muscles interact. The appendicular skeleton is made up of the limbs and limb girdles.

THE LIMBS

There are two pairs of limbs in every animal:

1. The Forelimbs
2. The Hind limbs

The limb skeleton consists of:

1. The bones of the shoulder, the arm and the hands
2. The bones of the hip, the legs and the feet in the lower body region, the upper body region has two flat bones called Scapulae.

LIMB GIRDLES

Generally, there are two limb girdles and they support the weight of the body. They are:

- i. The Pectoral (Shoulder) Girdle: This is a group of flat bones in the shoulder region to which the forelimbs are attached.
- ii. The Pelvic (Hip) Girdle: This is another group of large flat bones in the hip region to which hind limbs are attached.

FUNCTIONS OF BONES

Bones perform many useful functions in the body because of their different shapes, sizes and other features. For instance:

1. Most small holes in the bone allow blood vessels and nerves to pass through the bones. The big holes in the bones of the spines provide passage for the spinal cord.
2. Large bones plates protect delicate organs; for instance, the skull protects the brain, the ribs protect the lungs and the heart
3. The parts of bones that stick out provide places where muscles are attached. They also determine the type of movement the bones can make.
4. The ends of each bone are shaped so that it can work together with the bone next to it for distinct types of movement
5. The fusing of the two hip bones into one large bone allows it to carry the whole body.
6. The bones of the thigh and legs are long and hollow. These make them just as strong as solid bones, but light enough for locomotion.

CARTILAGES, LIGAMENTS, AND TENDONS

CARTILAGE

The ends of bones have a covering material called cartilage, which is made of a tough elastic tissue. The cartilage prevents these ends from the wears and tears (friction) that would have been caused by the movement of the bone on the other. Cartilage is a special type of connective tissue.

LIGAMENT

Ligament is the tight cord which holds bones together. Joints are held together by bones and sheets of very tough connective tissues known as Ligaments.

TENDONS

The tendon is a tough-like material found at the ends of muscles. It binds two neighboring bones together and hold a fluid which serves as lubricant to reduce friction as the bones move against one another.

JOINTS

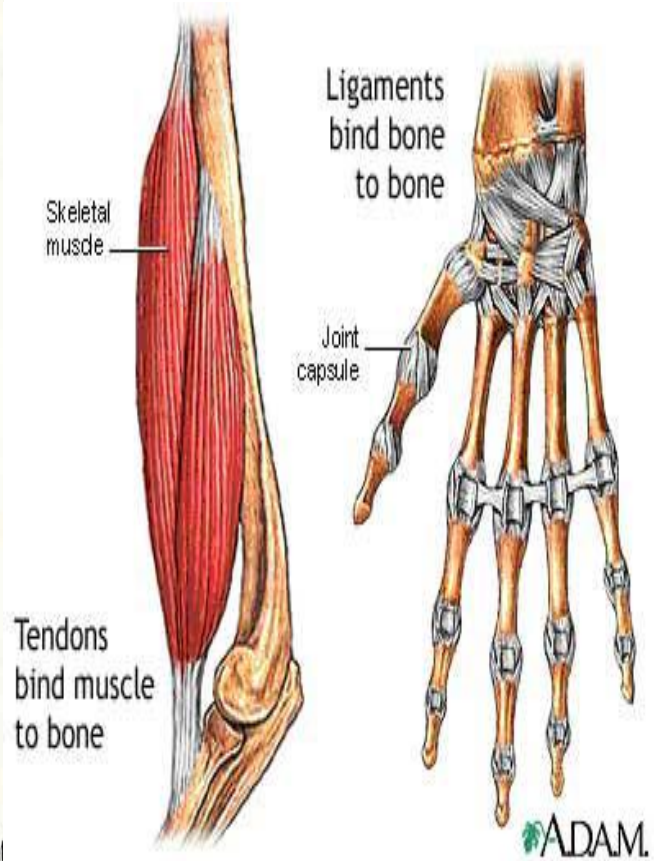
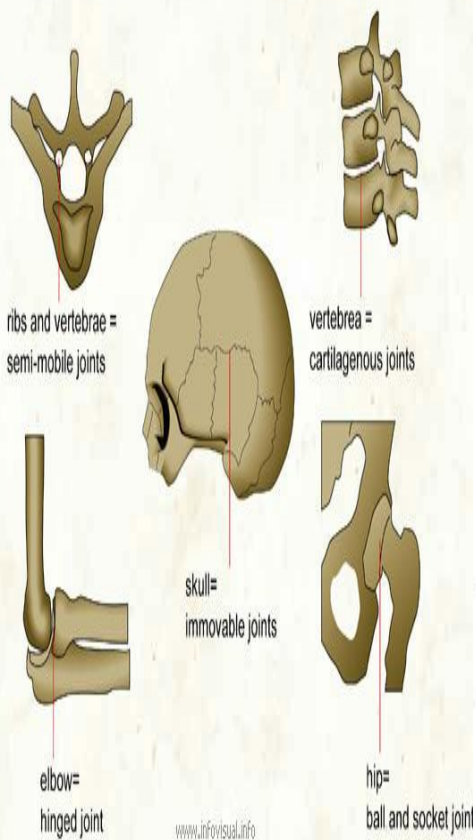
The skeletal system is made up of many bones of various shapes and sizes, and these are joined together in different ways. Joint is the point of movement between two bones.

