



For Performance Measurement

Zimbabwe School Examinations Council

O-LEVEL

**HUMAN & SOCIAL BIOLOGY
(5097)**

EXAMINATION SYLLABUS FOR 2013-2017

HUMAN & SOCIAL BIOLOGY (5097)

5097 HUMAN AND SOCIAL BIOLOGY (ZIMBABWE)

G.C.E ORDINARY LEVEL

CONTENT	PAGE
Introduction	4
Aims	4
Assessment objectives	5
Weighting of assessment objectives	6
Assessment scheme	7
Methodology scheme	8
Pre-requisite mathematical skills	9
Presentation of content	9
Living organisms	11
Plant nutrition	14
Human nutrition and diet	16
Digestion and absorption of food	18
Blood and the circulatory system	22
Breathing and respiration	24
Skeleton, muscles and movement	27
Homeostasis	29
Nervous system and hormonal coordination	31
Reproduction and continuity of life	34
Health and disease	39
Control of disease	46
Community environmental health	49
Glossary of terms used in Human and Social Biology examinations	52

A. INTRODUCTION

This syllabus assumes a knowledge of the content of the two year Zimbabwe Junior Science Syllabus. It is designed to provide a two year course of study which will culminate in the 'O' level examination.

It places more emphasis on the understanding and application of scientific concepts, principles and skills than factual recall. A practical and investigative approach must be adopted in teaching this syllabus. This will serve to develop the skills and abilities necessary to achieve the stated aims and objectives.

Application of science and technology to social, health, environmental and economic issues are included to extend subject concepts and skills.

B. AIMS

The aims of the syllabus are to help students:

1. develop interest and curiosity in human biology;
2. develop concepts that are relevant to the study and practice of human biology;
3. appreciate and enjoy science and its methods of enquiry;
4. develop creativity, initiative and skills of enquiry;
5. develop good practices for health and safety;
6. develop accuracy and precision, objectivity and integrity;
7. recognise the usefulness and limitations of science;
8. apply scientific methods in other disciplines and in everyday life;
9. appreciate the beneficial and detrimental effects of the applications of human biology;
10. recognise that the study and practice of science are inter-related and are subject to economic, technological, social, political, ethical and cultural influences;
11. communicate scientific information effectively;
12. participate in the technological development of Zimbabwe;

13. develop interest in, and participate in caring for the local and global environment.

C. ASSESSMENT OBJECTIVES

The following objectives reflect those aspects of the aims that will be assessed. Specific behavioural learning objectives are stated in each section of the syllabus.

1.0 KNOWLEDGE AND UNDERSTANDING

Students should be able to demonstrate knowledge and understanding of:

- 1.1 scientific instruments and apparatus, techniques of operation and aspects of safety;
- 1.2 biological units, terminology, symbols and conversions;
- 1.3 scientific quantities and how they are determined;
- 1.4 scientific phenomena, facts and laws, definitions, concepts, theories and models;
- 1.5 implications of biological application on the personal, social, economic and environmental issues.

2.0 HANDLING INFORMATION AND PROBLEM SOLVING

Students should be able to demonstrate their ability to:

- 2.1 present data in diagrammatic, symbolic, graphical, numerical or verbal form;
- 2.2 extract information from data presented in diagrammatic, symbolic, graphical, numerical or verbal form;
- 2.3 use extracted data to recognise patterns, formulate hypotheses and draw conclusions;
- 2.4 translate information from one form to another;
- 2.5 communicate logically and concisely;
- 2.6 explain familiar and unfamiliar facts, observations and phenomena in terms of scientific laws, theories and models;
- 2.7 explain the effects of technology applications on the environment and the organisms within it;
- 2.8 make logical decisions based on the examination of evidence and arguments;

- 2.9 apply scientific principles, formulae and methods to solve quantitative and qualitative problems;
- 2.10 explain the practical constraints affecting biological investigations.

3.0 EXPERIMENTAL PRACTICAL SKILLS

Students should be able to:

- 3.1 describe tests for foods, water, carbon dioxide and oxygen and draw conclusions from such data;
- 3.2 record readings from diagrams of apparatus;
- 3.3 make clear labeled line drawings;
- 3.4 interpret diagrams, graphs and tables of data;
- 3.5 describe, explain, analyse and suggest experimental arrangements, techniques and procedures.

4.0 WEIGHTING OF ASSESSMENT OBJECTIVES

Theory papers 1 and 2

Knowledge and understanding	45%
Handling information and problem solving	45%
Experimental skills	10%

D. ASSESSMENT SCHEME

Paper	Type of paper	Duration	Marks	Paper weighting
1	Structured and free response	2 h	100	100
2	Multiple Choice	1 h	40	40

Candidates will be required to enter for Papers 1 and 2.

Questions testing practical skills will be included in the two papers.

Paper 1 : 2 hours (100 marks)

Section A: 45 minutes (40 marks)

This consists of a number of compulsory short answer and structured questions of variable mark value.

Section B: 1 hour 15 minutes: (60 marks)

This consists of five free response, essay type questions. Candidates will be required to answer any three questions. All questions will be designed to give the same weighting to each category of assessment objectives.

Paper 2: 1 hour (40 marks)

This paper will consist of 40 compulsory multiple choice items.

E. METHODOLOGY

Emphasis is placed on the development of experimental skills through practical experience. Experiments should be planned and designed in advance. A pupil-centred problem-solving approach should be adopted. Individual and group work is encouraged.

Emphasis must be on the understanding of concepts rather than on the memorization of specific examples that illustrate these concepts.

Teachers may use an integrated, co-ordinated, topic based approach or any other style of organisation and delivery. Schools are encouraged to re-arrange the topics to suit their own conditions.

The drawing of diagrams should be encouraged to facilitate learning.

Direction should be given in the correct taking of notes and writing up of experiments.

A minimum of six teaching periods (3½ hours) per week is required.

F. PREREQUISITE MATHEMATICAL SKILLS

Many topics in the syllabus provide opportunities for quantitative work, including appropriate calculations. The mathematical knowledge and skills which students may need in order to cope with the specific objectives and content are listed below:

- recognise and use expressions in decimal form;
- add, subtract, multiply and divide number including decimal numbers and common fractions;
- make approximations and estimates to obtain a quick order-of-magnitude of answers or to make simple mental checks of answers obtained by calculator;
- calculate and use averages, ratios, direct proportion and percentages;
- read and interpret graphs, tables and statistical diagrams;
- take account of variability of experimental measurements;
- manipulate and solve simple equations;
- demonstrate a qualitative understanding of inverse proportion;
- read graduated scales of various forms;
- calculations may be used in both papers.

G. PRESENTATION OF CONTENT

The syllabus consists of thirteen compulsory topics listed below:

1. Living organisms
2. Plant Nutrition
3. Human nutrition and diet
4. Digestion and absorption of food
5. Blood and the circulatory system
6. Breathing and respiration

7. Skeleton, muscles and movement
8. Homeostasis
9. Nervous system, and hormonal coordination
10. Reproduction and continuity of life
11. Health and diseases
12. Control of diseases
13. Community environmental health

The suggested notes and activities are not exhaustive. Teachers are encouraged to use their own additional examples to assist students in understanding concepts and acquiring skills.

