HUMAN BODY

Specific Objectives
By the end of this topic, the learner should be able to:

- Identify some of the reproductive systems
- Describe physical changes during adolescence
- Identify parts of the circulatory system
- Describe the components of blood and their functions
- Identify the types of blood vessels and their functions
- Describe the structure of and functions of the heart
- Explain fertilization, development of foetus and birth process
- Identify the main excretory organs and their waste products

Revision Notes 1

1.1 Reproductive System

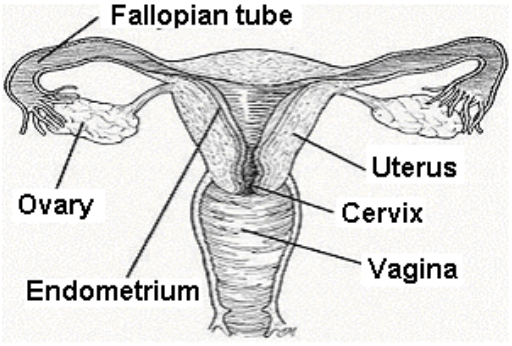
This part presents two kinds of reproductive system, namely female and male reproductive systems.

a) Female Reproductive System

The system by which human beings are enabled to produce young ones is called **reproductive system**. As shown by Figure 1.1, the system consists of different parts.
These include: Vagina, Cervix, Uterus, Ovaries and Fallopian tubes.

Ovary: There are two ovaries in the female body. There are several eggs in each ovary called **ova.** At puberty, that is 12-16 years the ova mature monthly and set free from the ovary into the oviduct. This is called **ovulation.**

Figure 1.1: Parts of a Female Reproductive System



Oviduct/fallopian tube: The tube from ovary to the uterus. There are two types one from each ovary. Ovum is released into this.

Uterus: The walls develop a thick lining every month. Fertilized ovum attaches its self in this lining and grows into an embryo. The lining sheds off if there is non fertilization and flows off with the unfertilized ovum via the virginal. This is called **menstruation.**

Vagina: this is canal from the outside. The sperms are deposited here in the time of sexual intercourse. At birth the baby passes out through here

b) Parts of Male Reproductive System

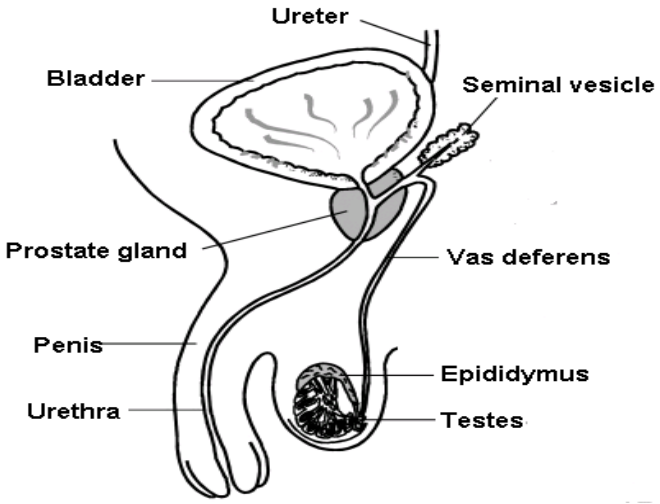
Male Reproductive System consists of various parts. These include penis, testis, urethra, prostrate and bladder.

Penis: tube like structure through which sperms are released. Also in this structure urine is passed outside the body.

Testis: Male human beings have two testes they are called testis in plural. They are enclosed in a bag called scrotum.

Urethra: a tube passing through the centre of penis. The sperms and urine pass through here.

Figure 1.2: Male reproductive parts



1.2 Changes during Adolescence

The period in a persons' life when developing from a child into an adult is referred to as **adolescence.** The stage is usually between the age of 12 and 19 years. During this time, many changes take place in terms of growth and physical changes.

a) Physical Changes in Boys

- Broader chest and shoulders
- Breaking voice to become deeper
- Growing of hair in part of the body (around sex organs, pubic hair, chest hair, beards on the face and armpits.
- Sperms mature in the testis experiences ejaculation, which is release of sperms through penis. At times this can happen during the night and is called **wet dreams.**
- Boys eat more because height and weight are increasing and becoming muscular
- At times development of pimples on the face may occur.