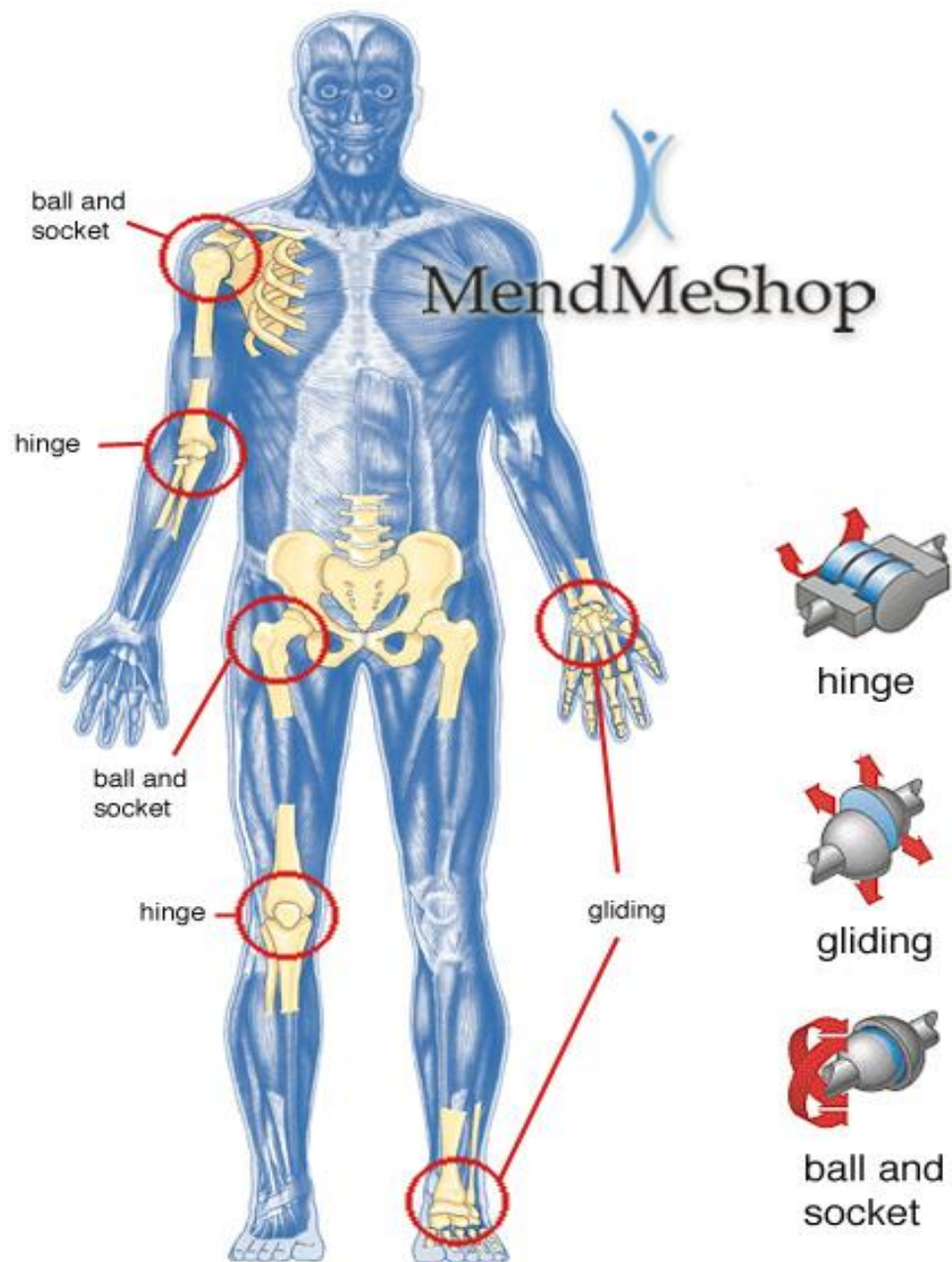
There are different types of human joints:

- i. Ball and Socket Joint: This joint is for free movement in all directions e.g in hip and shoulder joints.
- ii. Hinge Joint: This is for movement in one plane e.g elbow and knee joints.
- iii. Sliding Joint: This is for sliding one bone over another e.g. Wrist and ankle joints.
- iv. Suture Joint: This is an immovable joint which is found in the skull. It facilitates a good protective covering of the brain.
- v. Pivot Joint: This is found in the neck bone. It permits the turning action of the neck.

STRUCTURE OF JOINTS

TYPES OF JOINTS FOUND IN THE HUMAN BODY





JOINTS IN THE BODY

DISEASES OF THE BONES

1. Rickets- softening of the bones due to the lack of vitamin D in young children's diet
2. Arthritis - inflammation of joints
3. Rheumatism- a severe disease marked by pain and inflammation of the muscles, tendons, joints, bones and nerves.

MUSCULAR SYSTEM

Muscles are bundles of elastic substance in an animal body. Muscles are attached to bones by means of tendons. Muscles can contract and relax to produce movement in the animal body. The skeletal and muscular systems work together to produce movement.

Muscles are made up of many tiny cells, which are held together by thin strands of connective tissues. Muscles can move the bones of the body. There are muscles which can be moved voluntarily when you wish, while some muscles move involuntarily of their own accord ie no control over them. The heart muscles cannot be controlled.

Generally, there are three types of muscles namely:

- i. **SKELETAL MUSCLES:** Which are attached to the bones of the skeleton; they facilitate the movement of the bones. *The fibres making up the muscles are striped.*
- ii. **SMOOTH MUSCLES:** Which line many structures in our body such as intestine and blood vessels.
- iii. **CARDIAC MUSCLES:** Which are special striped muscles with the ability to work continuously. They form the walls of the heart.

OTHER CATEGORIES OF MUSCLES

- 1) **VOLUNTARY MUSCLES:-** These are muscles under our control. We relax and contract them when we wish to e.g the pectoral muscles.
- 2) **INVOLUNTARY MUSCLES:-** They move on their own without us being aware that they are moving e.g the heart muscles, inter coastal muscles.

- 3) **ANTAGONISTIC MUSCLES:** -These are so called because when one of them contracts, the other relaxes at the same time to bring about the desired movement e.g bicep muscle and triceps muscle in the forelimb. For the muscles to be able to perform, they need much energy and strength. Regular exercising gives them the required strength and increases their sizes.

SUMMARY

- Most animals you know have in their bodies very hard parts called bones
- Bones is a tissue and a major component of the vertebral skeleton
- The bones in your body together form a framework of your body known as the skeleton
- The parts of the body responsible for movement are bones, joints and muscles.
- The body of an animal is built on supporting framework of bones called Skeletons.
- The body of an animal consists of:
 1. Bones called skeletons
 2. Flesh called muscles
 3. Fluid called blood
- The skeletal system/bones in mammals are grouped into two major parts. These are the
 - I. Axial skeleton: is made up of the skull, vertebral column/backbone.
 - ii. Appendicular skeleton: is made up of the limb and limb girdles
 - The skull protects the brain
 - Vertebrae/Vertebral column is also known as backbone or spinal column
 - Cartilage is a special type of connective tissue that prevents the end of bones from the wears and tears (friction) that would have been caused by the movement of the bone on the other.
 - Ligament hold two bones together at a joint. i.e. they join one bone to another.
 - Tendons connect muscles to bones.
 - Joints: is a region where two or more bones meet or is the point of movement between two bones.
 - There are different types of human joints:

- i. Ball and Socket Joint: This joint is for free movement in all directions e.g in hip and shoulder joints.
- ii. Hinge Joint: This is for movement in one plane eg elbow and knee joints.
- iii. Sliding Joint: This is for sliding one bone over another e.g. Wrist and ankle joints.
- iv. Suture Joint: This is an immovable joint which is found in the skull. It facilitates a good protective covering of the brain.
- v. Pivot Joint: This is found in the neck bone. It permits the turning action of the neck.
 - Diseases of the bones are rickets, arthritis and rheumatism.
 - There are three types of muscles namely:
 - i. Skeletal muscles
 - ii. Smooth muscles
 - iii. Cardiac muscles.
 - Importance of movements to human beings

Human beings move in order to

- Obtain their food.
- Go to work and earn a living.
- Keep themselves and their surrounding clean.
- Exercise
- Find warmth and comfort.

