THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION AND CULTURE

BIOLOGY SYLLABUS FOR SECONDARY SCHOOLS

FORM I– IV

2005

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1.0 INTRODUCTION

This new Biology syllabus is a revised version which has been prepared to replace that of 1996. The revision process has been focused on change in paradigm from that of content based to a competence based curriculum. Moreover some basic content of the phased out bias subjects and cross cutting issues have been integrated in this syllabus.

2.0 OBJECTIVES OF EDUCATION IN TANZANIA

The general aims and objectives of education in Tanzania are to:

(a) guide and promote the development and improvement of the personalities of the citizen of Tanzania, their human resources and effective utilization of those resources in bringing about individual and national development;

(b) promote the acquisition and appreciation of the culture, customs and traditions of the people of Tanzania;

(c) promote the acquisition and appropriate use of literacy, social, scientific, vocational, technological, professional and other forms of knowledge, skills and attitudes for the development and improvement of the condition of man and society;

(d) develop and promote self-confidence and an inquiring mind, understanding and respect for human dignity, human rights and readiness to work hard for self advancement and national development;

(e) promote and expand the scope of acquisition, improvement and upgrading of mental, practical, productive and other skills needed to meet the changing needs of industry and the economy;

(f) enable every citizen to understand and uphold the fundamentals of the National Constitution as well as the enshrined human and civic rights, obligations and responsibilities;

(g) promote love for work, self and wage employment and improved performance in the production and service sectors.

3.0 OBJECTIVE OF SECONDARY EDUCATION

In Tanzania, secondary education refers to post primary formal education offered to the learners who successfully complete seven years of primary education and have met the pre-requisite entry qualifications for secondary education.

The aims and objectives of secondary education are to:

(a) consolidate and broaden the scope of baseline ideas, knowledge, skills and attitudes acquired and developed at the primary educational level;

(b) enhance the development and appreciation of national unity,

identity and ethic, personal integrity, respect for human rights, cultural and moral values, customs, traditions and civic responsibilities and obligations.

(c) promote linguistic ability and effective use of communication skills in Kiswahili and English;

(d) provide opportunities for the acquisition of knowledge, skills, attitudes and understanding in prescribed or selected fields of study;

(e) prepare students for tertiary and higher education, vocational, technical and professional training;

(f) inculcate a sense and ability for self-study, self-confidence and self-advancement in new frontiers of science and technology, academic and occupational knowledge and skills;

(g) prepare the students to become responsible members of the society.

4.0 GENERAL SUBJECT COMPETENCES

By the end of four year course, the student should have ability to:

1. make appropriate use of biological knowledge, concepts, skills and principles in solving various problems in daily life.
2. record, analyze and interpret data from scientific investigations using appropriate methods and technology to generate relevant information in biological science.
3. demonstrate knowledge and skills in combating health related problems such as HIV/AIDS, drug and drug abuse, sexual and reproductive health.
4. access relevant information on biological science and related fields for self study and life-long learning.

5.0 GENERAL SUBJECT OBJECTIVES

By the end of this four years course, the student should be able to:

1. evaluate the role, influence and importance of biological science in every day life.
2. develop the capacity to improve and maintain their own health, of families and the community.
3. develop mastery of fundamental concepts, principles and skills of biological science and related fields such as agriculture, medicine, pharmacy and veterinary.
4. develop necessary biological practical skills.
5. apply scientific skills and procedures in interpreting various biological data.
6. acquire basic knowledge and apply appropriate skills in combating problems related to HIV/AIDS/STIs, gender,

population, environment, drugs/substance abuse, sexual and reproductive health.

7. develop the ability and desire for self study, self confidence and self advancement in Biological sciences and relate fields.

6.0 STRUCTURE AND ORGANIZATION OF THE SYLLABUS

This Biology syllabus has a slightly different structure and organization compared to that of 1996. The current syllabus content has been organized into seven (7) columns instead of four (4). The columns consist of the Topic, Sub-topic, Specific Objectives, Teaching and Learning Strategies, Teaching and Learning resources, Assessment and the Number of Periods. This content is preceded by class level competences and class level objectives for each Form.

6.1 Class Level Competences

Class level competences have been derived from the general subject competences and objectives. Competences have been stated for each class level of Biology course. Competences are skills, knowledge and attitudes attained by the learner after the learning process.

6.2 Class Level Objectives

Class level objectives have been derived from class level competences. They are stated in general terms to indicate the scope of content to be covered within each level.

6.3 Topics

The first column on the left hand side of the syllabus content contains the main topics to be taught at each level. The topics have been derived from the class level competences and objectives. Topics have been arranged to attain logical order starting from the simple to complex. Both block and spiral arrangements of topics have been adopted.

6.4 Sub-topics

Every main topic in the syllabus is divided into several sub topics. They are presented in the second column. The subtopics are presented in the third column beside their respective main topics in the first column. The subtopics are organised sequentially and presented based on conceptual development of the learners.

6.5 Specific Objectives

There are specific objectives suggested for every subtopic in the syllabus. They are presented in the third column. These are benchmarks upon which the teacher targets to tailor his/her instruction to enable learners to meet the prescribed knowledge, skills and spelt out in each objective. The specific objectives are instructional objectives that the teacher should use to operationalize the teaching and learning process for the respective topics in the syllabus. The specific objectives also provide basis for assessment of learners' achievement.

6.6 Teaching and Learning Strategies

Teaching and learning strategies are presented in the fourth column. These are activities of the teacher and learners during the teaching and learning process of a particular subtopic. The teaching and learning strategies are focused to ensure achievement of the respective specific objectives under each subtopic.

However, caution is given that teachers should not adopt wholesale all the suggested teaching and learning strategies. They can formulate others in addition or replace some according to existing realities in their environment. Teachers are also advised to use participatory teaching and learning strategies as much as possible to help learners to demonstrate self esteem, confidence and assertiveness.

6.7 Teaching and Learning Resources

Teaching and learning resources are presented in the fifth column. They include non-consumable teaching aids and materials as well as consumable materials. The teaching and learning resources are those which are to be used during the teaching and learning process for each respective subtopic. Teachers can improvise teaching and learning resources other than those suggested in the syllabus where need arises.

6.8 Assessment

An Assessment guide is given to teachers in the sixth column. It shows what and how to assess students with regard to the required knowledge, skills and attitudes to be developed for each specific objective and respective set of teaching/learning strategies.

6.9 Number of Periods

Column seven constitutes the suggested number of periods per each sub topic. The number of periods has been taken into consideration the length of the sub-topic to be taught. Teachers are advised to strictly adhere to the framework of the allocated time so that teaching does not lag behind. Lost instructional time should always be compensated without fail.

6.10 Instructional Time

This syllabus is to be covered in flour (4) academic years having approximately 194 instructional days per year including two weeks reserved for mid year and annual examinations.

The number of periods for teaching this syllabus is 4 periods of 40 minutes each per week. The teacher is advised to make maximum use of time allocated for classroom interaction. Lost instructional time should always be compensated for.

Ricky A. Mpama
Chief Education Officer,
Ministry of Education and Culture

FORM ONE

CLASS COMPETENCES

By the end of Form One, the student should have the ability to:

1. make use of scientific procedures and practical skills in studying biology.
2. demonstrate appropriate use of biological knowledge, concepts, principles and skills in every day life.
3. group organisms according to their similarities and differences.
4. demonstrate appropriate preventive measures and precautions against common accidents, infections and other related health problems.

CLASS OBJECTIVES

By the end of Form One Course, the student should be able to:

1. develop basic knowledge and skills on scientific processes of studying biology.
2. develop mastery for carrying out experiments on various biological processes.
3. develop appropriate use of biological knowledge, concepts, principles and skills in every day life.
4. promote ability to communicate using biological terms and vocabularies.
5. classify living organisms in their respective kingdoms and phyla/divisions.
6. apply appropriate health precautions and measures against common accidents, infections and other health problems as well as protecting others.

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
1.0 INTRODUCTION TO BIOLOGY	1.1 Basic Concepts and Terminologies of Biology.	The student should be able to: 1. explain the meaning of basic biological concepts and terminologies.	i) Students in groups to discuss the basic biological concepts and terminologies such as life, cell living things/ organisms. ii) The teacher to use students responses to make clarification on basic biological concepts and terminologies.	• Texts extracted from various sources on basic biological concepts and terminologies. • A variety of living and non-living things. • Preserved organisms	Is the student able to explain the meaning of the basic biological concepts and terminologies?	6
		2. outlinethe characteristics of living things	i) Students in groups to discuss the characteristics of living things. ii) The teacher to guide students to summarize their responses and make conclusion.	•Chart/ Diagrams showing the characteristics of living things • Variety of living things	How accurately can the student outline the characteristics of living things?	
		3. explain the importance of studying biology.	i) The teacher to lead students to brainstorm using Visualization in Participatory Programme Cards (VIPP) on the importance of life, living things and studying biology.	• VIPP cards • Pictures • Variety of living organisms	Can the student clearly explain the importance of studying Biology?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students in groups to discuss the importance of studying biology.			
		4. relate biological science with other related fields.	i) The teacher to guide students to discuss in groups the relationship between biology and other science fields such as agriculture, medicine, veterinary science, nutrition, forestry and pharmacy.	• Magazines • Journals on Biological science and related fields.	How precise can the students relate biology with other science fields such as agriculture, medicine, veterinary, forestry and pharmacy?	
	1.2 Scientific Processes in Biology	The student should be able to: 1. use own sense organs to make correct observations.	i) The teacher to assign simple activities that will lead the students in using various sense organs to observe different conditions/situations in the surroundings. ii) Students to carry out simple activities and use their sense organs to make correct observations of different conditions /situation in the surroundings.	• Variety of living and non-living materials e.g. hot water, ice, colourful pictures, perfume, bell/whistle, plants, animals, stone, wood, preserved specimen.	Can the student carry out simple activities using sense organs to make correct observations?	10

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	1.2 Scientific Processes in Biology	The student should be able to: 1. use own sense organs to make correct observations	i) The teacher to assign simple activities that will lead the students in using various sense organs to observe different conditions/situations in the surroundings. ii) Students to carry out simple activities and use their sense organs to make correct observations of different conditions /situation in the surroundings.	• Variety of living and non-living materials e.g. hot water, ice, colourful picture, perfume, bell/whistle, plants, animals, stone, wood, preserved specimen.	Can the student carry out simple activities using sense organs to make correct observations?	10
		2. take measurements of mass, length, temperature and pulse rate.	i) The teacher to provide guidelines, materials, apparatus and equipment for measuring mass, length, temperature and pulse rate. ii) Students in pairs to take measurements of different substances, record their findings and present in class for discussion.	• Tapes • Thermometers • Weighing Scales • Stop watch • Rulers • Various objects such as boxes, stone, flour, sugar, water. • Real objects	How accurately can the student carry out practical exercises to measure mass, length, temperature and pulse rate?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. carry out simple Biological experiments.	i) The teacher to guide students to carrying out simple biological experiments sueh as observing specunen using a handlens, investigating habitats of different organisms, observation of various types of leaves. ii) Students in groups using guidelines to carry out simple biological experiments, record, analyse and accurately present their findings.	• Specimens • Apparatus • Equipment • Practical Manuals • Organisms • Soil	Can the student carry out simple biological experiments?	
	1.3 The Biology Laboratory	The student should be able to: - 1. describe the Biology Laboratory.	i) The teacher to lead students to describe the biology laboratory and laboratory rules. ii) Students to make familiarization tour in a biology laboratory to observe its common features and discuss laboratory rules.	• A variety of biology laboratory tools. • List of biology laboratory rules,	Is the student able to describe the common features of the Biology Laboratory?	8
		2. distinguish the biology laboratory from other school facilities.	(i) The teacher to organize a study visits to other school facilities e.g library, chemistry and physics laboratories, classroom, and stores.	• Laboratories • Library • Classrooms • Any other school facilities	Can the student differentiate biology laboratory from other school facilities?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			(ii) Students in groups to discuss the differences between biology laboratory and other facilities in the school (e.g. library, Chemistry and Physics laboratories, classrooms, stores).			
		3. interpret warning signs on containers of laboratory chemicals and apparatus.	i) Students in groups to observe and discuss the laboratory chemicals and apparatus warning signs. ii) The teacher to use students' responses to make clarification and conclusion.	• Wall charts and pictures showing warning signs • Containers collected by the teacher and students	Is the student able to interpret correctly warning signs on containers of laboratory chemicals and apparatus?	
		4. identify common apparatus and equipment of Biology laboratory.	i) The teacher to assist students to identify and name common apparatus and equipments of biology laboratory such as microscope, glass ware, dissecting kit, Bunsen burner, thermometer. ii) The teacher to lead a class discussion on the structure and use of the microscope iii) Students to demonstrate on how to use the microscope.	• A variety of biology laboratory apparatus and equipment. • Microscope • Microscope slides • Some tools or equipments collected by the students	Can the student identify common apparatus and equipment of biology laboratory?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
2.0 SAFETY IN OUR ENVIRONMENT	2.1 First Aid	The student should be able to: 1. explain the meaning and importance of First Aid at home and at school.	(i) Students in groups to brainstorm on the meaning and importance of First Aid at home and school. (ii) The teacher to lead class discussion and make clarification on the meaning and importance of First Aid at home and at school.	• Publications on First Aid.	Is the student able to explain the meaning and importance of First Aid Kit at home and at school?	8
		2. identify components of the First Aid Kit and their uses.	i) Students to observe and identify components of first Aid kit. ii)The teacher to lead a class discussion on the components of First Aid kit and their uses.	• First Aid Kit • Charts on components of First Aid Kit and their uses.	Can the student identify components of the First Aid Kit and their uses?	
		3. outline procedures of giving First Aid to various victims.	i) Students to brainstorm on ways of giving first aid to various victims. ii)The teacher to provide guidelines on "Procedures of giving First Aid to various victims", Risks and Safety Precautions.	• First Aid Kit • Charts on First Aid • Components of First Aid Kit • Stretcher. • Blanket • Wheel chair • Other relevant materials.	How accurately can the student outline proper procedures of giving First Aid to various victims?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) Students to carry out a guided practice of giving first aid to victims of insect bite, bruises, and snakebite, muscle cramps, vomiting, bleeding, and electric shock.			
		4. render first aid services to various victims.	i) Students in groups to design and practice procedures of giving First aid to various victims such as victims of bruises, snakebite and insect bites, electric shock, bleeding, vomiting, muscle cramps, hiccups and poisoning. ii) The teacher to follow up the students' practices/ exercises and makes appropriate clarifications and corrections.	• Fist Aid Kit • Clean Water • Soap • Blanket • Sand • Other relevant materials.	How accurately can the student demonstrate different ways of giving First Aid to various victims?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	2.2 Safety at Home and School	The student should be able to: 1. mention common accidents at home and school.	i) The teacher to lead a class discussion on common accidents at home and school. ii) The students to give examples of common accidents at home and school.	• Variety of things that can cause accident at home and school. • Knife • Kerosene. • Fire. • Medicine	Is the student able to mention common accidents at home and school	6
		2. outline ways of preventing accidents at home and school.	i) The teacher to lead students to brainstorm on ways of preventing accidents at home and school. ii) The teacher to collect proper responses from the students and make clarification.	• Variety of things that causes accident at home and school. • Kerosene • Fire • Medicine	Can the student outline proper ways of preventing accidents at home and school?	
		3. explain ways of maintaining safety at home and school	i) Students to brainstorm on ways of maintaining peace and safety at home. ii) The teacher to use students responses to give clarification on ways of maintaining peace and safety at home and school.	• Kerosene • Fire • Medicine	Is the student able to explain ways of maintaining peace and safety at home and school?	

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	2.3 Waste Disposal	The student should be able to: 1. explain the terms "waste" and waste disposal.	(i) Students to brainstorm on the meaning of waste and waste disposal. (ii) The teacher to use students' responses to make clarification and conclusion.	• Samples of waste (paper, plastics, glass, vegetation). • Pictures/ photographs of dumped waste.	Can the student clearly explain the meaning of waste and waste disposal?	10
		2. identify types of waste.	(i) The teacher to arrange a study tour to a nearby dumping site for students to observe different types of waste. (ii) Students to classify waste according to their physical state. (iii) The Teacher to assign group work to students of classifying waste produced at home, school and industry according to the living and non living components.	• Liquid waste • Solid waste • Plastics and non-plastic waste. • Pictures /diagram showing variety of wastes. • Dumping sites • Dust bin • Sewage system	Is the student able to identify different types of waste?	
		3. Outline basic principles of waste disposal.	i) Students in groups to discuss the basic principles of waste disposal. ii) The teacher to lead class discussion on basic principles of waste disposal according to local authority regulations.	• Textbooks • Local Authority, Health regulations • Publications on Waste Management • Assorted waste	How accurately can the student outline basic principles of waste disposal at home and school?	