1.0 LIVING ORGANISMS

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
1.1 Characteristics of living organisms	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe characteristics of organisms; - compare the characteristics of living organisms and non-living things. 	Feeding, respiring, excreting, growing, responding to stimuli, moving and reproducing.	Observing a wide variety of living and non-living things to identify the characteristics of living things including micro-organisms.
1.2 Cell structure and function	<ul style="list-style-type: none"> - define a cell; - describe and compare the structure of plant and animal cells; - describe the functions of various parts of the cell. 	<p>Cell</p> <p>Fine structure of plant and animal cells. Animal cell: cell membrane, cytoplasm, nucleus, mitochondria, ribosomes. Plant cell: cell wall, cell membrane, cytoplasm, nucleus vacuole, chloroplast and starch grains.</p> <p>Functions of parts of the cell.</p>	<p>Functional units and building blocks.</p> <p>Examining a prepared slide of leaf epidermis, such as onion and squash preparations; e.g. root tip of germinated beans.</p> <p>Studying biosets or micro photograph of cheek cell or animal liver squash. Fresh human tissue not to be used.</p> <p>Refer to passage of materials by diffusion, osmosis and active transport.</p>
1.3 Diffusion	<ul style="list-style-type: none"> - define diffusion; - investigate factors that affect the rate of diffusion. 	<p>Diffusion.</p> <p>Factors affecting rate of diffusion: Surface area/volume ratio, temperature and thin lining concentration gradients.</p>	<p>Carrying out experiments on diffusion.</p> <p>Carrying out experiments to compare rates of diffusion.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
1.4 Movement of water molecules	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define osmosis; - describe the function of the cell membrane in controlling the passage of materials into and out of the cytoplasm; - explain the effect of water gain and loss in plant and animal cells; - distinguish between diffusion and osmosis; 	<p>Osmosis.</p> <p>Factors determining the passage of materials across the cell membrane: Selective permeability, molecular size, concentration gradient, turgor pressure (turgidity); plasmolysis, haemolysis</p> <p>Diffusion and osmosis</p>	<p>Carrying out experiments with egg shell membrane or potato tissue and visking tubing.</p>
1.5 Active transport	<ul style="list-style-type: none"> - define active transport; - explain the importance of active transport in living organisms. 	<p>Active transport.</p> <p>Role of active uptake.</p>	<p>Discussing the importance of active transport in living organisms.</p> <p>Observing examples of prepared slides and specimens of tissues.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
1.6 Tissues, organs and organisms	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define tissue, organ and organism; - state the relationship between cells and tissues, tissues and organs, organs and organisms; - describe the structure and function of epithelium, blood and bone 	<p>Tissue, organ and organism.</p> <p>Structure and function.</p>	<p>Discussing structure of the tissue and its function.</p> <p>Identifying red and white blood cells from prepared slides and photomicrographs.</p> <p>Epithelium (lining of trachea and covering villus).</p> <p>Blood, red and white cells, plasma, platelets.</p> <p>Bone: (bone cells) osteocytes & mineral matrix.</p> <p>Observing an example of organ such as the arm and leg to identify bone, muscle cartilage, fibrous tissues (tendons and ligaments as making up organs).</p> <p>Observing and discussing human body as consisting of organ systems.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
2.1 Photosynthesis	<p>Students will be able to:</p> <ul style="list-style-type: none"> - explain a simple food chain; - define photosynthesis; - explain green plants as the ultimate source of food for all living organisms; - state the word equation for photosynthesis; - state conditions necessary for photosynthesis; - describe the conversion and storage of the end products of photosynthesis. 	<p>Simple food chains: Producers and consumers.</p> <p>Photosynthesis</p> <p>Carbon dioxide + water + (light) energy → carbohydrates + oxygen.</p> <p>Carbon dioxide, light and chlorophyll.</p> <p>Conversion of carbohydrates to proteins and lipids.</p> <p>Translocation, storage and structure formation.</p>	<p>Constructing food chains.</p> <p>Discussing the process of photosynthesis.</p> <p>Testing a leaf for starch. Discussing importance of light and chlorophyll.</p> <p>Discussing photosynthesis equation.</p> <p>Distinguishing raw materials and conditions for photosynthesis.</p> <p>No details of protein and ATP synthesis are required.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
2.2 Carbon cycle	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe the carbon cycle; - identify carbon dioxide; - describe gaseous exchange during respiration and combustion. 	<p>Fixation of carbon.</p> <p>Test for carbon dioxide.</p> <p>Respiration and combustion.</p>	<p>Using flow charts to illustrate carbon cycle.</p> <p>Carrying out tests for carbon dioxide.</p> <p>Carrying out experiments to illustrate that animals release CO₂ as a result of respiration and that carbon dioxide is released during burning.</p>
2.3 Nitrogen cycle	<ul style="list-style-type: none"> - describe the nitrogen cycle; - identify some organisms that take part in the nitrogen cycle. 	<p>Stages in the nitrogen cycle: Ammonification, nitrification, denitrification.</p> <p>Nitrogen fixing bacteria.</p> <p>Denitrifying bacteria.</p> <p>Decay bacteria.</p>	<p>Illustrating the nitrogen cycle using charts.</p> <p>Examining of nodules on roots of leguminous plants.</p> <p>The specific names of bacteria not required.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
3.1 Nutrients	<p>Students will be able to:</p> <ul style="list-style-type: none"> - identify macro nutrients in human diet; - state the major sources of each nutrient; - state the chemical composition of carbohydrates, proteins and fats/lipids; - state the functions of macro-nutrients; - list sources of vitamins A, C and D, Calcium, iodine and iron; - state the functions of vitamins and mineral salts. 	<p>Carbohydrates. (sugar as starch), protein, fats/lipids</p> <p>Sources. Chemical composition.</p> <p>Functions.</p> <p>Vitamins A, B complex, C and D.</p> <p>Minerals: Calcium, Iodine and Iron.</p> <p>Sources of vitamins and mineral salts.</p>	<p>Testing for reducing sugars, starch, proteins and fats in food samples.</p> <p>The formulae for macro-nutrients not required.</p> <p>Carrying out experiments on energy release during burning of food samples.</p> <p>Analysing tables of food values, pie charts and bar graphs.</p> <p>Yellow vegetables e.g. pumpkins, butternut, gem squash, tomatoes.</p> <p>Sampling foods that supply vitamins and minerals include yellow vegetables, fruits and fish oils.</p> <p>The study of micro-nutrients should be limited to the following: Vitamins A, C and D Minerals – calcium, iodine and iron.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
3.2 Balance diet	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define a balanced diet; - describe a balanced diet; - explain the importance of a balanced diet; - relate diet and energy intake to individual needs; - define malnutrition; - state examples of effects of malnutrition. 	<p>Balanced diet.</p> <p>Components of a balanced diet.</p> <p>Balance between food intake and energy expenditure, growth and health requirements.</p> <p>Factors affecting energy intake such as age, sex and activity.</p> <p>Malnutrition.</p> <p>Excess carbohydrates: obesity and coronary heart disease.</p> <p>Vitamin D: rickets</p>	<p>Draw up a balanced diet using locally available food.</p> <p>Emphasising the importance of water in a balanced diet.</p> <p>Analysing tables on dietary requirements for sedentary and manual workers.</p> <p>Malnutrition as a lack of balance in the diet, either as a shortage of particular nutrients or as an excess.</p>
3.3 Preparation of food	<ul style="list-style-type: none"> - explain the need for hygiene in handling and preparing food; - state ways of conserving mineral ions and vitamins during the cooking of food. 	<p>Hygiene in handling and preparing food.</p> <p>Steam cooking, pressure cooking, boiling, frying</p> <p>Water soluble and fat soluble vitamins.</p> <p>Effects of overcooking.</p>	<p>Discussing precautions taken when cooking food which contains soluble vitamins, fat soluble vitamins.</p> <p>The study of vitamins is limited to the following:</p> <p>water soluble – B and C.</p> <p>fat soluble – A and D.</p>