EXERCISES

1. Highlight the parts of the body responsible for movement.
2. Explain how the bones and muscles work together for movement.
3. Outline three reasons why human beings need to move about.
4. Explain the two main groups of skeletons and differentiate between the groups
5. Explain the meaning of:
 - a. Cartilage

- b. Ligament
 - c. Tendons
6. What are muscles? Analyze briefly the three types of muscles.
 7. Draw a well labeled diagram of a human skeleton.
 8. Mention five functions of skeletons.
 9. Define the term joints
 10. Outline different types of joint.

WEEK 3& 4:

DIGESTIVE SYSTEM

OBJECTIVES:

At the end of this lesson; students should be able to:

1. Understand that enzymes catalyze the breakdown of food.
2. Identify the parts involved in digestion.
3. Highlight the diseases of the digestive system,
4. Explain the general functions of the digestive system.
5. Define the term Digestion.

Digestive system includes the alimentary tract or canal and all organs and glands associated with digestion and assimilation of food in animals.

Digestion is the breaking down of large molecules of food into simple and absorbable form for use by animals.

The digestive system includes the alimentary tracts which varies from one animal to another

Animals have different types of alimentary tracts which vary in size, complexity, mode of feeding or type of diet. The nature of alimentary tract has some evolutionary trend as the complexity tends to increase from simple unicellular animals like protozoa to complex multicellular animals like mammals.

PARTS AND TYPES OF ALIMENTARY TRACT

A typical mammalian alimentary tract includes the following parts: Mouth, Pharynx, Oesophagus or gullet, stomach, small intestine or ileum, caecum, appendix, large intestine or colon, rectum and anus. All these parts can be found in most vertebrates. However, there are modifications of different parts in various animals (vertebrate and invertebrates). In some animals, some parts maybe reduced

or enlarged while in others some parts maybe totally absent as shown in the table below

Learning Outcome

Animal	Mouth	Pharynx	Gullet	Crop	Stomach	Small intestine	Large intestine	Caecum	Rectum	Anus
Planarian	P	P	A	A	A	P	P	A	A	A
Earthworm	P	P	P	P	A	P	A	P	P	P
Cockroach	P	P	P	P	A	P	A	P	P	P
Fish	P	P	P	A	P	P	A	A	P	P
Toad	P	P	P	P	A	P	A	A	P	P
Lizard	P	P	P	A	P	P	A	P	P	P
Bird	P	P	P	P	P	P	A	P	P	P
Rabbit	P	P	P	A	P	P	P	P	P	P
Cow	P	P	P	A	P	P	P	P	P	P
Man	P	P	P	A	P	P	P	P	P	P

Digestive system includes the alimentary tract or canal and all the organs and glands associated with the digestion and assimilation of food in animals. Digestion is the breaking down of large molecules of food into simple and absorbable form for use by the animals.

The digestive system including the alimentary tract varies from one animal to another. Organisms from simple to complex ones have different types of digestive system or alimentary tract. However, there is no definite alimentary canal in plants.

PARTS AND TYPES OF ALIMENTARY TRACTS

A typical mammalian alimentary tract or canal includes the following parts: mouth, pharynx, oesophagus or gullet, stomach, small intestine or ileum, caecum, appendix, large intestine or colon, rectum, appendix, large intestine or colon, rectum and anus. All these parts can be found in most vertebrates. However, there are modifications of different parts of the alimentary tract in various animals. In some animals, some parts may be reduced or enlarged while in others, some parts may be absent.

ALIMENTARY CANAL OF MAN

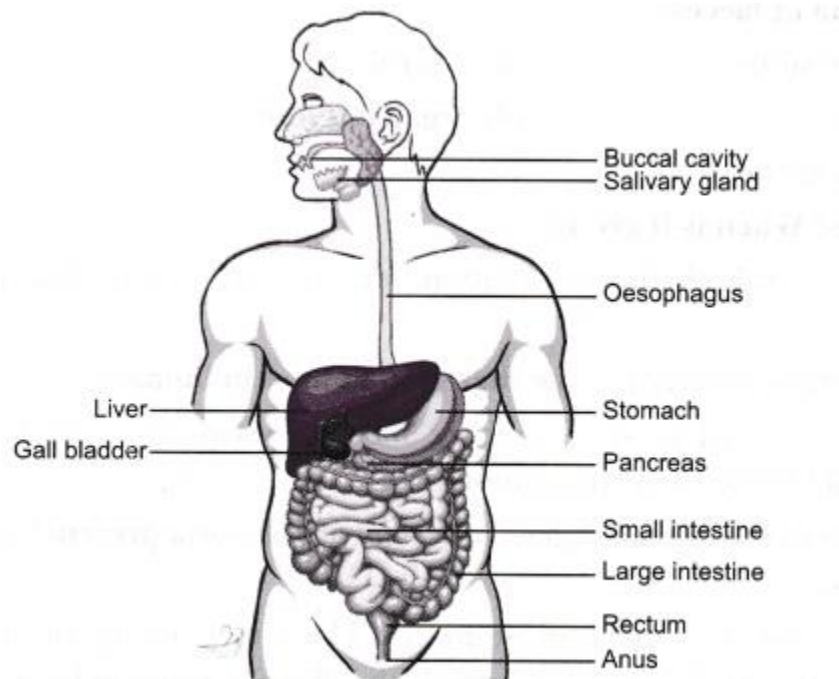
The alimentary canal of man includes the mouth, Oesophagus, stomach, small intestine, (duodenum, jejunum, ileum), caecum, appendix, large intestine or colon, rectum and anus.

The description and importance of the parts are as follows:

Mouth: The alimentary canal of man starts from the mouth. The mouth contains the teeth, salivary gland and tongue.

Teeth:

- The teeth are used to cut, grind or chew food into tiny particles.
- They expose large area of food for the action of enzymes.



The tongue:

- The tongue rolls the food into bolus.
- It aids movement of food in the mouth.
- It allows mixing of food with saliva or ptyalin.

- It aids swallowing of food into the gullet or oesophagus.

The salivary gland:

- The salivary gland secretes saliva which contains an enzyme called ptyalin. The ptyalin breaks down starch into maltose which is later swallowed into the gullet in form of bolus.
- It allows easy chewing or movement of food in the mouth for swallowing.
- It also serves as solvent for food. The saliva is slightly alkaline.

The Oesophagus or Gullet:

The Oesophagus connects the mouth to the stomach. The food swallowed is passed down through the oesophagus by a peristaltic movement into the stomach.

Stomach:

In the stomach, the food is temporarily stored for few hours and it is released at regular intervals by the opening of the pyloric sphincter. In the stomach, the gastric gland secretes gastric juice which contains two enzymes- renin and pepsin.

The renin acts on the milk (or it helps to curdle milk) while the pepsin breaks down proteins to peptones.