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		4. demonstrate proper ways of disposing waste.	i) The teacher to guide a practical session of classifying waste into recycled and non-recycled. ii) Students to demonstrate proper ways of disposing waste.	• Assorted waste into recycled and non-recycled. • Waste bins • Shovels and holes • Gloves and other protective gears • Water and soap	Can the student demonstrate proper ways of disposing waste?	10
		5. explain effects of poor waste disposal.	i) The teacher to present a case study of uncontrolled waste disposal in a locality. ii) Students in small groups to brainstorm on effects of poor waste disposal. iii) The teacher to lead students to discuss in a plenary session the effects of poor waste disposal and the importance of disposing waste properly.	• Text on case study. • Publications on waste disposal. • Any relevant materials and books.	Is the student able to outline the effects of poor waste disposal at home and school? Can the student explain the importance of disposing waste properly at home and school?	
		6. suggest proper ways of disposing waste in the surrounding community.	i) The teacher to guide students to make a simple survey on how waste is disposed in their community.	• Dust bin • Dumping sites		

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	3.1 The Concept of Health and Immunity	The student should be able to: 1. explain the concepts of Health and Immunity.	i) Students to brainstorm on the concepts of health and immunity. ii) The teacher to organize the students' responses and use them to lead a discussion on the definitions of health and immunity.	• Charts / pictures/photographs showing people with good health	Is the student able to explain the concepts of "health" and "immunity"?	4
		2. mention types of body immunity and their importance.	i) Using questions and answers, the teacher to explore what students know about body immunity. ii) The teacher to lead class discussion on types of body immunity (natural and induced) and their importance.	• Text extract on body immunity. • Samples of vaccines.	How accurate can the student mention types of body immunity and their importance?	
		3. state factors which affects body immunity.	i) Students to brainstorm on factors which affect body immunity. ii) The teacher to use student responses to make necessary clarifications and conclusion.	• Charts on health and body immunity • Samples of vaccines.	Can the student state factors affecting body immunity?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	3.2 Personal Hygiene and Good Manners	The student should be able to:- 1. explain concepts of 'Personal Hygiene' and 'Good Manners'.	(i) Students in groups to discuss the meaning of personal hygiene and good manners. (ii) The teacher to make clarifications and conclusion basing on students responses.	• Pictures showing people with characteristics of good manners.	Is the student able to explain the concepts of personal hygiene and good manner?	6
		2. outline principles of personal hygiene and good manners.	i) The teacher to lead a class discussion on the principles of personal hygiene. ii) Students to outline principles of personal hygiene and good manners.	• Chart on principles of personal hygiene and good manners.	How accurately can the student outline principles of personal hygiene?	
		3. mention requirements of personal hygiene and good manners.	i) Students to brainstorm on the ways of taking care of the body and clothes. ii) Students demonstrate on ways of taking care of the body and clothes.	• Pictures/charts showing varieties of towel, soap, comb, brush,, tooth brush, basin. • Pictures/charts showing the characteristics of good manners.	Can the student mention requirements of personal hygiene and good manners?	

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	3.2 Personal Hygiene and Good Manners	4. outline ways of maintaining proper personal hygiene during puberty.	i) Students in groups to discuss proper ways of maintaining personal hygiene during puberty. (ii) The teacher to make clarification and conclusion on healthy and life styles by focusing on drugs, diet, sexual behaviour, soaps and cosmetics.	• Posters Film and pictures showing effects of drugs on users. • Samples of good types of cosmetics and soaps.	Ils the student able to outline ways of maintaining proper personal hygiene during puberty?	6
		5. explain the importance of personal hygiene and good manners.	i) The teacher to lead a discussion on the characteristic features of good manners. ii) Students in groups to discuss the importance of good manners.	• Wall pictures and charts depicting people with characteristics of good manners. • Films • Educational slides.	How accurately can the student explain the importance of personal hygiene and good manners?	
	3.3 Infections and Diseases	The student should be able to: 1. explain the meaning of the terms infection and disease.	i) Students in groups to discuss the meaning of infection and disease. ii) The teacher to lead plenary discussion on the meaning of infection and disease and their differences.	• Texts on case studies on infections and diseases. • Charts/ Pictures of people suffering from common infections and diseases.	Is the student able to give the proper meaning of "Infection" and "Disease"?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. mention common infections and diseases	i) Students to brainstorm on the common infections and diseases (Communicable/Non communicable, epidemic, endemic and pandemic diseases). ii) Teacher to tabulate the students' responses, summarize them and make conclusions by giving examples such as: • Epidemic diseases e.g cholera, meningitis, tuberculosis and plague. • Endemic diseases e.g bilharzias, malaria, gonorrhea and syphilis. • Pandemic diseases e.g HIV/AIDS.	• Charts and pictures on common infections and diseases.	Is the student able to mention common infections and disease?	
		3. explain the causes, symptoms, mode of transmission and effects of common infections and diseases.	(i) The teacher to guide students in investigating the common infections and diseases in their community.	• Charts on common infections and diseases.		

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to visit local health facility to investigate the causes, symptoms and effects of common infections and diseases. iii) Students using guiding questions to analyse their findings and share their work in a plenary session and the teacher to make clarification and conclusion	• Pictures showing people with common infections/diseases. • Video/radio tapes on causes, symptoms, modes of transmission, and effects of common infections and diseases.	I. Is the student able to investigate causes, symptoms, mode of trasmission and effects of common infections and diseases?	
		4. suggest appropriate preventive and control measures for common infections and diseases	i) Students using guidelines to carry out a survey on the common diseases in the community and write reports. ii) The teacher to guide students to present their reports in the plenary and guide them to summarize and make conclusions on appropriate measures to be taken to control the spread of common epidemic, pandemic and endemic diseases.	• Charts • Journal articles on common epidemic, pandemic and endemic diseases.	Is the student able to suggest appropriate preventive and control measures for common infections and diseases?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	3.4 Human Immuno deficiency Virus (HIV) Acquired Immune Deficiency Syndrome (AIDs), Sexually Transmitted Infections (STIs) and Sexually Transmitted Diseases (STDs).	The student should be able to: 1. explain the meaning of HIV/AIDS, STIs and STDs.	i) The teacher to guide students in groups to discuss the meaning of HIV/AIDS, STIs, and STDs. ii) The teacher to guide students to present group tasks for plenary discussion and guide them in making necessary corrections.	• Pamphlets • Brochures • Charts/texts on HIV/AIDS/ STIs.	Is the student able to give the proper meanmg of "HIV/AIDS", "STIs" and "STDs"?	6
		2. explain causes, symptoms, mode of transmission and effects of HIV/AIDS, STIs and STDs.	i) Students to brainstorm on causes, symptoms, ways of transmission and effects of HIV/AIDS, STDs and STIs. ii) The teacher to invite a guest speaker to talk on causes, symptoms, mode of transmission, effects, preventive and control measures of STIs and HIV/AIDS. iii) The teacher to guide students to summarize the major points from the guest speaker's speech/presentation.	• Pictures • Charts • Brochures and fliers.	Can the student correctly explain the causes, symptoms, mode of transmission and effects of STIs and HIV/AIDS?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. outline the preventive and control measures of HIV/AIDS, STIs and STDs	i) By using questions and answers, the teacher to guide students to outline the preventive and control measures of HIV/AIDS, STIs and STDs. ii) Students to summarise major points and the teacher to guide them to make clarification and conclusion.	• Charts • Magazines • Journal/ articles on STIs and HIV/AIDs. • Radio/Video tapes. • Films.	Can the student correctly outline preventive and control measures of STIs and HIV/AIDS?	
	3.4Management of STIs and HIV/AIDS.	The student should be able to: 1.explain ways of avoiding risky situations, risky behaviours and practices.	i) The teacher to guide students to discuss in groups ways of avoiding risky situations, behaviours and practices. ii) Students to present group deliberations in plenary and the teacher to guide them in making necessary corrections.	• Magazines • Brochures/ fliers on ways of avoiding risk behaviours and practices.	Is the student able to explain ways of avoiding risky situations, risky behaviours and practices?	6
		2.demonstrate necessary skills for avoiding risky behaviours, practices and situations.	i) Students using guidelines to role-play on how to use various life skills to avoid risky situation, behaviours and practices. ii) The teacher to guide students to discuss the major effects and consequences shown in the role-play and make conclusions.	• Pamphlets • Charts/pictures showing risky behaviours, practices and situations.	How accurate can the student demonstrate necessary skills for avoiding risky behaviours, practices and situations?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. outline the importance of curative health care for STIs and opportunistic diseases.	i) The teacher to lead students to brainstorm on the importance of curative health care for STIs and opportunistic diseases e.g. early health care seeking habit, the importance of early medical testing and treatment. ii) The teacher to invite a health officer to talk on necessary curative health cares and services for STIs and opportunistic diseases. iii) The teacher to guide students to summarize the major ideas from the above presentation.	• Pamphlets • Brochures • Radio/Video tapes • Pictures showing health care for STIs and opportunistic diseases.ns.	Is the student able to explain the importance of curative health care for STIs such as early health care seeking habit?	
	3.5 Care and Support of People Living with HIV/AIDS (PLWHA)	The student should be able to: 1. explain the importance of providing care and support to PLWHA in the family, community and at school.	i) The teacher to lead students through questions and answers to explain the importance of providing care and support to PLWHA in the family, community and school. ii) The teacher to guide students to summarize the major ideas and points on the importance of providing care and support to PLWHA.	• Publications on home based care for PLWHA. • Any other, relevant materials. • Pictures showing how to take care of PLWHA.	Is the student able to explain the importance of providing care and support to people living with HIV/AIDS (PLWHA) in the family, community and at school?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. outline necessary care and support services to be provided to PLWHA in the family, community and at school.	i) The teacher to guide students to discuss in groups the necessary care and support services to be provided to PLWHA in the family and at school. ii) Students to present their responses for plenary and the teacher to guide them in making any necessary corrections and clarification. o Manuals on care and support for PLWHA.	• Manuals on care and support for PLWHA • Film/Video tapes on care and support services to PLWHA.	How accurately can the student outline necessary care and support services to be given to PLWHA?	
		3. explain the effects of discrimination and stigma to people living with HIV/AIDS to the Individual, family and society.	i) The teacher to provide case studies on the various incidences of stigma and discrimination and their effects to an individual, family and the society. ii) Students in groups to discuss the case studies, make correct interpretations and present their responses for plenary discussion and the teacher to sum up.	• Pamphlets/ Brochures on stigmatization and discrimination of PLWHA. •Pictures/photographs on incidences of discrimination and stigma to PLWHA.	Can the student explain the effects of discrimination and stigma and their effects to PLWHA?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
4.0 CELL STRUCTURE AND ORGANISATION	4.1 The Concept of Cell	The student should be able to: 1. explain the meaning of the cell	i) The teacher to lead students to discuss in groups the meaning of cell. ii) Students to present their responses for plenary discussion.	• Charts/models showing different types of cells	Does the student know the meaning of the cell?	4
		2. mention the characteristics of the cell.	(i) Students in groups to discuss the characteristics of the cell. (ii) The teacher to lead a class discussion on the characteristics of the cell .	• Charts/models of different types of cells. • Prepared slides on different types of cells.	Is the student able to mention correctly the characteristics of the cell?	
		3. differentiate various types of cells.	i) The teacher to design practical work for students to observe different types of cells. ii) Students in groups to observe and differentiate various types of cells, prepared microscope slides, charts, and models of different cell types. iii) The teacher to lead a class discussion on various cell types.	• Charts/ models/pictures of different types of cells • Prepared microscope slides showing different types of cells. • Microscope • Stains • Scalpels.	Can the student examine and differentiate various types of cells?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2.explain the functions of different parts of plant and animal cells.	i) Using guiding questions students in groups to observe charts/models/slides of plant and animal cell and discuss the functions of different parts. ii) The teacher to lead a class discussion on functions of different parts of a plant and animal cell.	• Microscope • Microscope slides • Stains • Scalpels • Charts / Diagrams Models/Pictures/Micrographs	Is the student able to explain functions of different parts of plant and animal cells?	
		3.draw and label plant and animal cell.	i) The teacher to guide students on how to prepare slides, charts and models of plant and animal cells. ii) Students to draw and label plant and an animal cell.	• Chart / micrographs/ microscope slides of plant and animal cells.	Can the student draw well labeled diagrams of plant and animal cells?	
		4.outline similarities and differences of plant and animal cells.	(i) Students in groups to observe and discuss displayed charts, models, slides and pictures of plant and animal cell. (ii) The teacher to lead a class discussion on the similarities and differences of plant and animal cell.	• microscope slides/charts showing plant and animal cells.	Is the student able to compare and contrast plant and animal cells?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	4.3 Cell Differentiation	The student should be able to: 1. explain the concept of cell differentiation.	i) The teacher to display fresh /preserved specimen/ charts/models of plant and animal tissues and organs. ii) Students in groups to observe the displayed tissues and organs of plants and animals. iii) The teacher to lead class discussion on the meaning of tissues, organs and body systems.	• Fresh preserved specimen of different tissues. • Charts/models of plant and animal tissues and organs.	Is the student able to explain the meaning of cell differentiation? Can the student explain the importance of cell differentiation?	
		2. outline the importance of cell differentiation and formation of tissues, organs and body systems.	i) The teacher to lead a class discussion on the importance of cell differentiation and formation of tissues, organs and body systems. ii) Students to outline the importance of cell differentiation and formation of tissues, organs and body systems.	• Fresh / preserved specimen/charts/models of plant and animal tissues and organs.	Is the student able to outline the importance of cell differentiation and formation of tissues organs and body system?	
		3. differentiate cells, tissues, organs and body systems.	(i) The teacher to lead a discussion on the formation of tissues, organs and body systems and differences existing between them.	• Charts/models of plant and animal tissues and organs.	How accurately can the student differentiate tissues, organs and body systems?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			(ii) Students to differentiate cells, tissues, organs and body systems.			
5.0 CLASSIFI -CATION OF LIVING THINGS	5.1 Concept of Classification	The student should be able to 1. explain the concept of classification	i) The teacher to organize study visit to places where items are systematically grouped (laboratory, school library, nearby shop, nearby market, pharmacy). ii) Students in groups to discuss on how various items are grouped systematically.	• Library • Laboratory • Nearby shop • Pharmacy. • Market	Is the student able to explain the meaning of the term classification? Can the student explain the importance of classification?	6
		2. group living things according to their similarities and differences.	i) Students to collect variety of living things ii) The teacher to design practical work for students to observe and group a variety of organisms according to their similarities and differences. iii) Students to group living things according to their similarities and differences.	• Pictures • Photographs of various organisms. • A variety of living and non-living things.	How accurately can the student group living things according to their similarities and differences?	