4.0 DIGESTION AND ABSORPTION OF FOOD

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
4.1 Mechanical digestion	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe mechanical digestion; - explain how the increase in surface area of food is achieved; - describe the movement of food in the alimentary canal. 	<p>Chemical and mechanical digestion. Chewing and churning.</p> <p>Volume to surface area ratio after chewing.</p> <p>Peristalsis.</p>	<p>Digestion as the breakdown of large insoluble food molecules into small soluble molecules.</p> <p>Using potato cubes of different sizes to demonstrate surface area: volume ratio.</p> <p>Chewing of food to demonstrate mechanical digestion.</p> <p>Illustrating with ball bearing in rubber tube.</p>
4.2 Teeth	<ul style="list-style-type: none"> - identify types and state functions of human teeth; - describe parts of a molar tooth; - state the functions of the parts of a tooth. 	<p>Types and functions of human teeth.</p> <p>Structure of a tooth.</p> <p>Functions of parts of a tooth.</p>	<p>Examining own teeth using mirrors.</p> <p>The study on the parts of teeth should be limited to crown, enamel, dentine, root, nerves and blood vessels.</p>
4.3 Care of teeth	<ul style="list-style-type: none"> - explain causes of dental decay; - explain the proper care of teeth. 	<p>Causes of dental decay. Plaque containing bacteria and food debris.</p> <p>Dental care.</p> <p>Oral hygiene.</p>	<p>Carrying out experiments showing action of bacteria on sugary food producing acids.</p> <p>Carrying out experiments showing action of acid on teeth.</p> <p>Experiments on the action of toothpaste and the determination of pH of toothpaste.</p> <p>Brushing teeth using salt and bicarbonate of soda (sodium hydrogen carbonate) as a substitute for toothpaste.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
4.4 Chemical digestion	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define chemical digestion; - define enzyme; - define the properties of enzymes; - describe the effect of change in temperature and pH on the rate of enzyme activity - state the roles of hydrochloric acid, rennin and bile in digestion. 	<p>Breakdown of molecules.</p> <p>Enzyme.</p> <p>Properties of enzymes.</p> <p>pH and temperature.</p> <p>Buffer action, hydrolysis, destruction of bacteria. Clotting of milk. Emulsification of fats.</p>	<p>Illustrating breakdown of molecules using models such as beads.</p> <p>An enzyme as a protein that acts as a biological catalyst.</p> <p>Demonstrating catalysis using hydrogen peroxide, fresh liver or potato.</p> <p>Carrying out protein test on enzyme using lock and key model to demonstrate specificity.</p> <p>Carrying out experiment on rate of digestion of starch by amylase. Saliva not to be used.</p> <p>Carrying out experiments on clotting time of milk at body temperature and different pH's using Rennet tablets and dilute HCl.</p>
4.5 The digestive system	<ul style="list-style-type: none"> - identify the main structures of the digestive system; - state the functions of salivary glands; - state the action of rennin and pepsin on food; - describe the functions of the liver and pancreas in digestion. 	<p>Mouth, oesophagus, stomach, duodenum, small intestine, colon, rectum and anus.</p> <p>Salivary glands, gall bladder, liver and pancreas.</p> <p>Production of bile.</p> <p>Production of pancreatic juice.</p>	<p>Diagrams and models of the digestive system.</p> <p>Illustrating digestive system using diagram and models.</p> <p>Pupils should examine a chart of enzymes in relation to parts of alimentary canal.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe the functions of the enzymes in pancreatic juice; - state the need for emulsification of fats. 	<p>Breakdown of starch.</p> <p>Mouth: starch to maltose. Stomach: Clotting of milk. Breaking of protein.</p> <p>Breakdown of sugars, starch and proteins.</p> <p>Trypsin; polypeptide to amino acids.</p>	<p>Carrying out experiments using diastase to demonstrate starch digestion.</p> <p>Experiment to investigate the action of pepsin on egg-white.</p> <p>Carrying out experiments on emulsification of fats.</p> <p>Discussing roles of amylase, lipase and trypsin.</p>
4.6 Absorption and Assimilation	<ul style="list-style-type: none"> - describe absorption of the end products of digestion; - describe how the small intestine is adapted for the absorption of products of digestion; - identify the role of the large intestines and rectum; - state the function of the hepatic portal vein; - describe the fate of the products of digestion; 	<p>Absorption in the ileum.</p> <p>Movement of fat.</p> <p>Adaptation of small intestines.</p> <p>Roles of large intestines and rectum.</p> <p>Transport of products of digestion to liver.</p> <p>Assimilation and storage.</p>	<p>Discussing diffusion and active transport.</p> <p>Using visking tubing to demonstrate absorption.</p> <p>Using corrugated card model to show increase of surface area.</p> <p>Using the biosets to show structure of colon and rectum.</p> <p>Discussing the movement of end products of digestion.</p> <p>Discussing the role of liver, respiration, growth and repair.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
	<p>Students will be able to:</p> <ul style="list-style-type: none"> - distinguish between egestion and excretion; - describe constipation and diarrhoea. 	<p>Undigested food and metabolic waste.</p> <p>Constipation and diarrhoea.</p>	<p>Egestion as the passing out of food not absorbed into the body. Excretion as the removal of waste products of respiration and cellular activities.</p> <p>Discussing the health problems connected with bowel movement.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
5.1 Blood	<p>Students will be able to:</p> <ul style="list-style-type: none"> - identify components of mammalian blood; - describe the functions of blood. 	<p>Red blood cells, white blood cells, plasma and platelets.</p> <p>Functions of blood.</p>	<p>Identifying red cells, phagocytes and lymphocytes from prepared slides, drawings, photomicrographs and biosets. Observing red blood cells in tadpole or fish tails or prepared slides.</p> <p>Fresh human specimens should not be used for health reasons.</p> <p>Discussing the functions of blood.</p>
5.2 Circulatory system	<ul style="list-style-type: none"> - describe the circulatory system; - state functions of the circulatory system; - describe and state the function of the heart; - name the parts of the heart; - describe how the heart pumps blood; - describe the role of the pacemaker; 	<p>Heart, vessels and valves.</p> <p>Transport of materials and distribution of blood.</p> <p>Atria, ventricles, valves and cardiac muscles. Pace maker. Valve function and movement.</p> <p>Cardiac cycle.</p> <p>Control of heart beat.</p>	<p>Studying model and diagram of a human heart and vessels.</p> <p>Examination of ox, chicken, goat or lamb heart.</p> <p>Identifying parts of the heart from drawings and models. Measuring pulse rate.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
	<p>Students will be able to:</p> <ul style="list-style-type: none"> - identify the main blood vessels and their functions; - relate the structure of vessels to their function; - relate pressure difference in the dual circulatory system to the function of the two circulations; - identify possible causes of high blood pressure; - list the likely causes of coronary heart disease. - describe the effects of high blood pressure and coronary heart disease; - state the origin and function of tissue fluid; - state the origin and functions of lymph. 	<p>Arteries and veins.</p> <p>Arteries, arterioles, veins, venules capillaries.</p> <p>Pulmonary and systematic circulations.</p> <p>Genetic predisposition, stress, diet, cigarette smoke.</p> <p>Diet, stress, smoking, obesity, high blood pressure.</p> <p>Stroke, heart attack and death.</p> <p>Formation of tissue fluid and exchange of materials between capillaries and cells.</p> <p>Structure and function of the lymphatic system.</p>	<p>The identification should be limited to the following: Aorta, vena cava, hepatic portal vein, hepatic artery, hepatic vein, pulmonary and renal veins, arteries and carotid vein.</p> <p>Using models, diagrams and active charts of the human circulatory system.</p> <p>Observing capillaries in tail of live tadpole or fish where possible.</p> <p>Discussing causes of high blood pressure.</p> <p>Reading articles on coronary heart disease.</p> <p>Refer to diffusion and osmosis.</p> <p>Reference to immune response system.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
6.1 Breathing	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define breathing; - identify parts of the respiratory system; - describe the roles of the ribs, internal and external intercostal muscles, muscular and fibrous parts of the diaphragm in breathing; - describe the structure and role of the alveoli in gaseous exchange. - describe the characteristics of a surface for gaseous exchange. 	<p>Breathing.</p> <p>Nasal passages, larynx. Trachea, bronchi, bronchioles, alveoli and capillaries.</p> <p>Inspiration and expiration.</p> <p>Changes in pressure during breathing.</p> <p>Structure and role of alveoli.</p> <p>Adaptations for gaseous exchange.</p>	<p>Demonstrating breathing.</p> <p>Identifying parts from diagrams and models.</p> <p>Drawing respiratory system.</p> <p>Examination or observation of diagrams to show inspiration and expiration.</p> <p>Using bell jar and balloon model to demonstrate breathing.</p> <p>Models showing movement of diaphragm and ribs.</p> <p>Examining respiratory surfaces used for gaseous exchange e.g. lung of goat, lamb or chicken. Emphasise the importance of good ventilation.</p>
6.2 Gaseous exchange	<ul style="list-style-type: none"> - state the differences between inspired and expired air; - describe the effects of changes in physical activity on the rate and depth of breathing and pulse rate; 	<p>Percentage composition of inspired and expired air.</p> <p>Depth and rate of breathing. Pulse rate.</p>	<p>Experiments to show that expired air contains a higher proportion of carbon dioxide.</p> <p>Measuring of pulse rates and breathing rates before and after exercise</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe vital capacity, tidal volume and residual air; - describe the technique of mouth to mouth resuscitation. 	<p>Vital capacity related to height and body mass.</p> <p>Tidal volume and residual air.</p> <p>Mouth to mouth resuscitation.</p>	<p>Carrying out experiments to investigate difference in vital capacity and tidal volume in groups of student in relation to height and body mass.</p> <p>Using charts, diagrams and models to demonstrate mouth to mouth resuscitation.</p>
6.3 Energy release	<ul style="list-style-type: none"> - define respiration; - state the word equation for aerobic respiration; - describe anaerobic respiration; - state the role of mitochondria; - list activities where energy is required. 	<p>Respiration.</p> <p>Aerobic respiration. Glucose + oxygen → carbon dioxide + water + energy.</p> <p>Formation of lactic acid, oxygen debt.</p> <p>Energy conversion.</p> <p>Activities such as cell division, active transport, maintenance of constant body temperature, muscle action and transmission of impulses.</p>	<p>Carrying out experiments to demonstrate release of energy and carbon dioxide from carbohydrates.</p> <p>Carrying out experiments to show release of heat energy and carbon dioxide by germinating seeds and oxygen up-take by a small animal.</p> <p>Discussing effects of excessive muscular activity leading to cramps.</p> <p><i>Word equation for anaerobic respiration required.</i></p> <p>Limited to mitochondria as site of energy conversion in respiration.</p> <p>Discussing energy requirements to do work.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
<p>6.4 Respiratory diseases associated with tobacco smoking.</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> - demonstrate the presence of some of the toxic materials in cigarette smoke; - describe some effects of cigarette smoke on health; - describe the effects of nicotine and carbon monoxide on a developing foetus. 	<p>Nicotine, tar, carbon monoxide, carbon dioxide.</p> <p>Short term effects: increased carbon dioxide content of inhaled air, irritation and damage to surfaces used for gaseous exchange, loss of cleaning mechanism.</p> <p>Long term effects: emphysema, bronchitis, lung cancer, heart disease.</p> <p>Low birth weight, possible brain damage.</p>	<p>Carrying out experiment to show the production of toxic substances from cigarette smoke.</p> <p>Discussing the effect of nicotine and carbon monoxide on a developing foetus.</p>