Small Intestine:

The duodenum is the first part of the small intestine. The middle and last sections of the small intestine are the jejunum and ileum respectively. Several substances are secreted into the duodenum. The pancreas secretes pancreatic juice, a watery alkaline liquid containing several digestive enzymes. The liver produces bile which is stored in the gall bladder. Bile is the greenish alkaline liquid which does not contain digestive enzymes. The pancreatic juice contains three important enzymes. They are:

- Amylase: This converts starch to maltose
- Lipase: Lipase converts fats and oil to fatty acids and glycerol.

- Trypsin: It converts proteins and peptones to polypeptides

Two major events take place in the small intestine. These are:

- Digestion and
- Absorption of digested food

Caecum and Appendix:

In man, the function of caecum and appendix are not well known but the caecum usually contains some bacteria which aid vitamins K and B-complex are partially synthesized in this region.

Large Intestine:

The undigested food passes into the colon. Here, water is absorbed. This absorption of water concentrates the waste products and turns them into faeces. The faeces are passed into the rectum and finally out of the body through the anus.

DISEASES AND DISORDERS OF THE DIGESTIVE SYSTEM

A. Appendicitis

Appendicitis, the inflammation of the appendix, is the most common surgical disease. It results from the obstruction of the opening to the appendix by a mass, stricture or infection. This sets off an inflammatory process that can lead to infection and necrosis. Symptoms of appendicitis include generalized abdominal pain, rebound tenderness, with the pain localizing in the lower right abdomen, nausea, vomiting, possibly fever, and an elevated white blood cell count. Treatment involves the removal of the structure and possibly antibiotic therapy.

B. Cirrhosis

Cirrhosis of the liver is a chronic liver disease characterized by the destruction of the liver cells followed by scarring. Mortality is high with most patients dying within five years of the onset. One of the major causes of cirrhosis is alcoholism. Signs and symptoms of cirrhosis include anorexia, indigestion, nausea, vomiting, abdominal pain, later including ascites, jaundice, and hepatomegaly. Treatment is designed to prevent further liver damage and to prevent and/or treat liver complications.

C. Colorectal Cancer

Colorectal cancer is the second most common form of cancer in the United States and Europe. Colorectal cancer has a slow progression and remains localized for long periods of time. If it is detected early, it has a 90% cure rate.

The problem is many people are embarrassed to talk with their health care providers about changes in bowel habits and do not seek professional help until the cancer has spread and is more difficult to treat. The exact cause is unknown, but studies suggest a relationship to a high fat diet, aging, and a family history of colorectal cancer. The signs and symptoms of colorectal cancer include mild abdominal discomfort and a change in bowel habits. Treatment varies but may include surgery and chemotherapy.

D. Gallstones

Gallstones or cholelithiasis is the presence of stones in the gallbladder, resulting from changes in the bile component. The stones are made of cholesterol, calcium bilirubinate, and the bilirubin pigment. They arise during periods of sluggishness in the gallbladder due to pregnancy, obesity, and diabetes mellitus. It is the fifth leading cause of hospitalization among adults. Symptoms include a classic gallbladder attack that follows a meal rich in fats. It begins with abdominal pain in the right upper quadrant and may radiate to the back. Other features include fat intolerance, nausea, vomiting, and chills. A person may have clay-colored stools. Diagnosis is usually made with an ultrasound. Treatment involves the removal of the gallbladder and a low-fat diet.

E. Hepatitis

1. Hepatitis A

This is a highly contagious form of hepatitis and is usually transmitted by the fecal-oral route, commonly within institutions and families. The usual cause is the ingestion of contaminated food, milk, or water. The disease is marked by liver cells destruction, anorexia, jaundice, headache, nausea and vomiting.

Also seen is a dark colored urine and clay-colored stools. There is no specific treatment. The person should rest. Liver failure is a complication. Vaccines are available to reduce the incidence of this disease.

2. Hepatitis B

This is a highly contagious form of hepatitis that is transmitted by the direct exchange of contaminated blood. The disease is marked by liver cell destruction, anorexia, jaundice, headache, nausea, and vomiting. Also seen is dark colored urine and clay-colored stools. There is no specific treatment. The person should rest. Liver failure is a complication. Vaccines are available to reduce the incidence of this disease. They are strongly recommended for all health care workers.

F. Obesity

Obesity is the presence of excess body fat, generally over 20% for men and over 30% for women. There are many precipitating causes, but the bottom line is that too many calories are consumed in comparison to the number of calories being used for energy. Precipitating factors include genetics, gender, and inactivity.

Treatment includes a reduction of calories and an increase in exercise.

Treatment may also include surgery, such as a gastric bypass to reduce the size of the stomach. Complications of obesity include joint pain, gallstones, hypertension, hyperlipidemia, atherosclerosis, heart attacks, strokes, and a predisposition to certain cancers.

G. Ulcers

Ulcers are lesions found in the mucosal membrane in the alimentary canal. They can develop in the esophagus, stomach, duodenum, or jejunum. The most common cause is a bacterial infection, followed by chronic use of non-steroid anti-inflammatory drugs, like aspirin and ibuprofen. Other predisposing factors include genetics, exposure to alcohol and tobacco, and stress. Symptoms of ulcers include heartburn, indigestion, and pain. Other side effects include weight loss and GI bleeding. Treatment includes removing the cause, the use of antibiotics to treat the infection, watching for signs of bleeding and possible surgery.

SUMMARY

- The alimentary canal is a long tube that runs from the mouth to the anus.
- Inside the alimentary canal, nutrients are first digested and then absorbed.

- Digestion happens inside the mouth, stomach and small intestine. Absorption happens inside the small intestine and large intestine.
- Only small molecules can pass through the wall of the alimentary canal.
- Digestion is the breakdown of large molecule of nutrients to small molecules, so that they can be absorbed.
- The digestive system is described as all the parts of the body which work together to ensure the digestion of the food we eat.
- Food is any substance we eat in order to provide the energy we need (carbohydrate, fats and oils, protein).
- The parts of the digestive system are the mouth, gullet, stomach, small intestine, large intestine, and anus.
- Digestion of food takes place in stages in the different parts of the digestive system.
- Different food types are digested in different parts of the digestive system.
- Digestion of carbohydrates starts in the mouth while digestion of proteins only starts in the stomach.
- The end products of digestion are:
 - i. Simple sugar (glucose) from carbohydrates.
 - ii. Amino acids from proteins.
 - iii. Fatty acids and glycerol from fats and oil.
- Vitamins, mineral salts and water do not undergo digestion. They exist in soluble states and are absorbed directly into the body.
- Digestion does not take place in the gullet and large intestine.
- Absorption of food substances take place in the small intestine while excess water is also absorbed in the large intestine.
- Undigested food particles are stored temporarily in the large intestine as semi solid substance called faeces.
- Faeces is passed out of the body through the anus.
- There are six classes of food: Carbohydrates, proteins, fats and oil, vitamins, mineral salts, and water.
- The salivary gland secretes saliva which contains an enzyme called ptyalin. The ptyalin breaks down starch into maltose.