TOPIC	SUB-TOPIC	SPICIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. explain the importance of classifying living things.	i) Students to brainstorm on the importance of classifying living things. ii) The teacher to summarise students' responses and make necessary clarification and conclusion.	• Charts on classification of organisms. • Pictures/ photographs of various organisms • Preserved or live specimen of living things.	Can the student explain the importance of classifying living things?	
	5.2 Classification Systems	The student should be able to: 1. outline types of classification systems and their differences.	i) The teacher to lead students to brainstorm on classification systems. ii) Students in groups to discuss types of classification and their differences.	• A variety of living things • Chart/pictures of a variety of living things.	Is the student able to outline types of classification systems?	4
		2. explain merits and demerits of each type of classification system.	i) Students to brainstorm on the merits and demerits of each type of classification system. ii) The teacher to summarise students' responses and give conclusions.	• Charts/pictures of a variety of living things. • Preserved/live specimen of living things	How accurately can the student outline the merits and demerits of each classification system?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. carry out practical activities of classifying living things according to artificial and natural classification systems.	i) The teacher to design simple practical work on grouping living things using each classification system. ii) Students to carry out practical exercise on classification of organisms basing on artificial and natural classification systems.	• A variety of living organisms. • Chart/pictures of variety of living things and non- living things.	Is the student able to classify living things according to artificial and natural classification systems?	
	5.3 Major Groups of Living Things	The student should be able to: 1. mention major groups of living things.	i) The teacher to lead a class discussion on the major groups. ii) Students to observe various living things and put them into their major groups.	• A variety of living organisms • Charts/pictures of variety of living things	Can the student mention major groups of living things?	2
		2. outline ranks of classification.	i) Students to observe representative of living things and discuss their ranks ii) The teacher to lead a class discussion on the ranks of classification.	• Representative samples of each group of living things.	How accurately can the student outline the ranks of classification?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3.carryout practical activities of grouping organisms into their respective major groups	i) The teacher to design practical work on grouping organisms into their respective major groups. ii) Students to carry out practical activities of grouping organisms into their respective major groups.	• Chart/pictures of variety of living things. • Representative organisms of each group of living things.	Is the student able to group organisms into their major groups?	
	5.3.1 Viruses	1.explain general and distinctive features of viruses.	i) Students in groups to observe charts/models/pictures of viruses and record their physical characteristics. ii) The teacher to lead a class discussion on the general and distinctive features of viruses.	• Charts and micrographs of viruses.	Is the student able to explain general and distinctive features of viruses?	4
		2. describe the structure of viruses.	i) Students in groups to observe charts/models/pictures of viruses. ii) The teacher to lead a class discussion on the structures of viruses. iii) Students to draw and label the diagram of viruses.	• Charts and micrographs of viruses.	Is the student able to describe the structure of viruses?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3.outline advantages and disadvantages of viruses.	i) The teacher to lead students to brainstorm on the advantages and disadvantages of viruses. ii) Students to outline the advantages and disadvantages of viruses.	• Charts and micrographs of viruses. • Extracts/ texts on characteristics of viruses.	Is the student able to explain the advantages and disadvantage of viruses.?	
	5.3.2 Kingdom Monera	The student should be able to 1.explain general and distinctive features of the Kingdom Monera.	i) Students in groups to observe charts/models/pictures of representative organisms of the kingdom Monera (Bacteria) and record the observable features. ii) The teacher to lead a class discussion on the general and distinctive features of Bacteria.	• Charts/models/ pictures of Bacteria.	How accurately can the student explain general and distinctive features of the Kingdom Monera'?	10
		2. describe structures of the representative organisms of the kingdom Monera.	i) Students in groups to observe charts/models/pictures of Bacteria and identify their structures. ii) The teacher to guide students to draw a well labeled diagram of Bacteria.	• Charts/ models/pictures of Bacteria	Can the student describe the structures of Bacteria'?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. outline the advantages and disadvantages of the Kingdom Monera	i) The teacher to lead students to brainstorm on the advantages and disadvantages of bacteria. ii) The teacher to record the students' responses and make relevant clarifications. iii) Students to outline advantages and disadvantages of bacteria.	• Samples of antibiotics • Charts/models/ pictures of Bacteria. • Yoghurt • Cheese • Root nodules of leguminous plants • Samples of antibiotics.	How accuratcley can the student outline advantages and disadvantages and disadvantages of bacterial?	
		4. Outline the characteristics of pathogenic and non-pathogenic bacteria	i) Students in groups to discuss the characteristics of pathogenic and non pathogenic bacteria. ii) The teacher to lead students on the characteristics of pathogenic and non-pathogenic bacteria	• Charts/Models pictures of Bacteria • Yoghut Cheese • Root includes leguminous plants	Is the student able to outline the characteristics of pathogenic and non-pathogcnic bacteria?	
	5.3.3 Kingdom Protoctista	The student should be able to: 1. explain general and distinctive features of the kingdom Protoctista.	i) Students in groups to observe charts/models/pictures of Amoeba, Euglena and Paramecium. ii) The teacher to lead a class discussion on the general and distinctive features of the kingdom Protoctista.	• Charts/models/ pictures/live or preserved specimen of Amoeba, Euglena and Paramecium • Microscope	Is the student able to explain general and distinctive features of the kingdom Protoctista'?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. mention phyla of the kingdom Protoctista.	i) Student to observe charts/models/pictures/live or preserved specimen of Amoeba, Euglena and Paramecium. ii) The teacher to guide students to group organism according to their similarities and differences and state their phyla.	• Charts/models/ pictures/live or preserved specimen of Amoeba, Euglena Paramecium and Plasmodium.	Can the student mention phyla of the kingdom protoctista?	
		3. describe structures of Amoeba, Plasmodium Euglena and Paramecium	i) Students to observe charts/models/pictures/specimen of Amoeba, Euglena Paramecium and Plasmodium. ii) The teacher to lead students to identify structures of Amoeba, Euglena Paramecium and Plasmodium. iii) Students to draw and label the diagram of Amoeba, Euglena Paramecium and Plasmodium.	• Charts/models/ pictures/live or preserved specimen of Amoeba, Euglena, Plasmodium and Paramecium	Is the student able to describe the structures of Amoeba, Euglena, Paramecium and Plasmodium?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. explain the advantages and disadvantages of Amoeba. Euglena Paramecium and plasmodium	i) The teacher to lead students to brainstorm on the advantages and disadvantages of representative organisms under the kingdom Protoctista. ii) Students to outline advantages and disadvantages of Amoeba. Euglena and Paramecium	• Charts/models/ pictures/specimens of Amoeba, Euglena and Paramecium and Plasmodium	How accurately can the student explain the advantages and disadvantages of Amoeba, Euglena Paramecium and Plasmodium?	

FORM TWO

CLASS COMPETENCES

By the end of Form Two, the student should have the ability to:

1. make appropriate use of basic biological concepts, principles and skills to evaluate the roles of various physiological processes in plants and animals.
2. demonstrate use of biological practical skills in studying various physiological processes in plants and animals.
3. group organisms according to their similarities and differences
4. appreciate nature and ensure sustained interaction of organisms in the natural environment.
5. demonstrate appropriate use of biological principles and skills in solving health related problems.

CLASS OBJECTIVES

By the end of Form Two the student should be able to:

1. acquire basic knowledge, concepts, principles and skills in evaluating the roles of various physiological processes in animals and plants.
2. apply appropriate skills in processing, preserving and storing food.
3. apply biological practical skills in studying physiological processes in plants and animals
4. classify organisms in their respective Kingdoms and Phyla/Divisions.
5. develop positive attitudes towards proper use of natural heritage and management of the environment for sustainable development.
6. apply appropriate biological principles and skills in solving various health related problems.

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
1.0 CLASSIFICATION OF LIVING THINGS	1.1 Kingdom Fungi	The student should be able to: 1. explain the general and distinctive features of the Kingdom Fungi.	i) The teacher to guide students in groups to observe the collected samples /diagrams/pictures and discuss the general and distinctive features of the Kingdom Fungi. ii) Students to share their group findings with others in plenary discussion and the teacher to clarify misconceptions and make general comments.	• Yeast • Mucor • Mushrooms • Molds • Pictures/charts of common Fungi	Is the student able to explain the general and distinctive features of the Kingdom Fungi?	4
		2. state the phyla of the Kingdom Fungi	i) The teacher to guide students through questions and answers to list down the phyla of the Kmgdom Fungi such as Ascomycota (yeast), Zygomycota (Mucor), Basidiomycota (Mushroom). ii) Students to record and summarize major points on the phyla of the Kingdom Fungi.	• Charts/diagrams of organisms under the Kingdom Fungi • Yeast • Mucor • Mushrooms	Can the student clearly state the phyla of the kingdom Fungi.?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. describe the structures of the representative organisms of each phylum (Yeast, Mushroom and Mucor).	i) The teacher to display samples/pictures/diagrams of organisms in each representative phylum of the Kingdom Fungi for students to observe and discuss their general and distinctive features. ii) Students in groups to record their responses and report in plenary discussion.	• Chart/diagrams pictures of yeast, Mucor and Mushroom • Yeast • Mucor • Mushrooms	Can the student clearly describe the structures of the representative organisms of the Kingdom Fungi?	
		4. outline advantages and disadvantages of the kingdom Fungi	i) The teacher to lead students to brainstorm on the advantages and disadvantages of the Kingdom Fungi. ii) Students to synthesize their responses and outline advantages and disadvantages of the Kingdom Fungi. iii) The teacher to lead a class discussion on the advantages and disadvantages of the Kingdom Fungi.	• Samples of yeasts, Mucor and Mushroom	How accurately can the student outline advantages and disadvantages of the Kingdom Fungi.?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	1.2 Kingdom Plantae	The student should be able to 1. explain general and distinctive features of the Kingdom Plantae	i) Students in groups to observe variety of plants or parts of the plant and discuss the general and distinctive features of the Kingdom Plantae. ii) The teacher to lead a class discussion on the general and distinctive features of the Kingdom Plantae.	• Variety of plans	Is the student able to explain the distinctive and general features of the Kingdom Klantae.'?	2
		2. state the divisions of the Kingdom Plantae	i) The teacher to lead a class discussion on the divisions of the Kingdom Plantae. ii) Students to record the major points and list down the divisions of the Kingdom Plantae.	• Chart on the divisions of the Kingdom Plantae	How accurately can the student state the divisions of the Kingdom Plantae.	
	1.2.1 Division Bryophyta	The student should be able to: 1. explain general and distrinctive features of the division Bryophyta.	i) Students in groups to observe plants, pictures diagrams or photographs of organisms belonging to the division Bryophyta and discuss the general and distinctive features. ii) Students to present their group work in plenary discussion and the teacher to make necessary clarifications.	• Texts/extracts on distinctive features of the division Bryophyta. • Moss plants. • Pictures or photographs showing variety of plants.	Is the student able to explain the general and distinctive features of Bryophytes?	2

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. describe the structure of Mosses	i) The teacher to prepare guidelines on the characteristic features of Mosses. ii) Students to discuss in groups using guidelines provided and describe the characteristic features of Mosses. iii) Students to draw well labeled diagrams of Mosses.	• Samples of Mosses. • Pictures/ Diagrams showing the structures of and Mosses.	Can the student describe the structures of Mosses?	
		3. outline advantage and disadvantages of Mosses	i) The teacher to lead a class discussion on the advantages and disadvantages of Liverworts and Mosses. (ii) Students to record and summarize the major points on the advantages and disadvantages of Mosses.	• Samples of Liverworts and Mosses	How accurately can the student outline advanateges and disadvantages of Mosses?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	1.2.2 Division Filicinophyta (Pteridophyta)	Students should be able to: 1. explain general and distinctive features of the division Filicinophyta	i) The teacher to guide students in groups to observe variety of organisms belonging to the division Filicinophyta the and discuss their general and distinctive features ii) Students to share their group findings with others in a plenary discussion and the teacher to make necessary clarifications.	• Ferns • Charts / diagrams/pictures of Ferns	Is the student able to explain general and distinctive features of the division Filicinophyta?	2
		2. describe the structure of Ferns	i) Students in groups to discuss the structures of ferns and draw well labeled diagrams. ii) The teacher to lead a class discussion on the structures of Ferns and make general comments on students drawings.	• Chart/pictures showing the structure of ferns. • Samples of fern	Can the student describe the structure of Ferns?	
		3. outline advantages and disadvantages of Ferns.	i) The teacher to lead a class discussion on the advantages and disadvantages of Ferns. ii) Students to record and summarize major points.	• Samples of Fern	How accurately can the student outline advantages and disadvantages of Ferns?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
2.0 NUTRITION	2.1 Concepts of Nutrition and Food Nutrients	The student should be able to : 1. explain the concepts of nutrition and food nutrients	i) The teacher to guide students to brainstorm on the meaning of nutrition and food nutrients. ii) Students to synthesize their responses and record the major points. iii) The teacher to guide students to summarize their responses and make clarifications.	• Charts displaying different food substances. • A variety of food substances.	Is the students able to explain the concepts of nutrition and food nutrients ?	2
		2. outline the importance of nutrition in living thmgs.	i) Students in groups to discuss the meaning of nutrition, food nutrients and the importance of nutrition in living things. ii) The teacher to lead a plenary discussion and make necessary corrections and clarifications.	• Charts displaying different food substances. • A variety of food substances.	Can the student outline the importance of nutrition and food nutrients in living things?	
	2.2 Nutrition in Mammals 2.2.1 Human Nutrition	The student should be able to: 1. identify different types of food substances and their functions in human body	i) Students in groups to observe variety of food substances/charts/pictures showing different food substances and list down different types of food substances.	• A variety of food substances • Charts/pictures displaying different food substances.?	Is the student able to identify different types of food substances and their functions in human body?	8

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead a class discussion on different types of food substances displayed and their functions.			
		2. explain the concept of balanced diet in terms of food quantity and quality.	i) The teacher to lead class discussion on the meaning of balanced diet in terms of food quality and quantity. ii) The teacher to guide students to brainstorm on the importance of balanced diet.	• Charts/ pictures showing variety of balanced diets • A variety of food substances.	Can the student explain the concept of balanced diet in terms of food quality and quantity?	
		3. explain nutritional requirement for different groups of people.	i) Students in groups to discuss nutritional requirements of different groups of people (expectant and lactating mothers, children, the elderly, the sick, sedentary workers and people living with HIV/AIDS). ii) Students to present group tasks for plenary discussion; the teacher to assist them in making necessary corrections and clarifications.	• A variety of food substances. • Charts/ pictures /photographs of different groups of people and their nutritional requirements.	Is the student able to explain the nutritional requirements for different groups of people?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. outline different types of Nutritional deficiencies and disorders in human beings.	i) The teacher to display pictures/ photographs charts showing different groups of people with nutritional deficiencies and disorders. ii) Students to observe the displayed photographs/charts and outline types of nutritional deficiencies and disorders in human such as marasmus, kwashiorkor, obesity and anorexia nervosa (slimmer's disease).	• Photographs/ charts/picture showing different groups of people with nutritional deficiencies and disorders. • Magazines/ Journals on nutritional deficiencies and disorders in human beings.	Is the student able to outline nutritional deficiencies and disorders in human being?	6
		5. explain the causes, symptoms, effect and control measures of nutritional deficiencies and disorders in human beings.	i) Students using given guidelines to discuss in groups the causes, symptoms, effects, and control measures of nutritional deficiencies and disorders in human. ii) Students to present the group tasks in plenary discussion and the teacher to assist them in making necessary corrections and conclusion..	• Photographs/ charts showing different groups of people with nutritional deficiencies and disorders. • Articles on nutritional deficiencies and disorders.	Is the student able to explain causes, symptoms, effects and control measures of nutritional deficiencies and disorders in human being?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	2.2.2 Digestive system in Human	1. identify parts of the human digestive system and their adaptive features.	i) Students in groups to observe pictures diagrams/models/ specimen showing parts of the digestive system and identify parts of the digestive system of human and draw. A well labelled diagram of the human digestive system. ii) Using guiding questions students in groups to discuss meaning of digestion, major parts of the digestive system and their adaptive features.	• Models/charts/ diagrams of the Human digestive system • Mouse • Dissecting kit • Dissecting tray/dissecting board • Chloroform • Cotton wool • Water • Trough	Can the student identify parts of the human digestive system and their adaptive feature?	8
		2. explain the digestion process in human being.	i) The teacher to guide students in groups to discuss the process of digestion in human and the roles of different enzymes. ii) Students to present group tasks for plenary discussion and the teacher to guide them to make necessary corrections.	• Models/charts/ diagrams of the human digestive system. • Articles from journals on digestion process in human.	Can the student explain the process of digestion in human?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACH NG/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. Compare the human digestive system with that of other mammals.	i) The teacher to guide students to identify different parts of the digestive system of the ruminants. ii) Students in groups to discuss the differences between the digestive system of ruminants and that of human	• Models/ charts / diagrams of the human and ruminant. digestive systems. • Extract from Journals/magazines on digestion process	Can the student compare the human digestive system with that of other mammals?	
		4. outline common disorders and diseases of the human digestive system.	i) Students in groups to discuss common disorders and diseases of the digestive system in human (Such as dental caries, heart burn, intestine ulcers, constipation and flatulence) ii) The teacher to lead a class discussion on the common disorders and diseases of the human digestive system.	• Charts / photographs showing common disorders/diseases of the human digestive system. • Video/film on diseases and disorders of the human digestive system	Can the student outline the common disorders and diseases of the human digestive system?	
		5. explain causes, symptoms, effects and control measures of common disorders and diseases of the human digestive system	i) Student in groups to discuss causes, symptoms, effects and control measures of common disorders and diseases of the human digestive system.	• Charts •Video/film on common disorders of the human digestive system.		