b) Physical Changes in Girls

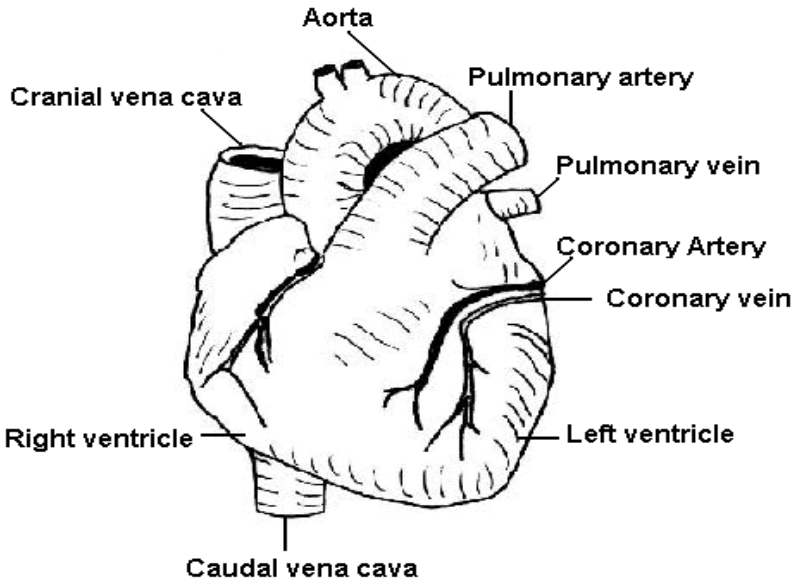
- Growth of breasts,
- Hair grows in the armpits and around sex organs(pubic hair)
- Hips become broader,
- Release an egg by ovaries after 28 days (ovulation). This happens if the egg (ovum) is not fertilized. The lining that had been formed in the uterus along with the egg breaks down and flows out of the body through vagina as blood. This process is called **menstruation.** It occurs once a month and may last 4-5 days,
- Pimples may appear on the face,
- Rapid increase of weight and heights and may cause them to eat more.

1.3 The Circulatory System

The heart, blood and the blood vessel make up the circulatory system

a) The Heart

Figure 1.3: External view of the human heart



This is the organ that pumps blood through out the body. It is muscular and placed between the lungs somewhere slightly to the left side of the body. The strong muscles of the heart can relax or contract when contracting the heart pumps blood with force. When the heart relaxes, the blood flows into chambers of the heart.

The contracting and relaxing of the heart is what is known as the **heart beat.**

b) Blood

When we are cut or injured there is a liquid which is red that flows out of the cut or injured part of the body. This is blood which contains water, blood cells, digested food, waste products and hormones which control growth and the other body activities

c) Blood Tissues

The tubes that contain the blood are called **blood vessels.** They carry blood to all parts of the body.

1.4 Components of Blood

Blood is made up of the following components:

- Plasma
- Red blood cells
- White blood cells
- Platelets

a) Plasma

This is the liquid part of the blood and most of it is water. Plasma of the blood of human beings and other mammals is pale-yellow.

It is made up of the following: Hormones, Urea, Salts, Food substance, Digested food, Carbon dioxide.

Functions of Plasma

- To transport red blood cell, white blood cells, digested food, hormones and waste products to all around the body.

b) Red Blood Cells

They contain red pigments giving them the red color. They are disc-shaped and are smaller than the white blood cells because of their red pigments, they give the blood color.

Functions of Red Blood Cells

Main function of the red blood cell is to carry oxygen from the lungs to all other parts of the body. In them is chemical called **hemoglobin** which carries oxygen within the red blood cells. **Oxygenated** blood is the blood rich in oxygen and is bright. Blood with little or without oxygen is dull red and is said to be **deoxygenated** blood.

c) White Blood Cells

They do not have a fixed shape since they keep on changing their shapes. They have no color but do have a dark part at the centre called **nucleus.** In size are larger than red blood cells. They are fewer than red blood cells.

Functions

The main function is protection of body from germs. They move to the attacked body part and fight the germs. They change the shape while fighting the germs and this way are able to engulf and destroy the germs.

d) Platelets

These are tiny cell fragments found in the blood. They are smaller than either white or red blood cells.

Functions

These help in the clotting of the blood. They prevent further loss of the blood from the part that was injured. They help to stop bleeding from cuts and wounds.