7.0 SKELETON, MUSCLE AND MOVEMENT

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
7.1 The Skeleton	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe the functions of a skeleton; - identify parts of the human skeleton; - distinguish between tendons and ligaments; - distinguish a hinge joint from a ball and socket joint. 	<p>Functions of the skeleton.</p> <p>Parts of the human skeleton: skull, vertebral, column, thorax, girdles and limbs.</p> <p>Tendons and ligaments.</p> <p>Movement in one or two planes.</p> <p>Hinge and ball and socket joints.</p>	<p>Examination of a skeleton or model of a skeleton.</p> <p>Examining specimens or prepared slides.</p> <p>Examining the structure and movement of a hinge joint and ball and socket joint.</p>
7.2 Bone cartilage	<ul style="list-style-type: none"> - distinguish between bone and cartilage; - describe the characteristics of fibrous tissue in tendons and ligaments. 	<p>Bone and cartilage tissues.</p> <p>Connective tissue: white fibrous: collagen (inelastic); yellow elastin.</p>	<p>Identifying and comparing bone and cartilage from slides, photomicrographs and or models.</p> <p>Comparing bone and cartilage tissue;</p> <p>Identifying connective tissues from slides or photomicrographs.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
7.3 Muscles and Movement	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define muscle; - identify origins and points of insertion of the biceps and triceps muscles; - describe antagonistic muscle action; - explain the role of involuntary muscles. 	<p>Muscular tissue.</p> <p>Bicep and triceps.</p> <p>Extensor and flexor.</p> <p>Alimentary canal, Iris, and ciliary muscles.</p>	<p>Identifying muscular tissue from prepared slides and photomicrographs.</p> <p>Observing fore limbs and models of a human being.</p> <p>The contraction of one and relaxation of the other muscles to raise or lower a limb.</p> <p>Observing and describing iris movement of own eye in a mirror or partner in low and high light intensity.</p>