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to invite a guest speaker (health specialist) to talk on causes, symptoms, effects and control measures of the common disorders/diseases of the digestive. iii) Students to summarise major points from the guest speaker's presentation and the teacher to guide them to generate major points and make conclusions.	• Chart/pictures showing disorders of the digestive system.	How accurately can the student explain the causes, symptoms, effects and control measures of common disorders/diseases of the digestive system in human being?	
	2.3 Nutrition in Plants 2.3.1 Mineral Requirements in Plants.	The student should be able to: 1. mention essential mineral elements in plant nutrition	i) The teacher to lead students to brainstorm on essential mineral elements in plant nutrition (Nitrogen, phosphorous, potassium, magnesium, calcium, sulphur and iron). ii) Students in groups to observe charts/ samples of fertilizers and list the essential mineral elements in plant nutrition. iii) The teacher to guide students to make group presentation and make necessary clarifications.	• Samples of inorganic and organic fertilizers. • Chart showing types of organic and in organic fertilizers	Can the student mention essential mineral elements in plant nutrition?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. investigate the roles of essential mineral elements in plant nutrition.	i) The teacher to display plants pictures/ photographs showing problems associated with nutrients availability for students to observe and discuss the roles, excess and deficiency symptoms of essential mineral elements. ii) The teacher to lead class discussion on the roles, excess and deficiency symptoms of the essential mineral elements in plant nutrition. iii) The teacher to guide students in groups to set up small plot field experiment to investigate effects of exeess and deficiency supply of essential mineral elements in plants iv) Students to make progressive observations and record results. v) The teacher to lead a class discussion on interpreting results of the experiments and make conclusions.	• Inorganic fertilizers • Hand hoes • Watering can • Water • Measuring tape • Charts /photographs showing healthy plants, plants with excess and deficiency symptoms of essential mineral elements	How accurately can the student investigate the roles of essential mineral elements in plant nutrition? Can the student explain the symptoms of excess and deficiency of essential mineral elements in plant nutrition?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	2.3.2 Photosynthesis	The student should be able to: 1. explain the concept of photosynthesis	i) The teacher to lead students to discuss in groups the meaning and importance of photosynthesis. ii) Students to present group task, summarize correct responses and make conclusion.	• Charts / diagrams/ drawings on photosynthesis of process.	Is the student able to explain the meaning and importance of photosynthesis?	
		2. describe the structure of the leaf in relation to photosynthesis.	i) Students to observe the displayed models/charts/ diagrams/ prepared slides showing the internal and external structure of the leaf. ii) The teacher to guide students to prepare slides showing a traverse section of a leaf under a microscope and draw well labeled diagram of the internal and external structures of a leaf.	• Models/ charts/ diagrams slides showing the internal structures of a leaf • Microscope • Microscope slides • Stains • Razors/knife • Leaves e.g. Hibiscus leaf/beans leaf/cassava leaf	Can the student describe the external and internal structures of a leaf in relation to photosynthesis? Is the student able to draw well labeled diagrams of the internal and external structures of a leaf?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. explain the process of photosynthesis	i) The teacher to lead students in groups to discuss the process of photosynthesis. ii) The teacher to guide students in groups to design and conduct experiments to verify raw materials, conditions and products of photosynthesis (carbon dioxide, water, chlorophyll, sunlight energy, oxygen and starch). iii) Students in groups to analyze experimental results and share their responses in plenary discussion.	• Opaque paper • Clips • Water • Ethanol • White tile • Iodine solution • Variegated leaves • Flasks • Sodium Hydroxide • Cotton wool • Beakers • Leaves • Wooden splint • Funnels • Pond weed e.g. Elodea • Bunsen burner, stover, charcoal, wood.	Is the student able to explain the process of photosynthesis?	
		4. outline the importance of photosynthesis in the real life situation	i) The teacher to lead students through questions and answers to explain the importance of photosynthesis in the real life situation. ii) Students to synthesize their responses and record major points on importance of photosynthesis in the real life situation.	• Chart/drawings on photosynthesis process • Variety of plants. Variety of storage organs of plants.	Is the student able to outline the importance of photosynthesis in the real life situation?	

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	2.4 Properties of Food Substances	The student should be able to : 1. mention the basic food substances and their properties.	i) The teacher to display a variety of sources of food substances. ii) Students in groups to classify varieties of the displayed food substances into basic food substances and discuss their properties.	• A variety of sources of food substances such as eggs, a piece of cassava/ potatoes, a piece of sugar cane, coconut, ground nuts, cooking oil, an onion bulb.	Is the student able to mention the basic food substances and their properties?	6
		2. identify common reagents and chemicals used to determine food properties.	i) The teacher to display to students reagents and chemicals used to determine food properties. ii) The teacher to lead a class discussion on the types and usc of the reagents and chemicals in the determination of food properties.	• Iodine solution. • Sudan III • Benedicts solution • Dilute HCl • NaOH • Copper (II) Sulphate solution.	Can the student identify each of the common reagents and chemicals used to determine food properties? Is the student able to outline chemicals and reagents that are used in food tests for starch, non and reducing sugars, lipids and proteins respectively?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. carryout food tests for reducing sugars, non reducing sugars, starch, proteins and lipids (fats and oil).	i) The teacher to demonstrate to students how to carry out food test experiments for different sources of food. ii) Students in groups to carry out food test experiments on starch, reducing sugar, non-reducing sugar, lipids and proteins. iii) Students to report their experimental findings in plenary discussion and the teacher to wrap up.	• Test tubes • Test tube holders • Dropper • Source of heat • Test tube rackers • Sudan III • NaOH • Dilute HCl • Knife/scapel • Eggs • Cassava/ potatoes/ maize flour • Sugar cane • Ground nuts • Coconut • Onions • Cooking oil	Is the student able to carryout experiments on food tests for reducing sugars, non reducing sugars, starch, proteins and lipids?	
	2.5 Food Processing, preservation and Storage.	The student should be able to : 1. explain the concepts of food processing, food preservation and food storage.	i) The teacher to lead students to brainstorm on the concepts of food processing, preservation and food storage. ii) Students to organize their responses and record the major points. iii) Students in groups to discuss and identify which of the food samples are raw materials, processed and preserved.	• Samples of raw food substances • Samples of processed food substances • Samples of preserved food substances	Is the student able to explain the concepts of food processing, preservation and storage? Can the student identify raw food materials, processed and preserved food materials?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iv) Students to report for plenary discussion and the teacher to make clarifications.			
		2. explain the importance of food processing, food preservation and food storage.	i) Students in groups to discuss the importance of food processing, storage and preservation. ii) Students to present in plenary and the teacher to lead discussion of the presentations.	• Photographs of processed, preserve and stored foods. • Samples of processed, preserved and stored food.	Can the student explain the importance of food processing, preservation and storage?	
		3. investigate various methods of food processing, preservation and storage.	i) The teacher to lead students on a study visit where foods are processed, preserved and stored. ii) Students in groups to discuss and write the report on study visit and make presentations on various methods of food processing, preservation and storage. iii) The teacher make clarification and conclusion.	• A variety of food substances (vegetables, grains, fruits, meat).	Is the student able to describe various methods of processing, preserving and storing food?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. differentiate beween traditional and modern methods of processing, preserving and storing food.	i) The teacher to use questions and answers to guide students to list down modern and traditional methods of processing, preserving and storing food. ii) Students in groups to discuss the differences between traditional and modern methods of processing, preserving and storing food.	• Variety of preserved and processed foods such as fruits vegetables/meat , grains beans and fish. • Pictures photographs showing various preserved and processed foods.	Is the student able to describe the differences between modern and traditional methods of processing, preserving and storing food? Can the student explain the advantages and disadvantages of the traditional and modern methods of processing, preserving and storing food?	
3.0 BALANCE OF NATURE	3.1 The Natural Environment	The students should be able to : 1. explain the concept of natural environment.	i) Students guided by the teacher to visit school compounds and nearby surroundings to observe the major features of the environment surroundings. ii) Students in groups to discuss the natural environment in nearby surroundings.	• Photographs of natural environment e.g natiaonal parks, game reserves, forest, plains, and mountains.	Can the student explain the concept of natural environment? Is the student able to describe the natural environment of various places?	8

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to lead plenary discussion and guide students to summarize the major points make general comments and conclusion.			
		2. describe biotic and a biotic components of the environment.	i) Students in groups to discuss components of the environment' and their characteristics. ii) The teacher to lead plenary discussion and guide students to summarize major points and make clarifications	• Soil • Water • Microorganisms • Insects of different types • Plants • Animals.	How accurately can the student describe biotic and abiotic components of the environment?	
		3. identify various organisms in their natural environment in the community.	i) The teacher to guide students to observe various living and non-living components in their natural habitats, ii) Students to record the observed living and non-living components and present their observations. iii) The teacher to lead a class discussion on the characteristics of the natural environment in their community	• Pictures/charts showing the nature of the environment.	Can the students observe and identify various organisms in their natural environment? How accurately can the student identify the components of natural environment in their community?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. explain the importance of the natural environment.	i) The teacher to guide students through questions and answers to explain the importance of the natural environment. ii) Students to summarize their response and write down the major points.	• Natural habitats of different types (ponds, shrubs, rocky hill and wood land) • Photographs depicting various environments • School surroundings • Video tapes/film.	Is the student able to explain the importance of the natural environment?	
		The student should be able to : 1. identify ways in which living organisms interact with the non living component of the environment.	i) The teacher to organise a field study of different habitats near the school ii) Students to carry out field visit to observe how living organisms interact with the non-living components of the environment.	• Natural habitats of different types (pond, stream, shrub, rock hill and wood land). • Organisms in their natural habitats.	Is the student able to identify ways in which living organisms interact with non-living components of the environment?	
	3.2 Interaction of Organisms in the Environment	2. explain the interaction of organisms among themselves	i) The teacher to lead students to observe interactions among living organisms in their natural habitats. ii) Students in groups to discuss how living organisms interact among themselves and the teacher to guide them in making clarification and conclusion	• Charts / photographs showing various living things in their natural environment.	Can the student explain how living organisms interact among themselves?	6

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	3.3 Food Chain and Food Web	The student should be able to : 1. explain the meaning of food chain and food web.	i) The teacher to organise a study visit to school surroundings, nearby pond river to observe different organisms in their natural environment. ii) Students to observe the organisms in their natural environment and how they obtain their food.	• Organisms in their natural habitats • Charts/pictures showing feeding relationships among organisms	Is the student able to give the meaning of food chain and food web?	8
		2. mention the components of a Food chain and food web	i) The teacher to guide students to discuss on components of a food chain and food web. ii) Students to summarize their responses and write down the major points.	• Chart/ pictures showing feeding relationships among organisms	Can the student correctly list down the components of a food chain and a food web?	
		3. distinguish food chain from food web.	i) The teacher to assign group tasks for students to illustrate food chain and food web by considering organisms in the school or home environment. ii) Students in groups to discuss the differences between food chain and food web.	• Diagrams drawn on the manila sheet showing food chain and food web.	Is the student able to differentiate between food chain and food Web?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) Students to present group tasks in plenary discussion and the teacher to guide them to make necessary clarifications and conclusion			
		4. construct a diagrammatic representation of a food chain and food web.	i) Students guided by the teacher to construct a diagrammatic representation of a food chain and food web using examples from their surroundings. ii) The teacher to lead a class discussion on diagrammatic representation of food chain and food web.	• Variety of organisms • Diagrams, photographs, pictures and charts showing variety of organisms.	Can the student correctly illustrate food chain and food web by considering organisms in their surroundings ?	
		5. explain the significance of food chain and food web in real life situation.	i) The teacher to guide students to establish an acquarium and to observe how different organisms depend on each other. ii) The teacher to lead a class discussion on the significance of food chain and food web in Balance of Nature.	• A chart showing various types of dood chain and food web. • Acquarium	Is the student able to explain the significance of food chain and food web in rcal life situation?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
4.0 TRANSPORT OF MATERIALS IN LIVING THINGS	4.1 The concept of Transport of Materials in Living Things	The student should be able to : 1. explain the concept of transport of Materials in Living Things.	i) The teacher to lead students to discuss in groups the concept of transport of materials. ii) Students to present their group assignments in plenary session and the teacher to guide students to construct the meaning of the concept using their responses.	• Charts / photographs/models showing transport of materials in living things.	How accurate can the student explain the concept of transport of materials in living things ?	2
		2. outline the importance of transport of materials in living things.	i) The teacher to guide students to brainstorm on importance of transport of materials in living things. ii) Students to synthesize their responses and explain the importance of transportation of materials in living things.	• Charts / photographs/models showing transport of materials in living things.	Is the student able to outline the importance of transport of materials in living things?	
	4.2 Diffusion, Osmosis and Mass-flow	The student should be able to : 1. explain the meaning of osmosis, diffusion and mass-flow.	i) The teacher to guide students in groups to discuss the meaning of osmosis, diffusion and mass flow. ii) Students to present group tasks for plenary discussion and the teacher to guide them in making necessary corrections.	• Potassium permanganate, • Water, • Beakers, • Thirstle funnel, • Cellophane paper, • Copper sulphate crystals,	Can the student give accurate definitions of diffusion, osmosis and mass-flow ?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
				• Retort clamp • Retort stand • Perfume • Airfreshner • Variety of flowers and herbs • Napthalene balls		
		2. carry out experiments to demonstrate the process of diffusion osmosis and mass flow.	i) The teacher to demonstrate simple experiments on osmosis diffusion and mass flow. ii) Students in groups to carry out experiments on osmosis and diffusion and record their observations. iii) Students in groups using guiding questions to interpret their findings and make conclusions.	• Irish potatoes, sugar or table salt, water, heat source, petridish or small trough, beaker • Distilled water • Pawpaw • Perfume • Air freshner.	Is the student able to demonstrate experimentally the processes of diffusion and osmosis?	
		3. outline the differences between diffussion, osmosis and mass flow.	i) The teacher to guide students through questions and answers to outline differences between diffusion, osmosis and mass flow.	• Chart/tables on differences between diffusion and osmosis.	Can the student differentiate between diffusion and osmosis?	

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			ii) Students to record the differences between diffusion, osmosis and mass flow.			
		4. explain the roles of diffusion, osmosis and mass flow in movement of materials in living organisms.	i) The teacher to lead students in groups to discuss the roles of osmosis, diffusion and mass flow in movement of materials in living organisms. ii) Students to share their group work in a plenary discussion and the teacher to make clarifications and necessary corrections.	• Models, charts, diagrams of circulatory system.	Can the student explain the roles of diffusion, osmosis and mass flow in movement of materials in living organisms.	
	4.3 Transport of Materials in Mammals 4.3.1 The Structure of the Mammalian Heart.	The student should be able to: 1. describe the external and internal structures of the mammalian heart.	i) Students to observe specimen/model/or charts showing the external and internal structures of the mammalian heart and identify the main structures ii) Students to draw and label the external and internal parts of the mammalian heart from a displayed specimen/model/chart or a drawing.	• Mammalian heart (fresh or preserved specimen) • Diagram/ model/chart of a mammalian heart.	Is the student able to describe the external and internal parts of the mammalian heart?	10