EXERCISES

1. Draw a well labeled diagram of the alimentary system.
2. Explain in details the process of digestion in the mouth.
3. Identify the structures and sections of the large intestine. You may use each word once, more than once or not at all.

Blood contracts muscle stretches tubes valves

The heart is made of ----- . This muscle ----- and relaxes rhythmically, pumping blood around the body. There are ----- inside the heart that make sure the blood keeps flowing in the correct direction.

Copy and complete these sentences using words from the list.

4. Outline ten parts of a mammalian alimentary tract.
5. Highlight the diseases of the digestive system,
6. Explain the general functions of the digestive system.
7. Define the term Digestion
8. What are enzymes?
9. List some enzymes in the body, their location and the food they catalyze with their respective end products.
10. Identify the parts involved in digestion.

WEEK 5&6: FAMILY LIFE EDUCATION

OBJECTIVES:

At the end of this lesson, students should be to:

1. Understand the meaning of the word “Education”.
2. Identify the implication of teenage pregnancy.
3. Highlight myths and facts about pregnancy.
4. Define teenage pregnancy.

Teenage pregnancy refers to pregnancy in a girl between the ages of 10-19. Teenage pregnancy is usually unintended and unwanted. The fact that you are at pubertal age and can get pregnant physically does not mean that you are really mature to be pregnant socially, emotionally, educationally and even financially.

Teenage pregnancy can be dangerous for both the mother and the unborn child. Complications at childbirth and unsafe abortion usually result from teenage pregnancy.

CONSEQUENCES OF TEENAGE

Consequences of teenagers are grouped into three major parts;

- Pregnancy and Delivery.
- Care needed during pregnancy.
- Child delivered by untrained person.

CONSEQUENCES OF TEENAGE

A. (PREGNANCY AND DELIVERY)

The following are some of the consequences of a girl who got pregnant at the unripe age of teenage.

1. Teenage mothers face the risk of increased health problem for themselves and their babies.
2. She could give birth to premature baby.

3. She could have still birth or low weight babies.
4. Early child bearing could lead to vesicle vagina fistulate (VVF) a hole caused by weakening of the wall between the bladder and the vagina which could leads to constant leakage of urine.
5. Teenage parents usually do not have the financial resources to provide for the child and must depend on their families and relation to assist them.
6. Teenage pregnancy leads to a break in vocational development, more often affecting the teenage mother. This break can hinder future employment opportunities and quality of life.
7. Teenage parents may feel isolated or shunned by their parents who are continuing with their education and plans for the future.

B. (CARE NEEDED DURING PREGNANCY)

The consequences of teenage pregnancy and delivery include the following:

1. **HEALTH RISKS:** Pregnancy induced hypertension which can cause heart failure and death of both mother and the child. This type of pregnancy can lead to a condition where by the girl's pelvic opening is too small to allow the infants head to pass during delivery. This may cause VESICO VAGINA FISTULA and RECTO VAGINA FISTULA. I.e. tear between the vagina and the urinary tract or rectum. Caesarean sections my result because the lips have not widened enough for the baby to come through the pelvis. Caesarian section involves making an incision through the wall of the abdomen into the uterus to bring out the baby. There could be premature labour leading to spontaneous abortion. There could be iron deficiency (anaemia), which normally contributes to premature delivery and low birth weight. Anaemia reduces the chances of surviving haemorrhage (excessive bleeding). This is a major cause of death among teenage mothers.

2. **UNSAFE ABORTION:** Since teenage pregnancy is unwanted. They are likely to seek abortion from untrained health care providers or can go on self-medication for self-induced abortion. This could lead to infection, incomplete abortion, injuries to genital orgasm.

3. **SOCIO-ECONOMIC**

- Termination of education.
- Stigmatization.
- Life span and career goals are disrupted.
- Early marriage due to pregnancy.
- Isolation from peers and low self-esteem.
- Few job opportunity.
- Poverty.
- Emotional feeling of guilt and fear.
- Loneliness and depression, feelings of insecurity.
- Loose of childhood and adapting to adulthood.

C. CHILD DELIVERY BY UNWANTED PERSON

This is very dangerous and is the major cause of infant mortality. Pregnant pregnancy should be encouraged to seek antenatal care from a reputable and well trained and highly professional obstetrician in order to ensure the survival of both the mother and her baby.

MYTHS AND FACTS ABOUT PREGNANCY

Find out about the following statements whether facts or myths.

1. **YOUNG GIRLS SHOULD NOT USE CONTRACEPTIVES:** Contraceptives prevent pregnancy, provide protection against STIs and are not harmful.

For a young girl, contraceptives are less harmful than the pregnancy or infection.

2. **CONTRACEPTIVES ARE FOR BAD GIRLS:** Girls are smart if they have sexual intercourse and use contraceptives.

3. **CONTRACEPTIVES DESTROY THE WOMB:** Myths hormonal methods make the womb believe that it is pregnant, and pregnancy does not destroy the womb. Getting a disease in the womb may damage it.

4. IT MAKES ONE INFERTILE FOR LIFE (NOT EXACTLY): It is the use of injectable and implants that can delay fertility for many months and years, and so are not considered suitable for teenagers who want to have children soon.

5. CONTRACEPTIVES MAKE ONE THIN: Hormonal contraception may have some side effects that may cause weight gain or weight loss. It depends on individual. Some don't change weight at all.

6. CONTRACEPTIVE USE REDUCES ONE'S BREAST SIZE: Hormonal methods may cause breast tenderness for some but it does not change the size.

NOTE: It is better for a woman to have children while still young as she can see them grow. Pregnancy in teenage has negative bio psycho social consequences. The ideal age for pregnancy is between 20 and 35.

EXERCISE

1. Highlight (five) reasons why you will not engage in sexual intercourse now as a junior secondary school student.

Explain the following:

2. Abstinence

3. Birth control

4. Self-control

5. Masturbation

6. Abortion

7. Vulnerable diseases.

8. Define teenage pregnancy.

9. Identify the implication of teenage pregnancy.

10. Highlight myths and facts about pregnancy.

WEEK 7&8: THE HUMAN RESPIRATORY SYSTEM

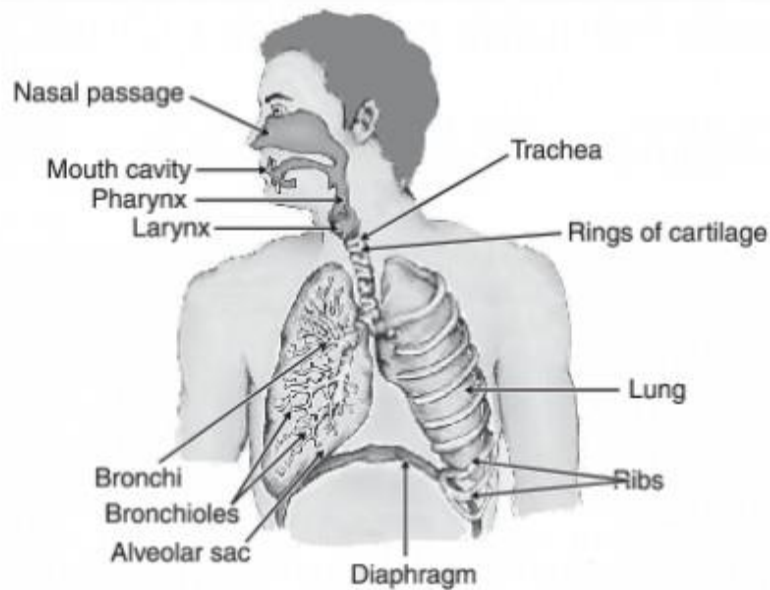
OBJECTIVES:

At the end of this lesson; students should be able to:

1. Understand why living organisms must obtain oxygen from their environment, and why they must release carbon dioxide to their environment.
2. Understand why organisms need energy in-order to carry out work.
3. Identify Differences between aerobic and anaerobic respiration.
4. Relate smoking to health; that smoking tobacco is harmful to health.
5. Highlight some of the harmful components of tobacco smoke and the damage they cause.
5. Define the word” respiration”.

The respiratory system refers to the group of organs that have to do with getting energy from digested food. The process by which living organisms take in oxygen and make use of oxygen in the air to break down the food, which they have taken and produce energy for their day-to-day activities is known as **RESPIRATION**. Better still, respiration is the process whereby food is broken down to release energy.

Respiration takes place with the use of a group of organs namely the nose, trachea (wind pipe) and lungs.



Every cell in your body needs a supply of oxygen. The cells use the oxygen for respiration. They produce carbon dioxide as a waste.

The oxygen comes from the air around you. About 20% of the air is oxygen.

The carbon dioxide that your cells produce goes back into the air around you.

About 0.04% of the air is carbon dioxide.

The organs that help to get oxygen from the air into your blood, and to get rid of carbon dioxide, make up the respiratory system.

When you breath in, air flows through the trachea and then into the two bronchi, which carry it deep inside the lungs. When you breathe out, air flows back in the opposite direction. Inside the lungs, oxygen passes from the air into the blood, and carbon dioxide passes out of the blood into the air. This is called GAS EXCHANGE.

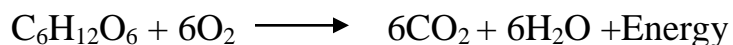
There are two types of respiration. They are:

1. Aerobic respiration
2. Anaerobic respiration

AEROBIC RESPIRATION

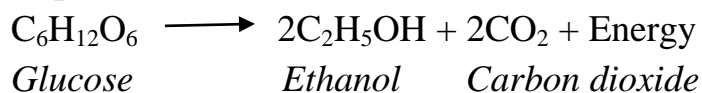
Oxygen is used to liberate energy in aerobic respiration, but in anaerobic respiration, oxygen is not used at all.

Equation of aerobic respiration is as stated below:



ANAEROBIC RESPIRATION

This involves a chemical process and this type of respiration is common in organisms like bacteria. For example, yeasts and many bacteria have enzymes which can break down sugars into carbon dioxide and ethanol. This release of energy in the absence of oxygen is known as anaerobic respiration.



SMOKING AND HEALTH

When people smoke, they damage their respiratory system and risk seriously damaging their health.

There are over a thousand different chemicals in cigarette smoke, including the highly addictive nicotine. These chemicals swirl around the air passages when a smoker inhales and touch the air passage linings. In a healthy person, dust particles are trapped in mucus and moved up to the throat by the beating of microscopic hairs called cilia.

The small amounts of dust and mucus are then swallowed. In a smoker's respiratory system the cilia stop beating because of chemical damage by the smoke. More mucus is produced but instead of being carried up by the cilia it is coughed up by a jet of air as the lungs exhale strongly. This is a smoker's cough and the amount of dirty mucus reaching the throat may be too much to swallow.

In time chronic ***bronchitis*** may develop. The lining of the bronchi becomes inflamed and open to infection from microorganisms. The inflammation of the air passages makes breathing more difficult and the smoker develops a permanent cough. The coughing causes the walls of some of the alveoli in the lungs to burst. When this happens the surface area of the lungs in contact with the air is reduced. This leads to a disease called ***emphysema***.

Some of the cells lining the air passages are killed by the chemicals in the smoke. They are replaced by cells below them as they divide and grow. Some of these cells may form ***cancer*** cells. These cells replace the normal cells in the tissues around them but they do not perform the functions of the cells they replace. The cancer cells continue to divide and form a lump called a *tumor*. This may block the airway or break up and spread to other parts of the lung where more *tumors* may develop.

SUMMARY

- The respiratory system includes the trachea, bronchi, lungs, diaphragm and the muscles between the ribs.
- Gas exchange is the diffusion of gases into and out of the body. This happens inside the air sacs in the lungs.
- Air sacs are very tiny, have very thin walls, and have blood capillaries lying closely alongside them. This helps gas exchange to take place quickly.
- Cells obtain energy from glucose by a chemical reaction called respiration.
- In aerobic respiration, oxygen combines with glucose. Carbon dioxide and water are produced.
- Some of the energy that is released from glucose during respiration is heat energy.

EXERCISES

1. Define the word "respiration".
2. Distinguish between aerobic and anaerobic respiration.
3. Understand why living organisms must obtain oxygen from their environment, and why they must release carbon dioxide to their environment.
4. Why do organisms need energy in-order to carry out work.
5. State two differences between aerobic and anaerobic respiration.
6. Explain why smoking tobacco is harmful to health.
7. Highlight some of the harmful components of tobacco smoke and the damage they cause.
8. Mention three diseases that could be associated with smoking.
9. Name the red pigment inside red blood cells that helps to carry oxygen.
10. Name the large blood vessel that carries blood from the heart to the lungs.

WEEK9&10: THE HUMAN CIRCULATORY SYSTEM

OBJECTIVES:

At the end of this lesson; students should be able to:

1. Identify the organs of the circulatory systems
2. Highlight different components of blood and their function (red blood cell, white blood cell, platelets and plasma-blood group)
3. Outline different blood vessels (arteries, veins and capillaries) with their function.
4. Outline the importance of blood test and blood grouping.
5. Describe blood defects and diseases, e.g. Leukemia, sickle cell anemia HIV/AIDS etc.
6. Explain circulation of blood in the body.

You began life as a single cell. Nine months later, you had become about two trillion cells. By the time you stop growing, you will be made up of over 100 trillion cells!