8.0 HOMEOSTASIS

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
8.1 Homeostasis	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define homeostasis 	Homeostasis.	Homeostasis as maintenance of internal environment constant. Naming organs involved in homeostasis.
8.2 Excretion	<ul style="list-style-type: none"> - define excretion; - list substances that must be excreted and organs involved: - identify the main parts of the urinary system; - describe the kidney function; - relate the process of filtration to blood pressure in glomerulus; - describe the effects of heavy sweating and diarrhoea on urine production and water balance. 	<p>Excretion.</p> <p>Kidneys: urea, salt, water and toxins. Lungs: carbon dioxide and water.</p> <p>Skin: salts and water.</p> <p>Liver: bile pigments. Urinary system.</p> <p>Functions of a kidney.</p> <p>Osmoregulation, urea excretion, urine production and storage. Collection of filtrate in the Bowmans' capsule and reabsorption in kidney tubule.</p> <p>Pressure filtration.</p> <p>Effects of excessive loss and gain of water.</p>	<p>Excretion as the removal of waste products of metabolism from the blood.</p> <p>Breathing on mirror and into indicator. Lime water or bicarbonate indicator. Carrying Albusix test on urine to show urea presence. Examining whitish salts on skin on a hot day after sweating. Discussing jaundice.</p> <p>Identifying the parts on a cut longitudinal section through a mammalian kidney or model model or bioset.</p> <p>Using tables to compare composition of blood and urine.</p> <p>Using hydrostatic pressure filtration models to demonstrate pressure filtration.</p> <p>Observing the colour and volume of urine after heavy sweating or diarrhoea.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
8.3 Regulation of body temperature	<p>Students will be able to:</p> <ul style="list-style-type: none"> - distinguish between heat and temperature; - explain regulation of body temperature; - identify and label parts of the skin involved in temperature control; - relate function of the parts of skin to the maintenance of a constant body temperature. - relate the evaporation of sweat to the concept of specific latent heat; - describe heat stroke and heat stagnation; - describe the loss of heat through the lungs during breathing. 	<p>Heat, temperature.</p> <p>Temperature control.</p> <p>Parts of a skin.</p> <p>Functions of the parts of the skin.</p> <p>Latent heat.</p> <p>Heat stroke and stagnation.</p> <p>Effects of relative humidity.</p> <p>Loss of heat during breathing.</p>	<p>Feeling heat and measuring temperature.</p> <p>Discussing negative feedback mechanism.</p> <p>Identifying the parts from a model or drawing of skin section.</p> <p>Using alcohol on the skin to demonstrate cooling by evaporation.</p> <p>Using a fan to cool wet skin.</p> <p>Measuring temperature of exhaled and inhaled air.</p>
8.4 Regulating blood sugar	<ul style="list-style-type: none"> - outline the role of the pancreas in regulating blood sugar; - outline the role of insulin in homeostasis; - describe the role of the liver in the control of blood sugar. 	<p>Role of pancreas.</p> <p>Regulation of blood glucose level.</p> <p>Feedback mechanism.</p> <p>Diabetes mellitus; signs and symptoms.</p> <p>Inter-conversion of glucose and glycogen: insulin, adrenalin and glycogen.</p>	<p>Discussing signs of diabetes mellitus.</p> <p>Using clinistix test.</p> <p>Discussing the role of the liver in the control of blood sugar level.</p>

9.0 NERVOUS SYSTEM AND HORMONAL COORDINATION

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
9.1 Perception	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define sense organ; - list the stimuli to which sense organs respond. 	<p>Sense organ: eye, ear and skin, nose and tongue.</p> <p>Stimuli: energy, sound energy, heat, touch, chemicals.</p>	<p>Carrying out simple practical activities to demonstrate each sense.</p> <p>Investigating the different perception of temperature and touch by different areas of skin on hand and forearm.</p>
9.2 The eye	<ul style="list-style-type: none"> - describe the structure of the eye; - describe how the eye focuses images on the retina; - explain stereoscopic vision; - state the functions and characteristics of rods and cones in the retina; - describe the reflex action of the circular muscles of the iris in regulating the amount of light reaching the retina; - describe shortsightedness and long sightedness and their correction. 	<p>Parts of the human eye.</p> <p>Refraction, image formation, accommodation, stereoscopic vision.</p> <p>Functions and characteristics of rods and cones.</p> <p>Colour vision.</p> <p>Radial and circular muscles.</p> <p>Eye defects and their correction.</p>	<p>Examining models of an eye.</p> <p>Examining own eye using a mirror.</p> <p>Experimenting with lenses and light sources.</p> <p>Investigating stereoscope vision.</p> <p>Investigating colour vision using filters.</p> <p>Investigating pupil reflexes and blind spot.</p> <p>Demonstrating long and short sightedness.</p> <p>Experimenting with concave and convex lenses.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
9.3 The ear	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe the structure and functions of the ear. 	Structure and function.	<p>Identifying parts of an ear from models.</p> <p>Functions limited to: collection of sound waves, transmitting waves, hearing and balance.</p>
9.4 The nervous System	<ul style="list-style-type: none"> - state the main divisions of the central nervous system (CNS); - identify and outline the functions of the main parts of the brain, spinal cord and nerves; - distinguish between a neurone and a nerve. - describe a simple reflex arc; - describe the structure and function of the spinal synapses. 	<p>Brain and spinal cord.</p> <p>Functions of brain, spinal cord and nerves.</p> <p>Neurone and nerve.</p> <p>Components of a reflex arc.</p> <p>Spinal synapses.</p>	<p>Examining models of the brain.</p> <p>Examining photomicrographs or biosets of spinal cord.</p> <p>Demonstrating structure of a nerve e.g. electrical cable.</p> <p>Examining photomicrographs or biosets of neurons.</p> <p>Observing movement at elbow in withdrawing the hand from a painful stimulus.</p> <p>Demonstrating reflex action e.g. blinking and knee jerk.</p> <p>Mention neurotransmitter substances but specific names not required.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
9.5 Homones	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define a hormone; - describe the nature and action of a hormone; - distinguish between quick acting and slow acting hormones. - distinguish between hormonal and nervous control system; - describe the effects of adrenaline; - describe the roles of oestrogen and progesterone in the menstrual cycle and pregnancy. 	<p>Hormone.</p> <p>Chemical nature, production, transport and effect.</p> <p>Quick acting such as Adrenaline and insulin. Slow acting such as oestrogen, progesterone and testosterone.</p> <p>Nature. Speed of response and transmission of messages. Source of adrenaline. Effects of adrenaline.</p> <p>Oestrogen. Progesterone.</p>	<p>Hormone as a chemical substance produced by a gland and carried by blood, which affects the activities of a target organ.</p> <p>Discussing the effects of hormones in human beings.</p> <p>Comparing speed of hormonal action.</p> <p>Refer to the effects on heart rate, pupil dilation, breathing rate and muscle activity.</p> <p>Discussing role of hormones during menstrual cycle and pregnancy.</p>