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			iii) The teacher to evaluate students work and give suggestions for improvement.			
		2. explain the functions of the external and internal parts of the mammalian heart.	i) The teacher to guide students through questions and answers to list the external and internal parts of the mammalian heart. ii) Students to discuss in small groups the functions of the external and internal parts of the mammalian heart iii) Students to share their group work in plenary presentation session and the teacher to make clarifications.	• Models/charts of mammalian heart. • Preserved or fresh specimen of mammalian heart.	Can the student explain the functions of the external and internal parts of the mammalian heart?	
		3. explain the adaptations of the parts of the mammalian heart to their functions.	i) Using the provided charts/models and heart specimen, students to discuss in groups the adaptations of parts of the mammalian heart in relation to their functions. ii) The teacher to summarize and make clarifications.	• Charts showing parts of the mammalian heart. • Models of the mammalian heart • Fresh or preserved specimen of the mammalian heart.	Can the student mention parts of the mammalian heart and explain how they are adapted to their function?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. describe the structure of arteries, veins and capillaries.	i) The teacher to guide students to brainstorm on types of blood vessels. ii) Students in groups to observe the charts, diagram or specimen and identify the structures of arteries, veins and capillaries. iii) Students to draw well labeled diagrams of each blood vessel.	• Chart/diagram /model/specimen of the mammalian heart and blood vessels. • Dissected mammal.	Can the student accurately describe the structure of arteries, veins and capillaries?	
		5. distinguish between arteries, veins and capillaries	i) Using the provided charts/diagrams/photographs/models/dissected mammal specimen, students to discuss in groups the differences between blood vessels. ii) Students to tabulate their responses and share them in a plenary presentation session. iii) The teacher to summarize and make clarifications.	• Specimens of dissected mammal with heart and blood vessels. • Charts / diagrams/photographs/models of the mammalian heart and blood vessels. Is the student able to explain the difference between arteries, veins and capillaries?	Can the student identify arteries, veins and capillary blood vessels?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		7. Carry out simple experiments to determine pulse rates in human being.	i) The teacher to guide students in pairs to take pulse rates at the wrist, behind the collar bone, above the left hand side of the breast while at rest and after an exercise. ii) Students to record their findings and share with others in plenary presentation and discussion.	• Stop watches • Recorded pulse rates • Wrist watches • Stethoscope	Is the student able to count own and other person's heart beats correctly?	
	4.3.2 The Blood	The student should be able to : 1. list the major components of the blood.	i) Students to brainstorm on major components of the blood. ii) The teacher to display pictures/photographs/charts showing the components of blood and explain constitutes of the blood. iii) The teacher to allow students questions and provides answers and clarifications.	• Pictures/ photographs/charts on components of the blood. • Charts/models /pictures of the major components of the blood. • Slides showing components of the blood.	Is the student able to list down the major components of the blood?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. explain the functions of major blood components.	i) Students in groups to discuss the structure and functions of the major components of blood. ii) The teacher to lead students group presentations and discussion in plenary.	• Charts/models /photographs of components of the blood. • Slides showing components of the blood.	Is the student able to explain the functions of the major components of blood?	
		3. explain the effects of HIV on white blood cells.	i) The teacher to invite a health specialist to deliver a presentation on effects of HIV on white blood cells. ii) The teacher to guide Students to summarize the major points from the guest speaker's speech and make conclusion.	• Charts / photographs/video depicting effects of HIV on white blood cells. • Photographs/ charts showing emaciated people with full blown HIV/AIDS	To what extent is the student able to explain the effects of HIV on white blood cells (leucocytes)? Can the student explain the end result of the white blood cells being attacked by HIV?	
	4.3.3 Blood Groups and Blood Transfusion.	The student should be able to : 1. explain the concepts of blood group and blood transfusion.	i) Students to observe tables/charts and identify the blood groups and their respective antigens and antibodies. ii) The teacher to lead a class discussion on the concepts of blood group and blood transfusion	• Charts and tables showing blood groups and their respective antigens and antibodies.	How accurate can the student explain the terms blood group and blood transfusion?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
					Is the student able to explain the importance of blood transfusion?	
		2. outline the relationship between blood groups and blood transfusion.	i) The teacher to lead students to discuss the relationship between blood groups and blood transfusion. ii) Students to synthesize their responses and outline the relationship between blood groups and blood transfusion.	• Chart showing blood groups and their respective antibodies and antigens.	How precise can the student explain the relationship between blood groups and blood transfusion?	
		3. explain the advantages and disadvantages of blood transfusion.	i) Teacher to lead students through questions and answers to explain the advantages and disadvantage of blood transfusion. ii) Students to synthesize their responses and categorize them according to similarities. iii) The teacher to summarize, answers students questions and give clarifications	• Pictures/ photographs/charts showing the process of blood transfusion	How accurate can the student explain the advantages and disadvantages of blood transfusion?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. outline precautions to be taken during blood transfusion	i) The teacher to guide students in groups to discuss the precautions to be taken during blood transfusion. ii) Students to share their group work in a plenary presentation session and discussion.	• Charts/pictures /photographs showing the process of blood transfusion.	Is the student able to outline the precautions to be taken during blood transfusion?	
	4.3.4 Blood Circulation	The student should be able to : 1. describe blood circulation in humans.	i) The teacher to lead the students through questions and answers to describe the process of blood circulation. ii) Students to summarize the major points and explain blood circulation in human body. iii) Students to draw a well labelled diagram of the human blood circulatory system	• Map of the circulatory system drawn on the floor or ground. • Chart/ pictures photographs showing blood circulation in human body	Can the student describe the blood circulatory system in human?	4
		2. explain the importance of blood circulation in humans.	i) Using games and simulations, the teacher to guide students to demonstrate the importance of blood circulation in transporting materials.	• Map of the human circulatory system drawn on the floor • Chart of the human circulatory system.	Is the student able to explain the importance of blood circulation in humans?	

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			ii) Students in groups to discuss the importance of blood circulation in humans.	• Model of the blood circulatory system.		
		3. mention disorders and diseases of the human blood circulatory system.	i) Using question and answer the teacher to lead the students to mention the disorders and diseases of the human blood circulatory system diabetes and sickle cell anaemia, Leukemia and blood pressure (B.P). ii) Students to synthesize their responses and summarize the major points on diseases and disorders of the human circulatory system.	• Chart/diagram on human circulatory system	How accurately can the student mention disorders and diseases of the human blood circulatory systems?	
		4. outline the causes, symptoms and effects and control/measures of the disorders and diseases of the human blood circulatory system.	i) The teacher to guide students in groups to discuss the causes, symptoms and effects of human blood circulatory system.	• A chart on human showing disorders associated with blood circulatory system.	Can the student outline the causes, symptoms and effects of the disorders and diseases of the human blood circulatory system?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to share their work in plenary presentations and discussion and the teacher to guide them to correct misconceptions and make clarifications	• Chart and documents on preventive and control measures of the blood circulatory disorders and diseases.	Can the student explain the preventive and control measures of blood circulatory disorders and diseases ?	
		5. carry out practical exercises to measure human pulse rate and blood pressure	i) The teacher to provide guidelines, materials, and equipments for meaning pulse rate and blood pressure. ii) Students in pairs to take measurements of pulse rate and blood pressure record their findings and present in class for discussion	• Materials and equipments for measuring pulse rate and blood pressure	Can the student carry out practical exercise to measure pulse rate and blood pressure?	
	4.3.5 The Lymphatic System	The student should be able to: 1. explain the concept of lymphatic system.	i) The teacher to lead students through questions and answers to describe the concept of lymphatic system.	• Chart on lymphatic system. • Diagrams/ drawings on the lymphatic	How accurately Can the student correctly explain the term lymphatic system?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to record the major points on the meaning of lymphatic system and the teacher to clarify		Can the student correctly explain the importance of lymphatic system in mammal?	
		2. describe the components of the human Lymphatic system .	i) The teacher to guide students in groups to describe the structure and functions of the lymphatic system. ii) Students to draw well labelled diagram of the lymphatic system in human.	• Chart/diagrams of human lymphatic system.	Is the student able to describe the lymphatic system in humans?	
		3. mention the common disorders and diseases of the lymphatic system.	i) The teachers to guide students through question and answers to discuss the disorders and diseases of the lymphatic system. ii) Students to summarize their responses and list down common disorders and diseases of the human lymphatic system.	• Pictures or charts showing the common disorders and diseases of the lymphatic system.	Is the student able to mention the common disorders and diseases of the human lymphatic system?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. explain causes, symptoms, effects and prevention of disorders and diseases of the human lymphatic system.	i) The teacher to guide students in groups to discuss the causes, symptoms and effects of disorders and diseases of the lymphatic system (such as Oedema. ii) Students to present their group responses in plenary discussion the teacher to make clarifications where necessary.	• A table drawn on the manila sheet on the causes, symptoms and effects of disorders and diseases of the human lymphatic system.	How correctly can the student explain the causes symptoms, effects and prevention of disorders and diseases of the lymphatic system?	
	4.4 Transport of Materials in Plants 4.4.1 The Vascular System	The student should be able to : 1. explain the concept of vascular system.	i) The teacher to display diagrams or mounted slides on transverse sections of the root, stem and lead. ii) Students to draw and label the transverse section of root, stem and leaf of a monocot and dicot. iii) The teacher to lead a discussion on vascular system in flowering plants basing on the observed diagrams or slides.	• Microscope • Mounted slides • Diagrams of vascular system of the root, stem and leaf of flowering plants	Is the student able to explain the concept of the vascular system in plants?	2

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. describe components of vascular system.	i) The teacher to set up and demonstrate an experiment to students on distribution of vascular system in plants. ii) Students in groups to carry out an experiment to investigate the distribution of vascular system in plants. iii) Students to draw and label the distribution of vascular system in monocot and dicot roots stems and leaves. iv) The teacher to lead class discussion on the distribution of vascular system in plants.	• Maize • Sunflower • Microscope • Slides • Stains	Can the student describe the components of vascular system in plants?	
		3. explain the functions of vascular system in plants.	i) The teacher to guide students to discuss on the functions of phloem and xylem tissues. ii) The teacher to guide students to carry out experiments to demonstrate upward and downward movement of materials in xylem and phloem.	• Potted plants • Colored water • Ringed plant • Charts / diagrams showing movement of materials in xylem and phloem tissues	How precisely can the student explain the functions of vascular system in plants?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) Students guided by the teacher to discuss their experimental. findings draw conclusions and share their work in a plenary session.			
	4.4.2 Absorption and Movement of Water and Mineral Salts in Plants.	The student should be able to : 1. explain the functions of root hairs in absorption and movement of water and mineral salts in plants.	i) The teacher to guide students in groups to observe and discuss root hairs on germinated seeds. ii) Students to draw the diagram of a root hair from their observation. iii) Students in groups to discuss the functions of root hairs.	• Germinated seeds • Damp cloth • Hand lens	Is the student able to explain the absorption and movement of water and mineral salts in plants?	6
		2. outline the movement of water and dissolved mineral salts in plants.	i) Teacher to display diagrams/charts/models on the movement of water and dissolved minerals from the from the soil into the root hair. ii) Students to draw and label the diagram showing the movement of water from the root hairs to the xylem cells.	• Diagram of plant root showing root hairs.	Can the student outline the movement of water and dissolved mineral salts in plants?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. Conduct experiments to demonstrate transpiration pull, root pressure and capillarity	i) The Teacher to guide students in groups to carry out experiments to demonstrate root pressure transpirational pull and capillarity. ii) Students to record their observations discuss in groups and draw conclusions. iii) The teacher to lead plenary discussion and make any necessary clarification	• Potted plants • Knife • Two bell jars • Dry soil • Cobalt chloride or anhydrous copper sulphate • Two glass, plates • Petroleum jelly • Cellophane paper.	Is the student able to demonstrate experimentally root pressure,transpiration pull and capillarity?	
		4. explain the concept of transpiration	i) Students in groups to discuss the meaning of transpiration. ii) The teacher to make clarifications and conclusion	• Potted plant • Picture/charts showing the process of transpiration	Is the student able to explain the concept of transpiration?	
		5. outline the significance of transpiration in plants.	i) Teacher to lead students through question and answers to outline the significance of transpiration in plants ii) Students in groups to discuss the significance of transpiration in plants	• Potted plant • Pictures/charts showing the transpiration process.	Can the student outline the significance of transpiration in plants?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		6. outline factors affecting the rate of transpiration in plants.	i) The teacher to guide students in groups to carry out an experiment to investigate the effects of transpiration in plant. ii) Students in groups to record their observations and share their group task with others in plenary presentations and discussion. iii) The teacher to lead a plenary discussion and make necessary clarifications.	• Leafshoot • Rubber tubing • Glass tubing • Mercury • Beaker • water	Is the student able to outline factors affecting the rate of transpiration in plants?	
5.0 GASEOUS EXCHANGE AND RESPIRATION	5.1 The Concept of Gaseous Exchange	The student should be able to : 1. identify organs responsible for gaseous exchange in living organisms.	i) The teacher to guide students in groups to examine sites of gaseous exchange in different organisms. ii) Students in groups to perform practical exercise on examination of gaseous exchange sites in different organisms. iii) The teacher to lead a plenary discussion on sites of gaseous exchange in different organisms.	• Samples of organisms such as insects, fishes amphibians and small mammals. • Variety of leaves e.g elodea leaf. • Hand lens • Microscope.	Is the student able to examine and identify gaseous exchange sites in different organisms?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. explain the concept of gaseous exchange	i) The teacher to guide students to brainstorm on the meaning and importance of gaseous exchange. ii) Students to summarize and record correct responses given by different individuals.	• Variety of living organisms • Charts/ diagrams/ pictures of organisms showing sites of gaseous exchange.	How correctly can the student explain the concept of gaseous exchange in living things?	
	5.2 Gaseous Exchange in Mammals	The students should be able to : 1. identify parts of the respiratory system.	i) The teacher to dissect a mammal and display the structure of the respiratory system. ii) Students to observe the structure of the respiratory system and identify its major parts. iii) The teacher to lead a class discussion on the parts of the respiratory system.	• A dissected mammal e.g mouse • Dissecting kit • Chloroform • Dissecting tray/bowl • Thread • Water • Chart/diagram of respiratory system.	Is the student able to identify parts of the respiratory system?	6
		2. describe the features of different parts of the respiratory system and their adaptive features.	i) The teacher to guide students to discuss in groups the features of different parts of the respiratory system of a mammal. ii) Students to present their group tasks for plenary discussion and then to guide them in making clarifications and conclusion.	• Models / Diagrams or chart of the respiratory system.	How accurately can the student describe the features of different parts of the respiratory system of a mammal?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
					Can the student explain how different parts of the respiratory system are adapted to their role?	
		3. describe the mechanism of gaseous exchange in mammals.	i) Students to discuss in group the breathing mechanism in human. ii) The teacher to guide students in groups to demonstrate inhalation and exhalation processes and illustrate the major parts involved.	• Charts / diagrams models on respiratory system.	Is the student able to describe the process of breathing in human? Can the student show the major parts of the body that are involved in inhalation and exhalation?	
		4. describe gaseous exchange across the alveolus.	i) Students in to observe diagrams/pictures/drawings showing gaseous exchange across the alveolus and draw the diagrams of alveoli. ii) The teacher to lead a class discussion on structures of the alveolus and explain how gaseous exchange takes place across the alveolus.	• Pictures or • Diagrams showing an alveolus of the hung.	Can the student describe gaseous exchange across the alveolus?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		5. outline factors affecting gaseous exchange in mammals.	i) The teacher to guide students in groups to outline factors affecting gaseous exchange in mammals. ii) Students to discuss in groups the factors affecting gaseous exchange in mammals and present their findings in the plenary and summarize major points.	• Pictures/charts showing gaseous exchange in mammals.	Can the student outline factors affecting gaseous exchange in mammals?	
	5.3 Gaseous Exchange in Plants	The student should be able to : 1. identify parts of plant responsible for gaseous exchange.	i) The teacher to organise a simple field study around the school compound for students to observe different parts of the plant responsible for gaseous exchange. ii) Students to discussion the parts of the responsible for gaseous exchange.	• Hand lens • Charts/pictures/ diagrams on gaseous exchange in plants • Plant leaves and shoots	Is the student able to identify part of plants responsible for gaseous exchange?	4
		2. describe the process of gaseous exchange in plants	i) The teacher to lead class discussion on the process of gaseous exchange in a leaf.	• Charts/ diagrams/pictures showing the process of gaseous exchange in a leaf.	How precisely can the student describe the process of gaseous exchange in plants?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to summarize and record important points on the process of gaseous exchange and draw the transverse section of a leaf.	• Pictures/charts showing gaseous exchange in mammals.		
		3. explain the importance of gaseous exchange in plants.	i) The teacher to guide students in groups to discuss the importance of gaseous exchange in plants. ii) Students to present group tasks in plenary discussion and the teacher to make necessary clarifications.	• Charts/ diagrams/ pictures showing the process of gaseous exchange in plants.	Is the student able to explain the importance of gaseous exchange in plants?	
	5.4 Respiration	The student should be able to : 1. explain the concept of respiration.	i) Students to brainstorm on the meaning of respiration. ii) The teacher to summarize the correct responses and make conclusion.	• Diagrams/ charts models on the process of respiration	Is the student able to explain the concept of respiration?	2
		2. mention types of respiration	i) The teacher to lead a class discussion on the types of respiration in living things. ii) Students in groups to discuss and summarize the types of respiration.	• Extracts of articles from journals/magazines on the types of respiration	Can the student correctly mention types of respiration?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	5.4.1 Aerobic Respiration	The student should be able to : 1. explain the concept of aerobic respiration.	i) Students in groups to discuss the meaning of aerobic respiration.. ii) The teacher to lead a class discussion on the meaning and importance of aerobic respiration.	• Charts/ diagrams models on the process of aerobic respiration Is the student able to explain the meaning of aerobic respiration?	Is the student able to explain the concept of respiration?	6
		2. outline the mechanism of aerobic respiration	i) The teacher to lead students through question and answers to explain the mechanism of aerobic respiration. ii) Students to discuss summarize and record major ideas.	• Charts/ diagrams on aerobic respiration	Can the student outline the mechanism of aerobic respiration?	
		3. carry out experiments on aerobic respiration.	i) The teacher to lead students in groups to carry out experiments to identify the products of aerobic respiration. ii) Students in groups to record the experimental findings and share with others in plenary presentation and discussion.	• Flasks • Seeds e.g. pea seeds • Thermometers • Cotton wool • Water • Beakers • Bunsen burner • 10% formalin.	Is the student able to outline the end products of aerobic respiration?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. describe factors which affect the rate of respiration.	i) The teacher to guide students in groups to discuss factors which affect the rate of respiration. ii) Students to present in plenary and teacher to culminate on how factors such (temperature, activity, body size and , age affect the rate of respiration	• Wall charts/ pictures/ showing the factors that affect the rate of respiration.	Can the student correctly describe factors that affect the rate of respiration?	
	5.4.2 Anaerobic Respiration	The student should be able to : 1. explain the concept of anaerobic respiration.	i) The teacher to guide students through questions and answers to discuss the meaning and importance of anaerobic respiration. ii) Students to synthesize their responses and explain the meaning and importance of anaerobic respiration.	• Charts/ diagrams on respiration process	Is the student able to explain the concept of anaerobic respiration?	6
		2. outline the mechanism of anaerobic respiration	i) The teacher to guide student through questions and answers to outline the mechanism of anaerobic respiration. ii) Students to summarize major points on mechanisms of anaerobic respiration.		Is the student able to outline the mechanism of anaerobic respiration in real life situations?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
				• Conical flasks, rubber bands, delivery tubes, beakers, glucose, yeast, water, liquid paraffin, fractionating column, thermometer, pyrogallol, test-tubes, string.	Can the student correctly describe factors that affect the rate of respiration?	
		3. mention the end products of anaerobic respiration	i) The teacher to guide students to carry out experiments to investigate the end products of anaerobic respiration. ii) Students to discuss on the importance of end products of anaerobic respiration in organisms.	• Chart on end product anaerobic respiration	How accurately can the student outline the end products of anaerobic respiration?	
		4. carry out an experiment to demonstrate the application of anaerobic respiration	i) The teacher to demonstrate how to carry out experiments on anaerobic respiration. ii) Students in groups to carry out experiments on anaerobic respiration.	• Various products of anaerobic respiration	How accurately can the student perform experiment on application of anaerobic respiration?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		5. distinguish between aerobic and anaerobic respiration.	i) The teacher to guide students in groups to discuss the differences between aerobic and anaerobic respiration ii) Students to present their finding in plenary discussion	• Chart/diagram on anaerobic and aerobic respiration	Is the student able to explain the differences between aerobic and anaerobic respiration?	
	5.4.4 Infections and diseases of the respiratory system	The student should be able to: 1. mention common airborne infections and diseases which affect the respiratory system.	i) The teacher to guide students in groups to discuss common airborne infections, diseases, and disorders such as flu, bronchitis, asthma and lung cancer. ii) Students to share their group work in plenary discussion and the teacher to make any necessary clarifications.	• Extracts/texts from journals on common airborne infections	Can the student mention common airborne infections and diseases that affect the respiratory system?	
		2 explain causes, symptoms, effects and control measures of common infections and diseases of the respiratory system.	i) The teacher to guide students through questions and answers to explain the courses, symptoms effects and control measures of common infections and diseases of the respiratory system.	• A tabulation of causes, symptoms effects and control of airborne infections on the manila sheet	How accurately can the student explain the causes, symptoms, effects and control measures of common infections and diseases of the respiratory system?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to summarize the major points on the causes, symptoms effects and control measures of the common infections, and diseases of the respiratory system. iii) The teacher to lead a a class discussion on the causes symptoms and effects and control measures of the common infections diseases of the respiratory system.	• Chart/diagram on anaerobic and aerobic respiration		
	5.4.5 Disorders of the Respirator y System	The student should be able to: 1. mention disorders of the respiratory system.	i) The teacher to guide students to brainstorm on common disorders of the respiratory system. ii) Students to summarize their responses and list down common disorders of the respiratory system.	• C h a r t s / d i a g r a m s s h o w i n g disorders of the r e s p i r a t o r y system	Is the student able to mention disorders of the r e s p i r a t o r y systems?	4
		2. explain causes, symptoms and effects of the disorders of the respiratory system.	i) The teacher to arrange a study visit to a nearby health facility for students to investigate common disorders of the respiratory system.	• C h a r t s / diagrams on disorders of the r e s p i r a t o r y system		