Just like the living things in a pond, each of your cells needs energy, oxygen, and nutrient particles to carry out its own life functions, and therefore, your life functions. Unlike the living things in a pond, your cells are unable to obtain what they need by themselves. They rely on your body's transportation network, the circulatory system, to bring what they need and to remove wastes.

Since cell is the most functioning unit of all living things, it therefore follows that all living things need energy to do work and the energy is supplied to our body by food materials. The food materials taken into the body are first digested in the alimentary canal so that the body can absorb them.

Food substance are reduced to simple substance, monosaccharide's, amino acids, fatty acids and glycerol in the ileum, and are then absorbed into the body and carried around in the blood stream.

All living things distribute food materials round the body, use them as energy, dispose those not used or not needed. The “engine” of your circulatory system is the **heart**. This fist-sized organ has a mass of only about 300g. However, what it lacks in size and mass, it makes up for in function. Your heart must pump (expand and contract) an average of 70 times each minute for your entire life, it must exert enough pressure to push blood throughout your heart is able to do this without rest and without your even thinking about it. Isn't that marvelous!

The Circulatory System consists of the

1. Blood
2. Heart
3. Blood Vessel

ACTIVITY:

Assume that your heart beats at an average rate of 70 times per minute. How many times will your heart beat from the day you were born until the day you celebrate your next birthday?

For a long time, the circulatory system presented an unsolvable puzzle. People could easily observe the arteries and the veins. They could see that these blood vessels branched out into smaller and thinner vessels. Some observers suspected that blood from arteries returned to heart through the veins. However, they could not observe any linking structures between them. They had reached the limits of human sight.

In 1600, an Italian scientist named Marcello Malpighi solved the puzzle. He looked at an intricate network of thin, hair like vessels connecting arteries and veins in the lung tissue of frogs. These blood vessels were later called Capillaries from an ancient Roman word meaning “hair”

The blood vessels (capillaries) found in the villi of the ileum absorb the digested food materials from the small intestine and sends them to the different parts of the body.

This is done through a transport system called Circulatory system. A multicellular plant or animal needs to be able to carry materials to and from different parts of itself. Materials that need transportation include:

- (i) Oxygen and carbon dioxide during respiration
- (ii) Food materials from where they are stored or manufactured to cells which need them waste products such as urine and excess minerals salts.
- (iii) Water products such as urine and excess minerals salts.
- (iv) Water and hormones are also transported from one tissue to the other.

In animals all the above substances are carried from one part of the body to another in the blood. This is because blood flows from one part to another in the blood. This is because blood circulates round our body through blood vessels. There are three main types of blood vessels namely the arteries, the veins and the capillaries.

COMPONENTS OF BLOOD AND THEIR FUNCTIONS

Blood is a living tissue. It is made up of:

- (a) Red blood cells
- (b) White blood cells
- (c) Plasma
- (d) Platelets

RED BLOOD CELLS (RBC.)

Give blood its red colour because it contains haemoglobin. *It is also called erythrocytes. They are regularly formed in the bone marrows and sent to the blood stream. The red blood cells numbered about eight to ten million in a cubic millimeter of blood.* Each red cell has a red cell pigment called haemoglobin which combines with oxygen in the lungs and carries the oxygen to the tissues that need and lack oxygen to the tissues that need and lack oxygen R.B.C are destroyed in the liver and spleen at the end of their life (about four months)

WHITE BLOOD CELLS

They are called leucocytes and are formed in special tissue called lymphatic nodes. The white blood cells which number about seven thousand in a cubic millimeter of blood help the body to fight germs which may get into the blood to cause diseases.

THE PLATELETS

It numbers about five hundred thousand in a cubic millimeter of blood. They are formed in the bone marrow and they assist the blood in clotting when there is an injury and when bleeding occurs

THE PLASMA

It is the liquid part of the blood which is about 50-60% of the total volume of the blood. It consists of a lot of substances including food substances, ions, and antibodies. It is the plasma which takes the digested food round the body to the places where it is to be used. It also takes the waste matter (not faeces) to the lungs and kidneys

ACTIVITY

Go to a nearby government or reputable private hospital and check the makeup of red blood cells in you.

What is the significance of blood tests?

DISCUSSION

A person's blood falls into one of four groups called O, A, B and AB.

The difference between these groups is due to the fact that red cells contain small amounts of different substances called antigens.

In animals, the heart is responsible for pumping blood round the body. It is found in the chest region between the two lungs.

The heart is a thick muscular four-chambered organ. The two upper ones are called the right and left auricles and the lower ones are the right and left ventricles.

The muscles of the heart are involuntary muscles which contract and relax automatically. By contracting and relaxing, the heart pumps out blood through the arteries and accept blood through the arteries and accept blood through the veins

respectively. The blood in the right side does not mix with the blood in the left side and vice versa.

CIRCULATION OF BLOOD

Blood moves around our body through tubes called blood vessels, namely; arteries, veins and capillaries. These are slender and extended tubes carrying blood from the heart, through the body organs and back to the heart.

How are these blood vessels different from each other? What are their functions?

Veins have thinner walls than arteries and they contain blood under low pressure and so, they do not show a pulse. They contain valves which prevent the back flow of blood.

Arteries are the blood vessels which carry blood away from the heart while veins carry blood to the heart.

Capillaries are very fine microscopic tubes connecting arteries with veins. Capillaries serve as outlets for food and oxygen to pass from the blood to the body cells. They also take away from the cells waste materials including Carbon dioxide. Therefore, capillaries are very useful, because apart from transporting blood between the arteries and the veins, they allow the exchange of essential materials between blood and cells through their very thin walls.

DIFFERENCES AMONG ARTERIES, CAPILLARIES AND VEINS

ARTERY		CAPILLARY	VEIN
1.	Carries blood away from heart	Links arteries to veins	Carries blood to heart
2.	Thick wall of muscle and elastic fibres	Wall is one cell thick	Fairly thick wall containing some elastic fibres
3.	Valves only where arteries leave the heart	No valves	Valves in long veins or arms and legs

4.	Blood flows in pulses	Blood flows steadily	Blood flows steadily
5.	Blood is at high pressure	Blood pressure changes	Blood is at low pressure
6.	Blood is bright red and contains oxygen (except in pulmonary artery)	Blood is losing oxygen and gaining carbon dioxide (except in lung capillaries)	Blood is dull red and contains very little oxygen (except in pulmonary vein)

HOW HEARTS FUNCTIONS:

During circulation, the heart contracts pumping blood out through the left and right ventricles into the blood vessels (the pulmonary artery and the aorta) which carry the blood to reach billions of cells that make up the body.

When the muscles of the heart relax, blood flows back into it from the veins via the left and right auricles. The blood reaching the auricles goes down to the ventricles again. The heart contracts again, pushing the blood through the pulmonary artery to the lungs (from where the blood gets its supply of oxygen). This is to say that blood that is circulated through the body is rich in oxygen. Also the blood from the left ventricle is forced through the aorta and its subsidiary arteries to reach every part of the body.