10.0 REPRODUCTION AND CONTINUITY OF LIFE

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
10.1 Sexual Reproduction	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define sexual reproduction. - define a gamete 	<p>Sexual reproduction.</p> <p>Sperm and ovum.</p>	<p>Sexual reproduction as the process involving the fusion of nuclei to form a zygote. Explain that a zygote is the single cell produced when male and female sex cells fuse.</p> <p>Gamete as either a sperm or an ovum having half the number of chromosomes found in body cells. Simple structure of sperm and ovum limited to size, cell membrane and numbers.</p>
10.2 Human reproductive systems	<ul style="list-style-type: none"> - describe the structure of the female and male human reproductive systems; - state the functions of the reproductive organs. 	<p>Female: ovary, oviduct, uterus, cervix, vagina.</p> <p>Male: testis, scrotum, penis, prostate gland, sperm duct, epididymis, seminal vesicles, urethra, Cowpers gland.</p> <p>Functions of the reproductive organs.</p>	<p>No detail of the internal structure of the testis or ovaries required. Identification of parts from diagram.</p>
10.2.1 Menstruation	<ul style="list-style-type: none"> - describe the human menstrual cycle. 	<p>Menstrual cycle</p>	<p>Role of oestrogen and progesterone should be covered.</p> <p>Studying the chart of the menstrual cycle.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
10.2.2 Fertilisation and development	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe how fertilization takes place; - describe the early development of an embryo; - describe how the embryo is maintained; - identify harmful substances that pass through the placenta; - describe the role of amniotic fluid; - describe the stages of birth. 	<p>Fusion of male and female gametes.</p> <p>Cell division and multiplication, implantation, growth and development.</p> <p>Selective permeability of placenta.</p> <p>Exchange of materials at the placenta; gases, nutrients, excretory products and antibodies.</p> <p>Nicotine, alcohol; some viruses.</p> <p>Protection: even distribution of pressure around foetus.</p> <p>Labour: rhythmic contraction of uterus muscles; opening (dilation) of cervix, rupture of amniotic sac, delivery and after birth.</p>	<p>Using active charts and biosets to show fertilization. Ejaculation, movement of sperms, fusion.</p> <p><i>Limited to the formation of a ball of cells which becomes implanted into the uterine wall and early development – organ formation.</i></p> <p>Movement of nutrients: Reference to placenta as a barrier separating maternal and foetal red blood cells, gases, excretory products and antibodies.</p> <p>Discussing dangers of taking drugs, smoking and alcohol during pregnancy. Refer to relevant hallucinogens, depressants and stimulants, HIV and medical drugs.</p> <p>Studying diagrams and pictures showing the embryo in the amniotic fluid.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
10.3 Child Spacing	<p>Students will be able to:</p> <ul style="list-style-type: none"> - explain the reasons for child spacing; - outline various methods of contraception. 	<p>Population concerns, health of mother and child.</p> <p>Contraceptive methods. Abstinence and natural method. Chemical: spermicides. Barriers: condom and diaphragm. Intra-uterine devices (IUDs): coil and loop. Hormonal: injection and pills. Surgical sterilization: tubal ligation and vasectomy.</p>	<p>Limiting number of children and spacing births. Refer to responsible parenthood. Explain what child spacing is. Activities to demonstrate the relationship between resources and number of consumers. Discuss reasons for controlling growth of population. Social and economic factors.</p> <p>Discussing of moral, social, ethical, medical, religious, cultural and economic implications, reliability, limitations, dangers and appropriateness of contraceptive methods.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
10.4 Inheritance	Students will be able to: - define inheritance;	Inheritance.	Discussing inheritance.
10.4.1 Units of heredity	- define a gene; - distinguish between the terms gene and allele; - describe chromosomes.	Gene. Allele. Chromosome.	Constructing models of DNA and chromosomes using beads. A gene as a length of DNA coding for a particular characteristic and basic structural unit of inheritance. An allele as a pair of genes on the same loci on homologous chromosomes controlling the same character. Limited to the thread like structure and the presence of protein and DNA.

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
10.4.2 Cell division	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define mitosis; - define meiosis. 	<p>Mitosis.</p> <p>Meiosis.</p>	<p>Using charts to demonstrate mitosis and meiosis.</p> <p>Mitosis as a nuclear division resulting in the formation of two nuclei with same chromosome number and same genetic content as the original nucleus. (No stages of mitosis are required).</p> <p>Meiosis as nuclear division resulting in halving of chromosome number and the production of variation during the formation of gamete cell. (No stages of meiosis are required).</p>
10.4.3 Monohybrid inheritance	<ul style="list-style-type: none"> - describe complete dominance; - predict possible outcomes of monohybrid crosses; - describe codominance; - explain how sex is determined in humans. 	<p>Dominant and recessive alleles. Phenotypes and genotypes.</p> <p>Gametes, F1 and F2. Generations.</p> <p>A,B,O Blood groups.</p> <p>Sex chromosomes X and Y.</p>	<p>Discussing examples of dominant and recessive features.</p> <p>Using symbols to draw and interpret diagrams for monohybrid cross Limited to 3:1 phenotypic ratio.</p> <p>Using coloured beads or beans picked at random to demonstrate monohybrid inheritance.</p> <p>Using symbols to illustrate inheritance of blood group.</p> <p>Using symbols to show sex inheritance.</p>

11.0 HEALTH AND DISEASES

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
11.1 Health	<p>Students will be able to:</p> <ul style="list-style-type: none"> - explain the meaning of health. 	Individual and community health.	<p>Discussing examples of ill health.</p> <p>Health as a state of complete physical, mental and social well being, not merely the absence of disease (WHO definition).</p>
11.2 Disease	<ul style="list-style-type: none"> - explain the meaning of disease. 	Diseases.	Loss of health due to: malnutrition, infections by organisms, degeneration of organs or tissues, environmental pollutants.
11.2.1 Non transmissible diseases	<ul style="list-style-type: none"> - explain the term malnutrition; - describe deficiency symptoms of iodine and vitamin A; - describe deficiency symptoms of protein-energy; - define degenerative disease. 	<p>Malnutrition.</p> <p>Iodine.</p> <p>Vitamin A.</p> <p>Kwashiorkor.</p> <p>Breakdown of cells, tissues or organs.</p>	<p>Discussing examples of nutritional diseases.</p> <p>Discussing examples of iodine and Vitamin A deficiencies and how they are prevented.</p> <p>Discussing of symptoms of kwashiorkor.</p> <p>Discussing thrombosis, arthritis and muscular dystrophy.</p>
11.2.2 Substance use and abuse	<ul style="list-style-type: none"> - define drug and substance; 	Drugs and substances.	Giving examples of drug and substance abuse.