Table 1.1: Summary of blood components and their functions

Components	Functions
Plasma	Carry blood cells, digested food and hemoglobin around the body
Red blood cells	Carry oxygen from lungs to the rest of the body
White blood cells	Protect the body from germs
Blood platelets	Help in clotting of blood

1.5 Types of Blood Vessels and their Functions

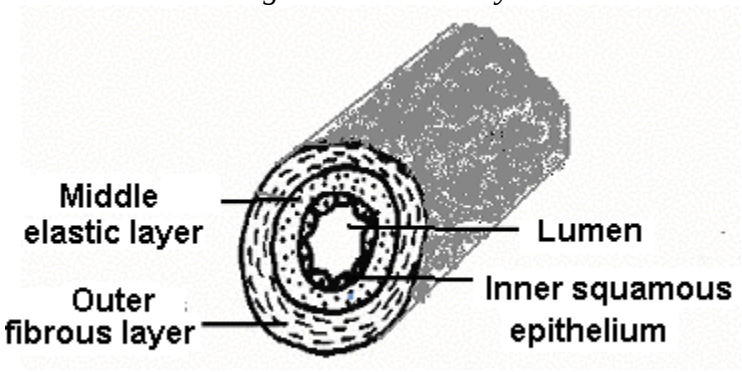
There are three main types of blood vessels. These include:

- Arteries

- Veins
- Capillaries

a) Arteries

Figure 1.4: An artery

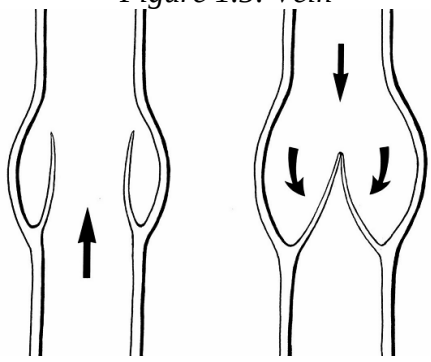


An artery is a blood vessel that carries blood from the heart to the rest of the body. Arteries have thick walls to withstand the high pressure at which the heart pumps the blood. Pushed under pressure, blood cannot flow backwards.

Function
Arteries carry oxygenated blood from the heart to all parts of the body. An exception case is for the **pulmonary artery** which carries deoxygenated blood from the heart to the lungs for purification (to receive oxygen).

b) Veins
They carry blood towards the heart and they have thin elastic walls. They have valves to prevent blood from flowing backwards into the heart. They are found near the body surface.

Figure 1.5: Vein

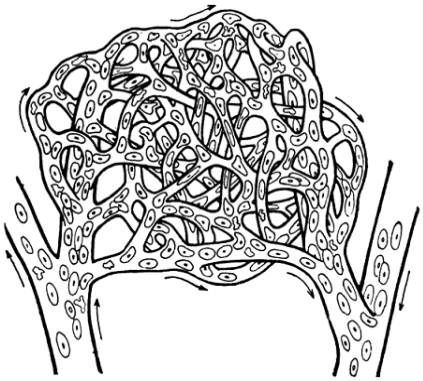


Valve A shows a vein with **open valve** to allow blood to pass through it while valve B shows a vein with **closed valve** to prevent blood from flowing backwards.
Functions
All except pulmonary vein carry deoxygenated blood from the lungs to the heart

c) Capillaries

These are the smallest blood vessels whose walls have tiny holes (pores). They are narrow and thin and form network in every organ and tissue in the body. They are link between veins and arteries.

Figure 1.6: Network of capillaries



Functions
Capillaries thin walls let food and oxygen leave blood and enter the tissues. This way waste material leaves the tissues and enters the blood to be transported to the excretory organs.

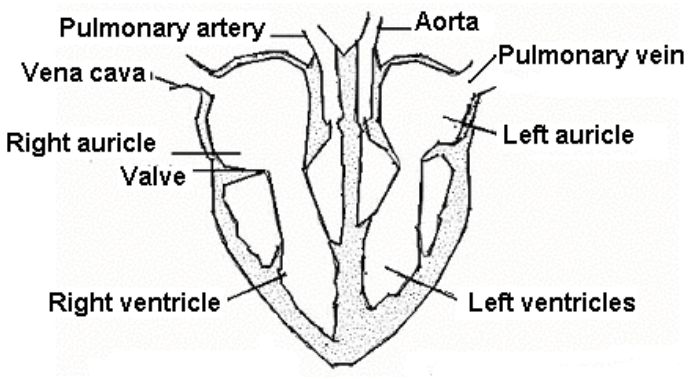
Table 1.2: Blood vessels and their functions

Blood vessel	Structure	Function
Arteries	Have thick walls, Have no valves	Carry blood rich in oxygen from the heart to all parts of the body but the pulmonary arteries.
Veins	Have thin walls and elastic, Have valves	Carry blood with little or no oxygen from the blood to the heart except pulmonary veins.
Capillaries	Have thin walls, Are very narrow, Form network in every organ and tissue	They connect the veins to the arteries, Allow digested food substances and oxygen to leave the blood and enter tissues.