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to discuss in group the causes, symptoms and effects of the disorders of the respiratory system. iii) The teacher to lead a class discussion and make clarifications on students' presentations.		How accurately can the student explain causes, symptoms and effects of the disorders of the respiratory systems?	
		3. Relate disorders of the respiratory system and HIV/AIDS	i) The teacher to guide students through questions and answers to point out the relationship between the resparatory system disorders and HIV/AIDS. ii) Students to record and summarize their responses and the teacher to make clarifications on the relationship between the respiratory system disorders and HIV/AIDS	• Texts/extracts on the relationship between disorders of the respiratory system and HIV/AIDS	Can the student relate disorders of the respiratory system and HIV/AIDs?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. Suggest ways of preventing and controlling disorders of the respiratory system	i) Students in groups to discuss ways of preventing and controlling disorders of the respiratory system. ii) The teacher to plenary discussion and make general comments and clarifications where necessary.	• Extracts/texts from journals or magazines on methods of preventing and controlling disorders of the respiratory system	Can the student outline ways of preventing and controlling disorders of the respiratory system?	

FORM THREE

CLASS COMPETENCES

By the end of Form Three, the student should have the ability to:

1. demonstrate appropriate use of biological knowledge, concepts, principles and skills in evaluating the roles of various physiological processes in plants and animals;
2. group organisms according to their similarities and differences;
3. demonstrate positive attitudes and responsiveness towards community social values and take measures to protect oneself, family and community;
4. use appropriate skills to solve various health related problems.

CLASS OBJECTIVES

By the end of Form Three Course, the student should be able to:

1. acquire basic knowledge principles, concepts and skills in evaluating the roles of physiological processes in plants and animals;
2. apply knowledge and skills of biological science and related fields in improving livestock and crop production;
3. classify organisms in their respective kingdoms, phylum/division and class;
4. develop positive attitudes, values and practices for enhancing positive gender relations, environmental protection, and sexual and reproductive health;
5. take appropriate precautions and measures against problems related to reproductive processes in animals and flowering plants;
6. apply appropriate skills in managing problems related to HIV/AIDS, drug/substance abuse, and sexual and reproductive health.

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
1.0 CLASSIFICATION OF LIVING THINGS	1.1 Kingdom Plantae 1.1.1 Division Coniferophyta (conifers)	The student should be able to: 1. explain general and distinctive features of the division Coniferophyta .	i) Using guidelines provided, students to collect a variety of plants (or plant parts) under division Coniferophyta (i.e pine. cedar, spruce etc) from the surrounding environments ii) Students in groups to observe the plants collected and those displayed by the teacher and record the observable features of those plants. iii) The teacher to lead a class discussion on the general and distinctive features of the division Coniferophyta, make clarification and conclusion.	• A variety of conifers (pine, cedar, cypress, spruce) • Pictures of conifers e.g pine, cypress, spruce, cedar. • Pictures of cones (male and female cones) • Charts of conifers • Cones (fresh or preserved cones)	Is the student able to explain the general and distinctive features of the division Coniferophyta?	
		2. describe the structure of *Pinus*.	i) Using guiding questions, students in groups to observe charts/pictures/pine tree or its parts and identity the structures.	• A variety of cone bearing plants • Pictures of conifers (pine tree, cypress, spruce. cedar)	Can the student describe the structure of a *Pinus*?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead a class discussion on the structure of a pine tree (*Pinus sp*) iii) Students to draw and label a pine tree (or plant parts), male and female cones.	• Charts showing different types of cone bearing plants. • Cones (fresh) or preserved)		
		3. explain the advantages and disadvantages of the division Coniferophyta.	i) The teacher to lead students to discuss on the advantages and disadvantages of plants under the division Coniferophyta ii) Students to outline advantages and disadvantages of plants under the division Coniferophyta.	• A variety of cone bearing plants. • Charts/pictures showing different types cone bearing plants.	How accurately can the student explain the advantages and disadvantages of the division Coniferophyta?	
	1.1.2 Division Angiospermophyta (Flowering Plants)	The student should be able to: 1. explain general and distinctive features of the division Angiospermophyta.	i) Students in groups to observe a variety of flowering plants and record their observable features. (Observations should base on the structure of roots, leaves, shoots, flowers etc.)	• Flowers from dicots and monocots • Fruits and seeds of flowering plants. • A variety of flowering plants	Is the student able to explain general and distinctive features of the division Angiospermophyta?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead a class discussion on general and distinctive features of division Angiospermophyta makes general comment and conclusion.			
		2. outline the classes of the division Angiospermophyta and their distinctive features	i) Students in groups using guiding questions to observe variety of flowering plants and group them into two groups. ii) The teacher to lead a class discussion on the classes and general and distinctive features of each class (Monocotyledonae and Dicotyledonae).	• A variety of Monocotyledonous and dicotyledonous plants. • Grains (maize, wheat, rice, millet) • Seeds (beans, peas, castor and groundnut) • Mature and young bean and maize plants. • Charts showing characteristic of classes of division Angiospermophyta • Razor blade/knife/scalpel/ surgical blade.	Is the student able to mention classes of the division Angiospermophyta? Can the student outline the distinctive features of each class of the division Angiospemophyta?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. describe the structures of representative plants under each class (Monocotyledonae and Dicotyledonae).	i) Using guiding questions, students in groups to observe variety of plants under each class and identify their characteristic features. ii) The teacher to lead a class discussion on the structure of representative plants under each class (maize, millet, rice, groundnuts, bean and pea). iii) Students to draw and label representative plants under each class, o A variety of flowering plants.	• Razor blade/surgical blade/scalpel. • Maize grains • Beans/peas seeds • A variety of seed		
		4. explain advantages and disadvantages of division Angiospermophyta.	i) Students to brainstorm on the advantages and disadvantages of kingdom Plantae. ii) The teacher to use students responses and give clarifications and summary on the advantages and disadvantage of the division Angiospermophyta.	• A chart on the representative plants under the division Angiospermophyta.		

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
2.0 MOVEMENT	2.1 Concepts of Movement and Locomotion.	The student should be able to: 1. explain the concepts of movement and locomotion.	i) The teacher to guide students to brainstorm on the meaning of the of movement and locomotion. ii) Students to synthesize their responses and explain the meaning and the differences between movement and locomotion.. iii) The teacher to lead a class discussion on the meaning and the differences between the two concepts	• Variety of organisms such as insects, fish and mouse. • Charts on locomotion/movement of different organisms.	How accurate can the student explain the concepts of movement and locomotion?	4
		2. explain the importance of movement in animals and plants.	i) Using guiding questions, students in groups to discuss the importance of movement in animals and plants. ii) The teacher to guide students to summarize their responses, make general comments and concluding remarks.	• Chart/drawing depicting movement in different organisms.	Is the student able to explain the importance of movement in animals and plants'?	
		3. demonstrate movement and locomotion actions	i) The teacher to design an activity for students in demonstrates movement and locomotion.	• Pictures/ drawings of various organisms depicting movement and locomotion.	How accurate can the student demonstrate movement and locomotion actions'?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students in groups to perform various actions depicting movement and locomotion. iii) The teacher to guide students through questions and answers to give the differences between movement and locomotion.	• Variety of organisms such as insects. fish and mouse.	How accurate can the student explain the concepts of movement and locomotion?	
	2.2. Movement of the Human Body 2.2.1 The Human Skeletal System.	The student should be able to: 1. describe the structures of human skeleton	i) Students in groups to examine the picture/model of skeleton and identify its major parts. ii) The teacher to lead a class discussion on the structure of the human skeleton and its major components. iii) Students to draw a well labeled diagram of the structure of human skeleton.	• Model of human skeleton • Diagrams/ pictures of the human skeleton.	Is the student able to describe the structures of human skeleton?	2
		2. explain the functions of the major components of the human skeleton and their adaptations	i) Students in groups to discuss the adaptation of the major components of the human skeleton to their rules.	• Model of human skeleton.		

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead plenary discussion and guide students to summarize and record major points or ideas.	• Diagrams/ drawings of the major components of human skeleton.	How accurately can the student explain the functions of the major components of the human skeleton and their adaptations?	
	2.2.2 Muscles and Movement	The student should be able to: 1. explain the concept of muscles.	i) Students to brainstorm the meaning of muscles. ii) The teacher to synthesize student's responses and use them to get the correct meaning of muscle.	• Charts / diagrams/pictures of different muscles	Is the student able to explain the concept of muscles?	6
		2. mention types of muscles.	i) Students in groups to observe charts/models/pictures of different muscles and identify their di erences. ii) The teacher to lead a class discussion on the types of muscles.	• Models / charts/pictures/diagrams of di erent types of muscles	Can the student mention types of muscles?	
		3. demonstrate how muscles facilitate movement.	i) The teacher to design an activity for students to demonstrate the role of muscles in movements.	• Models of different muscles		