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
	<p>Students will be able to:</p> <ul style="list-style-type: none"> - outline misuse and abuse of some medicinal drugs; - describe the effects of excessive intake of alcohol; - describe effects of use of mandrax and cannabis (mbanje); - describe the effects of inhaling solvents. 	<p>Drug abuse.</p> <p>Alcohol abuse.</p> <p>Effects of mandrax and cannabis.</p> <p>Effects of inhaling solvents.</p>	<p>Discussing everyday examples of drug abuse.</p> <p>Prophylactics, alcohol in cough medicine, morphine, valium, antibiotics, drugs which cause problems during pregnancy.</p> <p>Reduced self control, depressant effect on reaction times, damage to liver (cirrhosis) and social implications.</p> <p>Alteration of personality; addictive qualities; withdrawal.</p> <p>Refer to legal, moral, social, ethical and medical implications.</p> <p>Hallucination; reduced self control, damage to heart muscles. Refer to solvents such as solvents in glue and resins.</p>
11.3 Organisms affecting human health	- list the types of organisms which affect human health.	Characteristics of viruses, bacteria, protozoa, fungi	Using bioviewers or photomicrographs.
11.3.1 Viruses	- describe main characteristics of viruses;	<p>Structure.</p> <p>Nutrition.</p> <p>Reproduction.</p>	<p>Non-cellular, no cell wall, no cytoplasm.</p> <p>Parasite.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
11.3.2 Bacteria	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe main characteristics of bacteria; - describe the roles played by bacteria; 	<p>Structure</p> <p>Pathogenic and saprophytic bacteria;</p>	<p>Unicellular with cell wall and DNA, no nuclear membrane;</p> <p>Prepared commercial slides or biosets of bacteria should be studied.</p> <p>Rod, round or spiral shaped.</p> <p>References to the recycling of the nutrients carbon and nitrogen;</p>
11.3.3 Fungi	<ul style="list-style-type: none"> - describe the main characteristics of fungi; - state two fungal diseases; 	<p>Structure.</p> <p>Nutrition.</p> <p>Reproduction:</p> <p>Fungal diseases.</p>	<p>Mycelium of thread like hyphae, no chloroplasts, oil droplets.</p> <p>Observing of bread mould using hand lens and/or microscope.</p> <p>Saprophytic or parasitic storage of starch.</p> <p>Asexual (spore formation) and sexual (zygospore).</p> <p>Athletes foot, ringworm, thrush;</p> <p>Using biosets or photographs to show fungal diseases.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
11.3.4 Protozoa	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe the main characteristics of protozoa; - identify the protozoa which cause malaria and trypanosomiasis; 	<p>Structure.</p> <p>Reproduction.</p> <p>Plasmodium: malaria.</p>	<p>Examining of prepared slides or biosets of unicellular organisms.</p> <p>Unicellular organisms, presence of nucleus.</p> <p>Binary fission, gametes and spore formation.</p> <p>Trypanosoma: Trypanosomiasis. (sleeping sickness)</p>
11.3.5 Nematodes	<ul style="list-style-type: none"> - describe main characteristics of nematodes (roundworm); - describe the effects of intestinal and blood worms, hookworms and filarial on humans; 	<p>Structure.</p> <p>Reproduction.</p> <p>Nutrition</p> <p>Intestinal worms.</p> <p>Ascaris: wasting, bowel blockage, lung damage.</p> <p>Ankylostoma, anaemia.</p> <p>Filarial elephantiasis.</p>	<p>Examining of biosets or photographs of nematodes e.g. hookworms.</p> <p>Using photographs to show diseases.</p>
11.3.6 Flatworms	<ul style="list-style-type: none"> - describe the main characteristics of tapeworm; - describe life cycle of bilharzia parasite; 	<p>Structure.</p> <p>Reproduction.</p> <p>Life cycle.</p>	<p>Examining tapeworms or biosets.</p> <p>Examining charts of life cycle.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
11.4 Transmissible diseases	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe ways in which pathogens are transmitted; - distinguish between pathogen and vector; - distinguish between signs and symptoms. 	<p>Mode of transmission.</p> <p>Vector and pathogen.</p> <p>Signs.</p> <p>Symptoms.</p>	<p>Discussing examples of each mode of transmission.</p> <p>Droplet, contact, vectors, contamination of water and food.</p> <p>Discussing examples of pathogens and vectors.</p> <p>Signs are those indications of a disease that can be seen or measured for example: rash, temperature, cough, bowel movements, pulse rate, vomiting, swelling.</p> <p>Symptoms as that which can only be described by the patient for example: headache, nausea, pain, loss of sensation.</p>
11.4.1 Cholera	<ul style="list-style-type: none"> - describe signs, symptoms and treatment of cholera; - identify the causative agent of cholera; - describe methods of control of cholera. 	<p>Signs and Symptoms.</p> <p>Treatment.</p> <p>Oral rehydration and antibiotics.</p> <p>Vibrio bacterium.</p> <p>Methods of control.</p>	<p>Discussing oral rehydration and antibiotics.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
11.4.2 Sexually transmitted diseases	<p>Students will be able to:</p> <ul style="list-style-type: none"> - state the signs and symptoms of sexually transmitted diseases; - describe effects of sexually transmitted diseases on health and fertility; - explain the spread of sexually transmitted diseases, including HIV and methods by which they may be controlled. 	<p>Signs and symptoms of: Chancroid, syphilis, gonorrhoea and HIV/AIDS.</p> <p>Effects on health and fertility.</p> <p>Transmission and control.</p>	<p>Note that one symptom alone is not necessarily indicative of a particular disease.</p> <p>Discussing the incurability of AIDS and social, moral, medical. Ethical implications. (Include contact tracing).</p>
11.4.3 Tuberculosis	<ul style="list-style-type: none"> - state the signs and symptoms of tuberculosis; - describe methods of transmission and control of tuberculosis. 	<p>Signs and symptoms of tuberculosis.</p> <p>Transmission and control.</p>	<p>Discussing the spread and control of tuberculosis.</p>
11.4.4 Malaria	<ul style="list-style-type: none"> - state the signs and symptoms of malaria; - name the causative agent of malaria; - describe the methods of malaria transmission; - outline the life cycle of an anopheles mosquito; - outline the life cycle of plasmodium; 	<p>Signs and symptoms of malaria.</p> <p>Protozoa: plasmodium.</p> <p>Vector: female anopheles mosquito.</p> <p>Life cycle of a mosquito.</p> <p>Stages in the human body and mosquito.</p>	<p>Using charts to trace development of malaria.</p> <p>Studying the mouth parts using bioviewer, microscope or picture.</p> <p>Examining specimens.</p> <p>Names of specific stages of plasmodium not required.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
	<p>Students will be able to:</p> <ul style="list-style-type: none"> - describe treatment and preventative measures for malaria. 	<p>Treatment: malaria drugs</p> <p>Prevention: prophylaxis, avoidance of mosquito bites.</p>	<p>To include use of mosquito nets, repellents, and breaking the life cycle of the mosquito.</p>
11.4.5 Bilharzia	<ul style="list-style-type: none"> - identify the snail that carries bilharzia; - describe the signs and symptoms of bilharzia; - Name the causative agent of bilharzia; - outline the life cycle of the parasite; - describe methods of controlling spread of parasite. 	<p>Fresh water snail.</p> <p>Signs and symptoms.</p> <p>Schistosoma.</p> <p>Life cycle.</p> <p>Prevention</p> <p>Treatment</p>	<p>Using photographs, diagrams, real specimen of host snail.</p> <p>Examining a photomicrograph or bioset or slides.</p> <p>Discussing sanitary measures.</p>