1.6 The Structure and Functions of the Heart

The heart consists of various components. Figure 1.7 shows the various parts.

Figure 1.7: Structure of the Heart



Parts of the Heart

Auricles and ventricles: The heart is divided into four parts called **chambers**. The upper chambers are called *auricle* while the lower chambers are called *ventricles*. On the left side of the heart are found left auricle and left ventricle while on the right side of the heart are found right auricle and right ventricle.

Auricles: Auricles pump blood to the ventricles, which in turn pumps the blood to all parts of the body. They therefore must have thick walls to provide the extra force needed.

Table 1.3: Functions of Auricles and Ventricles

	Structure	Function
Auricles	The walls of the auricles are thinner	Auricles pump blood to the ventricles. The left auricle gets oxygenated blood from the body while the right auricle receives deoxygenated blood from the body.
Ventricles	They are larger than the auricles and have strong muscular walls.	Blood to the lungs is pumped by the right ventricle and the left ventricle pumps the blood to all parts or the pump body. Thicker walls of the left ventricle help to pump blood longer distance while right ventricle pumps to a shorter distance i.e. to the lungs.

Blood Vessels of the Heart

The main blood vessels in the heart include: Pulmonary artery, Pulmonary veins, Vena cava and Aorta

Table 1.4: Main blood vessels of the heart

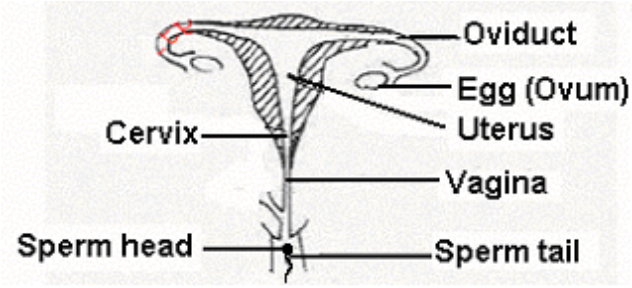
Part	Function
Pulmonary artery	Pulmonary artery carries deoxygenated blood from the right ventricle to the lungs.
Pulmonary vein	Pulmonary vein carries blood oxygenated blood from the lungs to the left auricle.
Vena cava	This is the main vein in the body which carries deoxygenated blood from all parts of the body to the heart.
Aorta	Aorta is the main artery in the body. It carries oxygenated blood from the left ventricle to all parts of the body
Valves	The work of the valves in the heart is to prevent back flow of the blood. They ensure that the blood goes from the heart only through the pulmonary artery and does not come back through the pulmonary vein.

1.7 Fertilization, Development of Foetus and Birth Process

a) Fertilization Process

Sperms produced by testis which travel through the epididymis, sperm duct and then urethra and they are deposited in the vagina of the female by the penis during coitus. Ova (eggs) in woman are produced at intervals by the ovaries. Only one ovum is produced in turn by every ovary. This cycle lasts 28 days with every cycle the uterus undergoes major cyclical changes. The eggs are released onto the oviduct and then they move down to the uterus and to the outside after passage through vagina if not fertilized. Sperms deposited swim up the cervix into the uterus and **oviduct** where fertilization takes place.

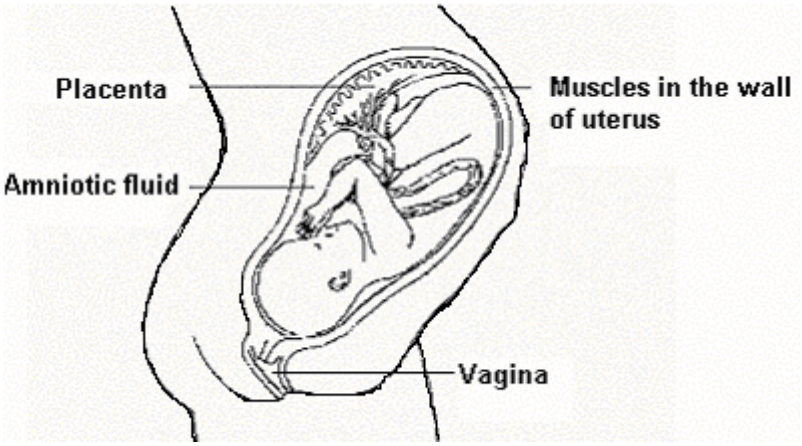
Figure 1.8: Fertilization in Human Beings