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students in pairs to perform various actions depicting the role of muscles in movement such as stretching arms and legs and jot down the observed changes. iii) Students to present their findings and the teacher to lead plenary discussion, guide students to summarize the major points and make conclusion.	• Charts / diagrams / photograph of muscles.	How correctly can the student able to demonstrate accurately how muscles facilitate movement?	
		4. describe the structure of muscle.	i) Students in groups to observe pictures/diagrams/model of muscles (biceps and triceps muscles) and discuss the structure of muscles. ii) The teacher to lead a class discussion on the structures of muscles. iii) Students to draw and label the structure of biceps and triceps muscles during bending and stretching of the arm.	• Charts / Diagrams/models of different muscles • Real objects.	Is the student able to describe the structures of muscles?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		5. explain adaptations of different types of muscles to their roles.	i) Students in groups to observe pictures/diagram/models of different types of muscle and discuss the adaptation of different types of muscles to their roles. ii) The teacher to lead a class discussion and summarize the major points on the adaptation of different types of muscles to their roles.	• Models / pictures/diagrams of muscles.	How accurately can the student explain adaptations of different types of muscles and their roles?	
		6. explain causes effects and preventive measures of muscles cramps.	i) Students in groups to discuss causes, effects and preventive measures of muscle cramps. ii) The teacher to lead class discussion and make any necessary clarifications	• Models / pictures/diagrams of different types of muscles.	Can the student explain causes, effect and preventive measures of muscle cramps?	
	2.3 Movement in Plants	The student should be able to: 1. explain the concept of movement in plants (movement of curvature).	i) Students to observe plants/potted plants showing movement in plants and record the finding.	• Photograph, diagrams and charts showing movement in plants. • Plants showing movement of curvature.	Is the student able to explain the concept of movement in plants?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students in groups to discuss movement exhibited by plant and their importance and present their task for plenary discussion. iii) The teacher to lead plenary discussion and make clarification and conclusion on the meaning and importance o movement exhibited by plants.	• Potted plants,		
		2. mention types of movement exhibited by plants.	i) Students to observe plants showing different types of movement and record the findings. ii) The teacher to lead a class discussion on the types of movement exhibited by plants (i.e. Nastic and Tropism).	• A variety of plants showing movement exhibited by plants. • Charts/ diagrams/pictures showing nastic and tropic responses in plants	Can the student mention types of movement exhibited by plants?	
		3. carry out experiments to investigate movement in plants.	i) Students in groups using guidelines to perform experiments to investigate movement exhibited by plants and record their findings.	• Potted plants	Can the student investigate movement in plants?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to present their findings and the teacher to lead class discussion, make clarification and conclusion.	• Charts, photograph diagrams, and pictures depicting movement in plants. • Young potted plants.		
3.0 COORDINATION	3.1 Concept of Coordination	The student should be able to: 1. explain the concept of coordination in organisms.	i) The teacher to guide students in groups to discuss meaning and importance of coordination in organisms. ii) Student to present group tasks and the teacher to lead plenary discussion, make necessary clarifications and conclusion.	• Hot objects • Sharp objects • Live specimens or toys of insects and small mammals.	Is the student able to explain the concept of coordination in organisms?	4
		2. outline the ways in which coordination is brought about.	i) Students to observe charts/diagrams/pictures showing main components of nervous coordination and discuss the role of each components, stimulus, receptors, coordinator, effectors and response.	• Chart to show how coordination is brought about • Hot object • Sharp object • Real objects	How accurately can the student outline ways in which coordination is brought about?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to discuss in groups on the ways in which coordination is brought about. iii) The teacher to lead a class discussion on the ways in which coordination is brought about.	• Game or puzzle chart on nervous coordination process		
	3.2 Nervous Coordination in Human 3.2.1 Neurones	The student should be able to: 1. describe the structure of motor sensory and relay neurones.	i) The teacher to lead a class discussion on the structures of motor, sensory and relay neurons ii) Students to draw and label diagram to show the structure of motor, sensory and relay neurones.	• Models / Pictures/photographs of neurones • Prepared slides of neurones. • Microscope	How correctly can the student describe the structure of motor, sensory and relay neurons?	2
		2. explain the roles of motor, sensory and relay neurones.	i) Students to discuss in group the roles of motor, sensory and relay neurone and to present their responses for plenary discussion. ii) The teacher to summarize students responses, make general comment and necessary corrections.	• A chart showing summary of the roles of motor, sensory and relay neurons.	Can the student explain the roles of motor, sensory and relay neurons?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	3.2.2. Central Nervous System (CNS).	The student should be able to 1. give the meaning of Central Nervous System	i) Students to brainstorm on the meaning of central nervous system (CNS). ii) The teacher to summarize students' responses and give general comments and conclusion.	• Charts of the Central Nervous system • Pictures/ photographs of brain and spinal cord.	Is the student able to give the meaning of (Central Nervous System?	2
		2. identify the components of the central nervous system and their functions.	i) Students to observe models charts/ diagrams/ photographs of brain and spinal cord and identify their components.. ii) The teacher to guide students in groups to identify the components of the central nervous system and discuss their roles.	• Charts/ diagrams of CNS •Diagrams/ models of brain and spinal cord.	Can the student identify the components of the central nervous system and their functions?.	
		3. describe the structures of the spinal cord and brain.	i) The teacher to guide students in groups to observe models/diagram/pictures of the spinal cord and brain and discuss their structures. ii) Students to draw and label the structures of the spinal cord and brain.	• Diagrams and photographs of the spinal cord. • Models of the brain and spinal cord.	How accurately can the student describe the structures of the brain and spinal cord?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	3.2.3 Peripheral Nervous System (PNS).	The student should be able to: 1. give the meaning of Peripheral Nervous System .	i) Students to brainstorm on the meaning of Peripheral Nervous System. ii) The teacher to guide students to summarize and record correct responses and make clarification and conclusion.	• Photographs/ Charts showing the structures of PNS	Is the student able to give the meaning of peripheral Nervous system and their functions?	2
		2. identify the components of the Peripheral Nervous System and their functions.	i) Students to observe charts, photographs/ specimens of mice/rabbit/frog to identify the components of the PNS. ii) The teacher to lead a class discussion on the components of the peripheral nervous systems.	• Charts / photographs/pictures on peripheral Nervous systems • Preserved specimen of frog mouse/rabbit showing the PNS.	Can the student identify the components of Peripheral Nervous System?	
	3.2.4 Reflex Action	The student should be able to 1. give the meaning of reflex action.	i) The teacher to design activities for student to demonstrate the reflex action. ii) Students in groups to demonstrate the reflex action and record their findings. iii) The teacher to lead students to discuss the meaning of reflex action.	• Hot objects • Live specimens of insects or small mammals • Toys (snake, scorpion)	Is the student able to give the meaning of reflex action? 6	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. describe the neuronic pathway of a reflex action.	i) The teacher to display the chart/diagram /photographs showing the neuronic pathway of a reflex action for students to observe and identify the components of the neuronic pathway of reflex action. ii) Students to draw and label the neuronic pathway of reflex action. iii) The teacher to lead a class discussion on the neuronic pathway of a reflex action	• Charts/ photographs/diagrams showing neuronic pathways of a reflex action.	How accurately can the student describe the neuronic pathway of a reflex action?	
		3. distinguish simple reflex from conditioned reflex action.	.i) The teacher to design activities for student to demonstrate simple reflex and conditioned reflex actions. ii) Students in groups to demonstrate simple reflex actions and conditioned reflex actions and record their findings. iii) The teacher to lead a class discussion on the differences between simple reflex action and conditioned reflex action.	• Charts/ diagrams of simple and conditioned reflex actions. • Bell • Video/radio tapes showing simple and conditioned reflex action.	Is the student able to differentiate simple reflex from conditioned reflex action?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	3.2.5 Sense Organs The student should be able to	1. explain the meaning of a sense organ.	i) Students in groups to observe models/pictures/diagrams/charts and brainstorm on the meaning of sense organ. ii) Students to present their group responses in plenary session and the teacher to guide them to record the correct responses and make general comments and conclusion.	• Charts of different sense organs • Pictures/ diagrams/Models of sense organs.	How correctly can the student explain the meaning of sense organ?	6
		2. identify types of sense organs and their relative position.	i) Students to observe models/pictures/diagrams/charts of mouse (or any other small mammal) and identify sense organs and their relative position. ii) Using guiding questions, students in groups to observe charts/models/specimens of different sense organs and identify its parts. iii) The teacher to lead a class discussion on the types of sense organs and their relative positions.	• Models/charts showing the structure of sense organs. • Mirror • Small mammals such mouse.	Can the student identify types of sense organs and their relative position?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		The student should be able to 3. describe the structure of each sense organ.	i) The teacher to lead students to discuss in groups the structure of each sense organ. ii) Students to draw and label the human ear, eye, nose the tongue (to show the location of taste buds) and the transverse section (T.S) of the skin.	• Small mammal • Models/Charts of different sense organs.	How accurately can the student describe the structure of each sense organ?	6
		4. explain the functions of sense organs and their adaptive features.	i) Students in groups to observe modes/pictures/specimens showing different sense organs and discuss the role of each sense organ and its adaptive features . ii) Students to present their group task and the teacher to guide them to summarize major points and make clarification.	• Charts/models/ photographs of different sense organs. • Live or preserved specimen.	Can the student explain the functions of each sense organ and its adaptive features?	
	3.3 Drugs and Drug Abuse in Relation to Nervous Coordination.	The student should be able to 1. explain the meaning of drugs and drug abuse, in relation to nerous coordination.	i) The teacher to lead the students to discuss in groups the meaning of drugs and drug abuse in relation to nervous coordination.	• Video/film on effects of drug and substance abuse • Samples of drugs.	Is the student able to explain the meaning of drugs and drug abuse in relation to nervous coordination?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to summarize group responses, give necessary corrections and make conclusion			
		2. outline proper ways of handling and using drugs.	i) Students in groups to discuss proper ways of handling and using drugs. ii) The teacher to guide students to make clarification and conclusion on proper ways of handling and using drugs.	• Video/film • Pictures and posters of illegal drug users and addicts. • Samples of drugs • Video/firm showing proper ways of handling and using drugs.	Can the student outline proper ways of handling and using drugs?	
		3. explain causes and effects of drug addiction.	i) The teacher to invite a drug abuse control expert or health officer/practitioner to talk on drug addiction, its causes and effects. ii) Students to summarize major points from the guest speaker presentation and the teacher to guide them to clarify major issues and make conclusion.	• Brochure and fliers on causes and effects of drug addition • Video/firm showing people affected by drugs.	How accurately can the student explain causes and effects of drug addiction?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ L EARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) Students to do a project on cases of drug addiction in their surrounding community.			
		4. suggest preventive and control measures of drug abuse.	i) Students in groups to discuss the preventive and control measures of drug abuse. ii) The teacher to use students correct responses and give clarifications and conclusion. iii) Students to make a study visit in a nearby health center/hospital and collect data of causes and effects of drug abuse and measures taken by health department to prevent and control drug abuse in the community.	• Video/Film about drug and substance abuse • Posters of drug addicts/users	Is the student able to suggest preventive and control measures of drug abuse'?	
		The student should be able to: 1. identify location of the different endocrine glands in the mammalian body.	i) The teacher to lead a class discussion on the location of the endocrine glands in the mammalian body and the types of hormones produced by each gland.	• Chart/or diagrams of endocrine glands and hormones produced by each gland.	How can the student identify location of different endocrine glands in the mammalian body?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to draw the diagram to show location of endocrine glands in human body. iii) The teacher to lead class discussion on the differences between endocrine and exocrine gland.	• Diagrams/ models/pictures showing the position of the endocrine glands in a mammalian body.		
		2. explain the role of hormones produced by each endocrine gland.	i) Students in groups to discuss the role of each hormone in the mammalian body. ii) The teacher to use students responses to make clarifications and conclusion.	• Charts of the endocrine glands	Is the student able to explain the role of hormones produced by each endocrine gland?	
		3. outline disorders of hormonal coordination in mammals.	i) Students in groups to discuss the disorders of hormonal coordination in mammals. ii) The teacher to lead a class discussion on the disorders of hormonal coordination due to hyper-and hypo-secretion of insulin, growth hormone, antideuretic hormone and thyroxin	• Pictures/ photographs of disorders of hormonal coordination e.g goiter, gigantism and dwarfism.	Can the student outline disorders of hormonal coordination in mammals?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	3.5 Coordination in Plants 3.5.1 concept of Tropic and Nastic Responses	The student should be able to 1. explain the concepts of tropic and nastic responses	i) Students to observe potted plants grown in all round light and unilateral light and record their observations. ii) Using question and answers, the teacher to guide students to give the meaning of tropic and nastic responses	• Potted plants • Charts / photographs /or pictures of tropic responses of shoots and roots. • Young plant • Mimosa plant	Is the student able to explain the concepts of tropic and nastic responses?	4
		2. carry out experiments to investigate the effects of tropic and nastic responses in plants.	i) Students using guidelines to carry out experiments to investigate the effects of tropic and nastic in plants and record their findings. ii) The teacher to lead class discussion, make clarification on misconceptions and make conclusion.	• Potted plants • Beakers • Cotton wool • Bean or maize seeds • Young plant • Mimosa plants	Can the student investigate the effects of tropic and nastic experimentally?	
		3. explain the importance of tropic and nastic responses.	i) Students in groups to discuss the importance of hydro-geo-photo - and chemo-tropisms in plants.	• Potted plants subjects to all-round light and unidirectional light. • Charts to show examples of tropic responses.	How accurately can the student explain the importance of tropic and nastic responses?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead plenary discussion, make general comments and conclusion on the significance of tropisms and nastic responses in plants. iii) Students to outline significance of tropisms in plant growth.	• Seedlings of maize or beans grown in a beaker containing wet cotton wool. • Mimosa plant.		
4.0 EXCRETION	4.1 Concept of Excretion	The student should be able to: 1. explain the concept of excretion.	i) Students in groups to discuss the meaning and importance of excretion ii) The teacher to guide students to categorize their responses and record the major points.	• Models of kidney • Preserved specimen of kidney. • Diagrams/ charts of excretory system.	Can the student explain correctly the concept of excretion?	2
		2. give examples of excretory products eliminated by organisms.	i) Using questions and answers the teacher to lead student to name excretory products eliminated by organisms.	• Pictures/chart showing various types of excretory products and their importance.	Is the student able to provide examples of excretory product eliminated by animals?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead a plenary discussion and guide students to summarize major ideas on the exeretory products eliminated by organisms.			
	4.2 Excretion in Human.	The student should be able to 1. mention excretory organs in human being.	i) Students in groups to observe charts/pictures/models showing different excretory organs and identify their differenees. ii) The teacher to lead students to discuss on the types of excretory organism in human.	•Model/chart/diagram of exeretory organs.	Can the student mention excretory organs in human being?	4
		2. describe the urinary system and its adaptive features	i) The teacher to dissect a mouse or any other small mammal to display the urinary system ii) Using guiding questions students to observe models/diagram/pictures showing the human urinary and identify the structures (kidney. ureter. urmary balder).	• Models/charts/ diagram/pictures/specimens showing the human .urinary system. • Disseeting kits and trays. • Chloroform • Cotton	How aeeurately ean the student deseribe the urinary system?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to lead students to discuss the structure of urinary system and its adaptive features. iv) Students to draw and label the structure of the human excretory system (Kidney, ureter, urinary bladder, urethra).			
		3. explain the process of urine formation	i) The teacher to guide students to brainstorm on the process of urine formation. ii) Students to discuss in groups the process of urine formation and the teacher to make clarifications	• Models/charts/ pictures showing the urinary system.	Is the student able to explain the process of urine formation?	
	4.3 Complications and Disorders of the Excretory System.	The student should be able to 1. mention common complications and disorders of the excretory system.	i) The teacher to prepare case studies on common complication and disorders of the excretory system e.g kidney stones and kidney failure.. ii) Students in groups to discuss the cases using guiding questions given by the teacher.	• Charts/diagram of the urinary system and the associated disorders and complications.	Can the student mention common complications and disorders of the excretory system?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to lead plenary discussion and guide students to summarize key ideas.			
		2. explain the causes, symptoms, effects and control measures of common complications and disorders of the excretory system.	i) Students to discuss in groups causes, symptoms effects and control measures of disorders and complications of the excretory system. ii) The teacher o invite a health officer/ to talk on complications and disorders of the excretory system (kidney failure and kidney stones). iii) Students to summarize major points from the guest speaker presentation and the teacher to guide them to clarify major issues and make conclusion.	• A chart showing the tabulation of causes, symptoms, and effects control of the complications and disorders of the excretory system. • Charts/models/pictures showing urinary system.	How accurately can the student explain causes, symptoms and effects and control measures of common complications and disorders of the excretory system?	
	4.4 Excretion in Plants	The student should be able to 1. mention types of excretory products eliminated by plants.	i) The teacher to lead students using questions and answers to mention ways by which plants get rid of excretory products and give examples.	• A chart showing various plants and their excretory products.	Is the student able to mention types of excretory products eliminated by pants?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to summarize the major points and list down types of excretory products eliminated by plants. iii) The teacher to make general comments and conclusion on the different types of excretory products eliminated by plants.	• Sample of plant excretory such as gum, alkaloids and latex.		
		2. explain the importance of common excretory products of plants.	i) The teacher to lead students in groups to discuss the importance of excretory products of plants such as gum. alkaloids and latex. ii) Teacher to lead plenary discussion on the importance of excretory products from plants, summarize the major points and make conclusion.	• A chart showing various plants and their waste products. • Samples of plant excretory products such as gums, alkaloids and latex.	Is the student able to explain the importance of excretory products of pants?	
5.0 REGULATION	5.1 Concept of Regulation	The student should be able to: 1. explain the concept of regulation.	i) The teacher to guide students in groups to discuss the meaning of regulation and its importance .	• A chart showing the process of regulation in animals.	Can the student explain correctly the concept of regulation?	2

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead plenary discussion and make clarification and conclusion on the concept of regulation and its importance.			
		2. mention various types of regulation	i) Students in groups to observe charts/pictures showing the process of regulation in animals and identify their differences. ii) The teacher to lead a class discussion on the types of regulation temperature regulation, regulation of water and mineral salts in animals.	• Extracts/texts on various types of regulation • Charts/pictures /diagrams showing various types of regulation.	Is the student able to mention types of regulation correctly?	
	5.2Temperature Regulation in Animals	The student should be able to: 1. explain the concept of temperature regulation in animals	i) Students in groups using guidelines to perform experiments to determine the temperature of a frog/toad and a small mammal under different conditions (cold and hot) and record their findings. ii) Students to divide the experimental animals into two groups ectoderms and endoderms.	• Toad/frog • Small mammal (rat, mouse, rabbit) • A clinical thermometer.	Is the student able to explain the concept of temperature regulation in animals?	6

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			iii) The teacher to lead plenary discussion and guide students to clear out misconceptions and make conclusion.			
		2. carry out practical activities to determine temperature regulation in mammals.	i) Students in pairs, to carry out practical exercises on measuring body temperatures and record changes in body temperature before and after performing a physical exercise. ii) Students to report their findings and the teacher to lead class discussion on the temperature regulation in mammals and make clarification.	• A clinical thermometer • A chart showing a table for recording body temperature. • Small mammals e.g mouse or rabbit.	Is the student able to explain the concept of temperature regulation in mammals?	
		3. describe the mechanism of temperature regulation in mammals	i) Students to discuss in groups the body reactions when the temperature of the surrounding is lower and when is higher than the body temperature. ii) The teacher to lead a class discussion on the structure of the skin in relation to temperature regulation (vasoconstriction and vasodilition).	• Models/ charts photographs showing the section of the skin • Pictures/ diagrams showing the reaction of the skin under different conditions (hot and cold).	Can the students accurately describe the mechanism of temperature regulation in mammals?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) Students to draw and label section of the skin showing vasoconstriction and vasodilation.			
	5.3 Osmo regulation in Mammals.	The student should be able to 1. explain the concept of osmoregulation.	i) Students to discuss in groups on the meaning of osmoregulation and its importance. ii) The teacher to make clarifications and conclusion on the meaning of osmoregulation and its importance.	• Charts, pictures, photographs or diagrams showing osmoregulation in mammals.	Is the student able to explain the concept of osmoregulations?	4
		2. mention factors which affect the contents of salt and water in the body.	i) The teacher to guide students through questions and answers to mention factors which may affect the contents of salt and water in the body. ii) The teacher to guide students in groups to categories factors which affect the salt and water content in the body. iii) Students to present their group tasks and the teacher to lead plenary discussion and give correction where necessary.	• Charts, pictures, or diagrams showing osmoregulation in mammals. • Models/charts/ pictures showing the structure of a nephrone.	Can the student mention the factors which affect the salt and water content in the body.	