12.0 CONTROL OF DISEASES

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
12.1 Hygiene	<p>Students will be able to:</p> <ul style="list-style-type: none"> - state the importance of body cleanliness; - explain the importance of food hygiene. 	<p>Body hygiene.</p> <p>Food hygiene.</p>	<p>Discussing the importance of cleaning pubic and anal regions.</p> <p>Discussing methods of preventing contamination of food.</p>
12.2 Sterilisation	<ul style="list-style-type: none"> - define sterilisation; - describe methods of sterilisation; 	<p>Sterilisation.</p> <p>Steam, boiling, autoclave, antiseptics and disinfectants.</p>	<p>Carrying activities to sterilize.</p> <p>Demonstrating the presence of micro-organisms in water, air and food.</p> <p>Carrying out experiments to investigate the effects of disinfectants on bacterial growth.</p>
12.3 Antibiotics	<ul style="list-style-type: none"> - define antibiotic; - describe the use of antibiotics; 	<p>Antibiotics.</p> <p>Treatment for bacterial infections.</p>	<p>Discussing the action of antibiotics.</p> <p>Refer to common bacterial infections.</p> <ul style="list-style-type: none"> - Stress the importance of completion of dosage (resistance).
12.4 Immunity and Immunisation			
12.4.1 Immunity	<ul style="list-style-type: none"> - define immunity to disease; 	<p>Immunity.</p>	<p>Immunity as the ability of an organism to resist attack by antigens or pathogens.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
	<p>Students will be able to:</p> <ul style="list-style-type: none"> - explain how the body protects itself against disease; -define active immunity; - explain immunity in infants; - explain artificial passive immunity. - describe the effects of the human immune deficiency virus (HIV) on the body's immune system. 	<p>Skin, tears, mucus, clotting of blood; white blood cells; engulfing action and production of antibodies.</p> <p>Infection leading to antibody production. Vaccination.</p> <p>Transfer of antibodies.</p> <p>Injection of serum containing antibodies. Inability to resist infection.</p>	<p>Active immunity as resistance the body offers due to production of antibody as a result of a secondary attack; Illustrated by tuberculosis natural immunity. Recovery from disease; artificial immunity through BCG injection.</p> <p>Transfer from mother via placenta or breastmilk. Discuss the use of milk formulae to feed babies.</p> <p>Passive immunity as resistance acquired when ready-made antibodies are transferred to an individual. Passive immunity as illustrated by immunity to tenants through injection of immune serum.</p> <p>HIV and immune system.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
12.4.2 Immunisation	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define immunisation; - explain the importance of immunisation; - describe the child immunisation programme. 	<p>Immunisation.</p> <p>Immunisation programme.</p>	<p>Examining child immunisation cards.</p> <p>Discussing an extended programme of immunization. Occasional problems that occur as a result of immunization. Tuberculosis, polio, tetanus, measles, whooping cough, diphtheria and hepatitis B.</p>

13.0 COMMUNITY ENVIRONMENTAL HEALTH

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
13.1 Sewage and garbage disposal	<p>Students will be able to:</p> <ul style="list-style-type: none"> - define sewage; - define garbage; - explain the dangers of leaving sewage and garbage exposed. 	<p>Sewage.</p> <p>Garbage.</p> <p>Diseases from vectors, run off into water supply.</p>	Examining wastes from the home.
13.1.1 Small scale disposal	<ul style="list-style-type: none"> - describe the design and function of a Blair toilet. - describe the function of the water closet and septic tank; 	<p>Vent pipe.</p> <p>Fly screen.</p> <p>Spiral superstructure.</p> <p>Avoidance of contaminating sources of water and odour.</p> <p>Odour trap.</p> <p>Decomposition pit.</p> <p>Soak away.</p>	<p>Pupils should examine a model of a Blair toilet.</p> <p>Examining water closet, septic tank and soak away.</p>
13.1.2 Large scale disposal	<ul style="list-style-type: none"> - describe the part played by settlement ponds in treatment of sewage; - describe the large scale treatment of sewage; - state the part played by micro-organisms in sewage treatment. 	<p>Micro-organism.</p> <p>Biological filter, activated sludge.</p> <p>Decomposition of wastes.</p>	<p>Visiting large scale sewage works.</p> <p>Mention should be made of food chain in biological filter.</p>

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
13.2 Water	Students will be able to: - explain the importance of clean safe water;	Absence of pathogens and pollutants.	Observing micro-organisms in water using bioviewer or microscope;
13.2.1 Small scale water treatment	- compare the purity of water from various sources; - explain the need for protecting water supplies; - state the reasons for boiling water for drinking;	Sources of water:- Well, borehole, tap, roof run off, dam, river. Destruction of micro-organisms.	Carrying out experiments to show presence of soluble and insoluble substances in various sources of water. Correct siting of wells and latrines. Refer to air ventilated toilets and spread of cholera. Carrying out milk souring test for water purity;
13.2.2 Large scale water treatment	- explain the main stages in large scale purification of water from rivers and dams;	Slow sand filter, rapid sand filter, chemical treatment. Large scale water purification.	Using a flow chart to show the process of water purification. Visiting water purification plants.
13.3 Pollution	- define pollution; - describe the causes and effects of pollution.	Pollution. Causes and effects of pollution.	Observing examples of pollution. Identifying causes and effects of pollution. Agricultural, industrial and social activities resulting in pollution of air, soil and water. Effects of pollution to include acid rain, destruction of ozone layer and global warming.
13.3.1 Water pollution	- describe the causes and effects of water pollution.	Causes of water pollution. Effects of water pollution.	Visiting areas showing water pollution.

TOPIC	LEARNING OBJECTIVES	CONTENT	NOTES AND ACTIVITIES
13.3.2 Air pollution	<p>Students will be able to:</p> <ul style="list-style-type: none"> - state the toxic components of motor exhaust fumes and their harmful effects. 	<p>Air pollutants and their effects:- carbon monoxide, lead, nitrogen oxide.</p> <p>Chloroflourocarbons, asbestos.</p>	<p>Observing exhaust and industrial fumes.</p> <p>Economics of lead in the petrol, brain damage in children and effect on asthmatics should be discussed.</p> <p>Discussing asbestosis, ozone layer destruction and global warming.</p>