b) Development of Foetus

After fertilization in the oviduct, a zygote is formed by fusion of male and female nuclei. The **zygote** then moves down to the uterus and attaches to the walls of the uterine lining. The zygote develops into a foetus which is connected to the placenta (baby container) by an umbilical cord. Through this, food is provided to the foetus by the mother and waste products are removed from the other end.

Figure 1.9: Foetus in the womb



NB. By the end of 40 weeks all organs of the **foetus** have developed. The foetus is suspended in a fluid filled sac. It turns around so that the head is lying next to cervix. Birth is started by hard (vigorous) contraction of the uterus muscles which expels the foetus out of the uterus via the vagina (parturition).

c) Process of Birth

During pregnancy the breasts of woman increase in size and by the time of birth (parturition) are capable of producing milk for the breast milk for the nourishment of the baby. All nutritional requirements of the baby for the first months are met by the breast milk. The birth of human foetus is accompanied by loud cry and this reflex initiates spontaneous breathing by the lungs.

1.8 Excretory Organs and Waste Products

The working of our bodies produces unwanted substances (excreta). These unwanted substances are got rid off by a process known as **excretion**. Below are examples of excretory organs and the waste products they get rid of.

a) Skin

The skin covers the body and prevents dust and germs to enter the body. When the skin is broken by cut, scratch or bite, germs can enter. Skin also protects the body from drying up. The skin is made up of two layers namely: Epidermis (top layer) and Dermis (underneath layer).

Epidermis
This is the upper layer of the skin. It is made up of the dead cells on the top and below is living cells. The living cells contain pigment (colouring) which is different in different areas. This colour of the pigment determines the colour of our skin. The cells die to replace the worn out cells.

Dermis
This is the lower part of the skin which contains many things

Figure1.10: Human Skin

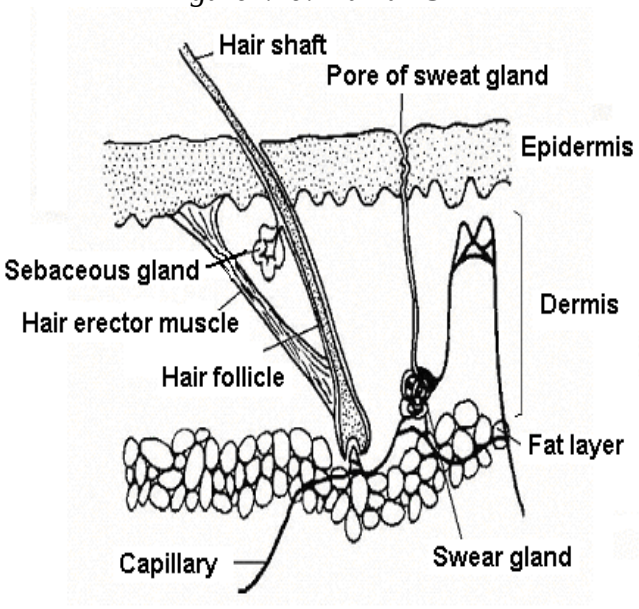


Table 1.5: Parts of Skin and Their Functions

Part	Function
Tinny blood vessels	For the supply of food and oxygen to the living parts of the skin.
Nerves	There are a number of nerves: e.g. for feeling cold, pain, touch, and pressure.
Oil glands	These make oil to oil the hair and keep the skin soft.
Glands	These are responsible for secreting sweat as a waste product.

Table 1.6: General Functions of Skin

	Functions
Excretion	Waste products from the blood are excreted from the capillaries surrounding the gland in form of sweat via pores.
Feelings	There are millions of nerve ends in the skin. There are different nerve ends for feeling e.g. touch, cold, pain and pleasure.
Maintaining Constant body temperature	The body vessels expand when the body is hot. This allows more heat to escape by radiation. Sweat glands produce sweat and when this sweat evaporates, cooling is produced. The blood vessels contract when the body is cold and glands secret less sweat. This way, the skin looses less heat.