The food absorbed by the capillaries of the villi is carried by a special vein to the liver. Some of it is stored there and the rest enters the general circulation to the body cells take in, the digested food which releases oxygen, and gives out waste materials like Carbon dioxide. These gaseous exchanges, oxygen and carbon dioxide, take place through the capillaries that connect the arteries with the veins.

ACTIVITY

List the main parts of the circulatory system.

BLOOD DISEASES

Blood disease are caused by the malfunctioning of the various organs circulatory system of the blood.

Blood test regularly is very good for human being. This will quickly alert one of any blood disease when it happens so that adequate care could be quickly given.

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Blood test regularly is very good for human being. This will quickly alert one of any blood disease when it happens so that adequate care could be quickly given.

Blood diseases are caused by the following

1. ANAEMIA

This is a situation where people are not having enough supply of oxygen in the blood system due to the absence of enough red blood cells. Anemic patients are usually short of breath. They get easily tired- it could lead to paleness rapid pulses and even death.

2. SICKLE CELL

Here instead of the oval shape of the red blood cell, it is crescent shaped which affects the normal functions of the blood. The victim suffers severe pains and fever which could easily lead to death; if they do strenuous exercise. It is hereditary disease which is passed from parent to offspring

3. LEUKAEMIA

This is blood cancer which results from the over production of white blood cells. It can be produced by exposure to radioactive fall-out from atomic bombs or by over exposures to X-rays. Early signs of the diseases is weakness of the body generally. Leukemia easily leads to death because there is no known cure of it yet.

4. HIGH BLOOD PRESSURE

This is the condition in which the heart over-works itself in the sense that, the pressure by which the heart is pumping blood into the arteries is higher than the normal blood pressure. This situation is caused by over anxiety of the mind, and this can easily damage the kidney. This easily leads to heart attack and eventually death

5. CORONARY THROMBOSIS

This is a condition whereby the heart and the blood vessels are not working normally, if the blood does not get to the heart due to blockage of any of the arteries that supply blood to the heart, the victim will have heart attack

6. STROKE

This is a condition caused by blood not getting to some parts of the brain, due to blood clot or damage of a blood vessel in the brain. The victim has difficulty in speaking, experiences loss of memory, and may even become paralyzed and eventually die.

7. HEMOPHILIA during accident the accident victim could bleed to death because his blood cannot clot like normal blood. It is hereditary but not common in Nigeria.

8. HIV

It is Human Immuno Deficiency Virus. This virus destroys an important component of the immune system called the white blood cells. Once a person is infected by this HIV, the infected person becomes seriously sick and is said to have AIDS. i.e Acquired immune deficiency syndrome. AIDS is the name we give the condition that occurs when HIV has weakened the body's soldier, and the person begins to fall sick, by losing weight until death occurs finally. HIV is very bad, it mostly gets to the blood through unsafe sexual intercourse

SIGNIFICANCE OF BLOOD TESTS

Blood test is very important in the sense that, in case of accident when somebody loses a lot of blood, and there is reason to give blood to such an accident victim

One may even be sick, and the blood dries up, leading to a need for blood transfusion. Blood transfusion can safely take place when then the blood group of the donor matches with the blood group of the recipient, hence the need for blood tests.

It is important to note that blood can be categorized into different groups and that the blood of one group will cause the red cells of some other groups to agglutinate or clump together.

The four main groups differ,

1. In the presence or absence of two agglutinins (antigens A and B) in the red blood cells
2. In the development in the blood of two agglutinins (antibodies anti A and anti B)

GROUP	AGGLUTINOGEN IN RED CELLS	AGGLUTININ IN SERUM
O	None	Anti-A and Anti –B
A	A	Anti-B
B	B	Anti-A
AB	A or B	None

The blood groups are shown in the table above.

The bloods of the donor and recipient must be compatible to avoid an agglutinating reaction.

For example, group A blood containing agglutinating A is not compatible with group B blood containing agglutinin anti A because agglutino­gen (antigen) A and agglutinin (antibodies) anti – A would react with the resulting destruction of red blood cells.

Group O blood can usually be given to any person because it contains no agglutino­gen Group AB person can receive any blood because their blood contains no agglutinin. Out of 100 blood donors about

46 have type O

40 have type A

10 have type B

4 have type AB

HOW SYSTEM WORKS TOGETHER

Your body's organs systems depend on one another. In other words, they are interdependent. This means they work together as single unit to carry out all the functions that are vital to your survival.

The circulatory system provides an excellent example of the interdependence of organ system. As you know, its function is to transport substance throughout the body, including water, nutrients (such as fats, sugars, proteins, vitamins and minerals) and gasses (such as oxygen and carbon dioxide). All of these are carried in blood.

Your circulatory system gets these substances from your other organ systems. For example, your digestive system provides the nutrients in a form your blood can transport easily. Your respiratory system brings in oxygen from the air outside your body which is carried by your blood. At the same time your respiratory system removes the carbon dioxide from your blood and releases it to the air. It follows that the digestive and respiratory systems depends on your circulatory system, too, too. Recall that all of your organs are made up of tissues. Which are themselves made up of cells. Every cell needs nutrients and oxygen in order to function. Your body's cells cannot get these substances on their own. They depend on the circulatory system to provide them with what they need.

SUMMARY

- The heart and blood vessels make up the circulatory system.
- Blood flows out of the heart inside arteries, and back into the heart inside veins.
- Blood picks up oxygen as it passes through the lungs, and releases oxygen as it passes through the tissues in the rest of the body.

EXERCISES:

- 1 a. Mention four materials that need to be transported from one part of our body to another part.

- b. What is the medium of transportation of these materials?
 - c. Why is this medium used?
- 2.
 - a. Name the three main types of blood vessels found in mammals.
 - b. What are the functions of the blood vessels named above?
- 3.
 - a. What is the circulatory system made up of?
 - b. How does the circulatory system work?
 - c. What is the function of the circulatory system?
 - d. Describe the main functions of the heart and the blood vessels.
 - e. How does the circulatory system relate to other systems of the body?
- 4.
 - a. Name the three types of blood cells that make up blood?
 - b. Which of the blood cells contains haemoglobin?
 - c. What purpose does the haemoglobin serve?
 - d. Where are the red blood cells destroyed?
- 5.
 - a. Which of the blood cells play an important role in the clotting action of blood?
 - b. Which of the blood cells helps the body to fight germs which may get into the blood and cause disease?
 - c. What is the liquid part of blood called?
 - d. What is the significance of blood tests?
- 6. Identify the organs of the circulatory systems
- 7. Highlight different components of blood and their function
- 8. Outline different blood vessels (arteries, veins and capillaries) with their function.
- 9. Outline the importance of blood test and blood grouping.
- 10. Describe blood defects and diseases,