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	5.4 Blood Sugar Regulation in Mammals	The student should be able to: 1. explain the mechanisms of regulating sugar level in the blood.	i) Students in group to discuss how hormones regulate sugar levels in the blood (insulin and glucagon). ii) Students to present their tasks in a plenary discussion and the teacher to guide students to summarize major ideas and make conclusion on the mechanisms of regulating sugar level in the blood.	• Pictures, charts or photographs showing the mechanisms of regulating sugar level in the blood.	Can the student explain accurately the mechanisms of regulating sugar level in the blood?	4
		2. outline the causes, symptoms and effects of high and low sugar levels in the blood.	i) The teacher to assign tasks to students in groups to read literatures and outline the causes, symptoms and effects of high and low sugar levels in the blood. ii) Students to share their findings in class and the teacher to use those findings to make clarifications and conclusion.	• Videotapes, charts, and pictures showing the causes, symptoms and effects of high and low sugar levels in the blood.	Is the student able to outline the effects of high and low sugar levels in the blood?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
6.0 REPRODUCTION	6.1 Concept of Reproduction	The student should be able to: 1. explain the concept of reproduction.	i) The teacher to guide students to discuss the meaning and importance of reproduction. ii) The teacher to summarize students' responses and make necessary clarification and give conclusion.	• Flip charts • V.I.P.P Cards carrying key messages on reproduction.	Can the student explain the concept of reproduction?	2
		2. distinguish between sexual and asexual reproduction.	i) The teacher to display variety of organisms which reproduce by seeds or vegetative. ii) Students to observe a variety of organisms displayed and discuss in groups the ways in which the plants reproduce whether by means of asexual or sexual reproduction iii) Students in their group to discuss the differences between asexual and sexual reproduction and present their group tasks for plenary discussion. iv) The teacher to lead plenary discussion, make general comments and conclusion.	• Variety of organisms • Picture/ photographs of plants that reproduce by seeds or vegetatively	Is the student able to distinguish between sexual and asexual reproduction?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
6.0 REPRODUCTION	6.1 Concept of Reproduction	3. explain the merits and demerits of sexual and asexual reproduction.	i) Students in groups to observe variety of plants which reproduce by asexual means and those reproduce sexually. ii) Students in their groups to discuss the merits and demerits of asexual and sexual reproduction iii) Students to present their group tasks for plenary discussion and the teacher to guide them to make necessary corrections and conclusion	• Varieties of organisms • Photographs or pictures of plants that reproduce sexually or vegetative.	Can the students explain the merits and demerits of sexual and asexual reproduction?	2
	6.2 Meiosis and Reproduction	The student should be able to 1. give the meaning of meiosis	i) The teacher to guide the students to brainstorm the meaning of meiosis using charts/photographs and models showing stages of meiosis ii) Students to synthesize and correct responses iii) The teacher to summarize the student responses and make conclusion	• Chats / photographs showing stages of meiosis	Is the student able to give the correct meaning of meiosis?	2

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. explain the significance of meiosis in relation to reproduction	i) Using charts/photograph and models, students to observe the events which take place in different stages of meiosis. ii) The teacher to lead class discussion on the significance of meiosis in relation to reproduction and summarize the main ideas.	• Charts/ photographs showing stages of meiosis • Models showing stages of meiosis	Can the student explain the significance of meiosis in relation to reproduction?	
		3. carry out experiments to show stages of meiosis process	i) Using guidelines/procedures students in groups to conduct practical exercise to observe the events taking place in meiosis. ii) The teacher to display charts/ photographs/ diagrams showing the events taking place in each stage of meiosis process.	• Prepare microscope slide on stages of meiosis • Microscope • Charts/ photographs/models showing stages of meiosis.	Is the student able to carry out experiments to show stages of meiosis?	

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			iii) Students in groups to observe the displayed model chart. photographs or diagrams and outline the events taking place at each stage of meiosis and record their findings. iv) The teacher to lead plenary discussion and make reflection on students responses to summarize major ideas during presentations.			
	6.3 Reproduction in Flowering Plants 6.3.1 The structure of the Flower	The student should be able to 1. describe the structure of the flower	i) Students using guidelines to collect variety of flowers ii) Students in groups to observe the collected flowers and identify different parts of the flower and describe their structures. iii) The teacher to lead plenary discussion and make clarifications and conclusion on the structure of the flower iv) Students to draw a well labeled diagram of the named flower.	• Variety of flowers • Charts/Models /Photographs of flowers	How accurately can the student describe the structure of flowers?	2

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. identify reproductive parts of the flower	i) Students in groups to observe variety of flowers and identify the reproductive parts. ii) The teacher to lead students to identify and discuss the reproductive parts of the flower	• Variety of flowers • Models/ charts/pictures showing different types of flowers	Is the student able to identify reproductive parts of the flower?	
	6.3.2 Pollination	The student should be able to 1. explain the term pollination.	i) Students to brainstorm on the meaning of pollination ii) The teacher to lead a class discussion on the meaning of pollination and its importance	• Variety of flowers • Models/chats /photograph pollination of the flower.	Can the student correctly explain the term pollinations?	4
		2. Identify types of pollination.	i) The teacher to designs a study visit around the school environment/school garden for students to observe different flowers and identify types of pollination (self and cross pollination)	• Variety of flowers • Diagrams, pictures and models of different flowers.	How accurately can the student identify types of pollination?	

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			ii) Using guiding question students in groups to discuss ways in which the two types of flowers are pollinated and present their finding in plenary discussion. iii) The teacher to lead plenary discussion and guide students to summarize their findings and make conclusion.			
		3. outline agents of pollination	i) The teacher to guide the student to observe the characteristics of flowers (in terms of colour of petals,, structure of stigma , styles, presence or absence of nectar. ii) Basing on these characteristics student to suggest agencies of pollination for different types of flowers	• Different types of flowers. • Models/ diagrams photographs of different types of flowers • Variety of flowers e.g flowers of hibiscus, common bean, rose, maize, millet and grass.	Is the student able to outline the agents of pollination?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to record the suggestions/points given by students and make necessary clarification and conclusion on different types of flowers and their agents of pollination (wind and insect pollinated flowers).	• Pictures / diagrams showing insects/small birds pollinating a flower		
	6.3.3 Fertilization	The student should be able to 1. explain the concept of fertilization	i) The teacher to guide students to discuss on the meaning of fertilization in flowering plants. ii) The teacher to guide students to summarize their responses, make general comments and conclusion on the meaning of fertilization	• Models / diagrams Charts showing the process of fertilization in flowering plants. • Variety of flowers	Is the student able to explain the concept of fertilization?	4
		2. explain the process of fertilization in flowering plants	i) Students to discuss in groups the process of fertilization in flowering plants and present their group tasks for plenary discussion . ii) The teacher to lead the plenary discussion and make necessary clarifications.	• Charts/Models /photographs showing the process of fertilization in flowering plants. • Variety of flowers	Can the student explain the process of fertilization in flowering plants?	

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	6.4 Reproduction in Mammals	The student should be able to 1. identify parts of male and female reproductive organs.	i) Students in groups to identify male and female reproductive organs from the dissected mice/any other small mammal.	• Mouse/any other small mammal • Dissecting kit • Tray/dissecting board • Chloroform • Cotton wool • Water.	Can the student accurately identify parts of the male and female reproductive organs?	4
		2. describe the male and female reproductive systems.	i) Students in groups to observe the dissected mammal/models/charts/pictures showing male and female reproductive systems and identify the structures ii) The teacher to lead class discussion and make correction and clarification on the structures of the male and female reproductive systems iii) Students to draw and label diagrams of male and female reproductive systems of a mammal.	• Models of dissected mice • Pictures, photograph and charts showing structures of male and female reproductive system. • Dissected nice or any other small mammal	Is the student able to describe the male and female reproductive systems?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	6.4.1. Gamete Formation and Fertilization	The student should be able to: 1. outline the process of gamete formation in mammals	i) Through question and answers the teacher to guide students to discuss the process of gamete formation in mammals. ii) Students in groups to discuss the process of gamete formation in mammals, gamete formation in mammals. iii) The teacher to lead plenary discussion on gamete formation, liberation and the meaning of gamete.	• Pictures/charts showing formation and liberation of gametes	How correctly can the student outline the process of gamete formation in mammals?	
		2. explain the processes of ovulation and menstruation.	i) Using illustrations/graphs, the teacher to guide the student to identify the phases of menstrual cycle and events that take place in each phase. ii) Students in groups to discuss the process of ovulation and hormones involved in the process.	• Charts/graphs showing phase of menstrual and ovarian cycle.	To what extent is the student able to explain the processes of ovulation and menstruation?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	6.4.1. Gamete formation and Fertilization		iii) The teacher to lead plenary discussion and give comments and clarification on the process of ovulation and menstruation in groups.			
		3. explain the process of fertilization pregnancy and child birth	i) The Teachers to guide students to discuss the process of fertilization pregnancy and child birth. ii) Students in groups to observe charts models/pictures showing process of fertilization in mammals and present their finding in plenary discussion iii) The teacher to lead plenary discussion and to give comment and clarifications on the students responses.	• Charts on fertilization process	How accurately can the student describe the process of fertilization, pregnancy and child birth?	
		4. outline factors which may hinder fertilization.	i) Students to discuss in groups the factors affecting fertilization and present their group tasks for plenary discussion.	• Pictures showing various contraceptives	Is the student able to outline factors which may hinder fertilization?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead plenary discussion and clarify students responses			
		5. explain the concepts of artificial insemination and its importance	i) The teacher to lead students to discuss on the meaning and importance of artificial insemination. ii) The teacher to guide students to summarize the major responses and make general comments.	• Charts/drawing depicting artificial insemination	Is the student able to explain the concept of artificial insemination and its importance?	
	6.4.2 . Multiple Pregnancies	The student should be able to: 1. give the meaning of multiple pregnancies	i) Students to discuss in groups using guiding questions the causes of multiple pregnancies and present their task for plenary discussion. ii) The teacher to lead plenary discussion and make appropriate comments on the students responses	•Charts/pictures /photographs showing multiple pregnancies cases	Can the student accurately explain the causes of multiple pregnancies?	2
		2. explain the causes of multiple pregnancies.	i) Students in groups to discuss the causes of multiple pregnancies and present their task for plenary discussion.	• Charts/pictures on multiple pregnancies	How accurately can the student explain the causes of multiple pregnancies?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead plenary discussion and make clarification and conclusion.			
		3. differentiate between identical twins and fraternal twins.	i) Students to observe the diagrams/photographs/pictures showing identical and fraternal twins and suggest the differences between identical and fraternal twins. ii) The teacher to lead a class discussion and summarize the major points on differences between identical and fraternal twins.	• Charts/ diagrams or pictures showing identical and fraternal twins. • Diagram/ pictures showing fertilization which lead to either identical and fraternal twins	How accurately can the student differentiate between identical and fraternal twins?	
	6.5 Disorders of Reproductive System	The student should be able to: 1. mention types of disorders of human reproductive systems	i) Students in groups to discuss types of disorders of the human reproductive systems. ii) The teacher to lead plenary discussion and make clarification and conclusion	• Documents on the disorders of the human reproductive system.	Is the student able to mention correctly types of the disorders of the human reproductive systems?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. explain causes and effects of the reproductive system disorders	i) Using guiding questions, students in groups to discuss the causes and effects of the reproductive system disorders. ii) The teacher to invite a health officer from the nearby hospital/health centre to talk on the causes and effects of the reproductive system disorders. iii) Students to summarize major points from the guest speaker and the teacher to guide them by clarifying major points.	• Documents on the disorders of the human reproductive. • Manila sheet showing the tabulation of causes and effects of the reproductive system disorders	Is the student able to explain accurately the causes and effects of the reproductive system disorders?	
		3. Suggests possible remedie of reproductive system disorder	i) The teacher to lead class discussion on the possible remedies of reproductive systems disorder. ii) Students to summarize major points on the possible remedies of reproductive system disorders.	• Documents on the disorders of reproductive system • A chart showing the causes and effects of disorders of the human reproductive system.	Can the student suggest remedies of reproductive system disorders?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	6.6 Complications of the Reproductive System	The student should be able to: 1. mention types of complications of the reproductive system	i) The teacher to guide students to brainstorm on the types of complications of the reproductive systems. ii) Students to synthesise their responses and the teacher to guide them to summarize the major points on the meaning of abortion, still births, miscarriage and ectopic pregnancy	• Charts/ pictures/photographs showing complications of reproductive system. • Video tapes • Texts on case studies on complications of the reproductive system.	Is the student able to mention types of complications of the reproductive system?	6
		2. Outline causes of complications of the reproductive system	i) The teacher to guide students to investigate the causes and effects of complications of the reproductive system. ii) Students to visit local health facility to investigate causes and effects of complications of reproductive system. iii) The teacher to lead students to summarize their finding and make conclusion on the complications of the reproductive system	• Video tapes/Charts/ pictures/ photographs showing complications of the female reproductive system. • Texts on case studies on complications of the female reproductive system.	To what extent can the student outline complications of the reproductive system?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. suggest ways to minimize the occurrence of complications and disorders of the reproductive system	i) The teacher to guide students to discuss in groups ways of minimizing complications and disorders of the reproductive system. ii) Students to present their work in plenary discussion and the teacher to guide them in making any necessary corrections.	• Video tapes • Charts, pictures and photographs showing complications of reproductive system • Brochures and fliers • Models showing the reproductive system	Is the student able to suggest ways of minimizing the occurence of complications and disorders of the reproductive system?	
	6.7 Sexuality and Sexual Health and Responsible Sexual Behaviour	The student should be able to: 1. explain the concept of sexuality.	i) Students to discuss the meaning sexuality sexual health and sexual behaviour. ii) The teacher to organize the student's responses and use them to lead a discussion on the meaning of sexuality, sexual health and responsible sexual behaviour.	• Pictures, charts and photographs, video tapes depicting cases of sexuality and sexual behaviours.	Can the student explain the concept of sexuality, sexual health and sexual behaviour?	4
		2. mention social cultural factors influencing sexual behaviour in different age groups of people	i) The teacher to assign group tasks to students to discuss factors influencing sexual behaviour in different age groups of people			

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to present group tasks for plenary discussion and the teacher to guide them to make any necessary corrections and clarifications.	• Pictures, charts, photographs Brochures, fliers, Radio/Video tapes and texts depicting cases of sexuality and sexual behaviour.	Is the student able to mention factors influencing sexual behaviour in different age groups of people?	
		3. differentiate responsible from irresponsible sexual behaviour and their impact on oneself family and community	i) Students using guidelines to role play on responsible and irresponsible sexual behaviour. ii) The teacher to guide students to discuss responsible and irresponsible sexual behaviour and their impact on oneself, family and community as shown in the role play and make conclusions. iii) Students to tabulate the differences between responsible and irresponsible sexual behaviour.	• Radio/Video tapes • Texts depicting cases of sexuality and sexual behavior tapes, pictures and photographs showing people with different sexual behaviour (responsible and irresponsible behaviour)	Is the student differentiate responsible from irresponsible sexual behaviours? Can the student explain the impact of irresponsible sexual behaviour on oneself, family and community?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		4. suggest ways of eradicating irresponsible sexual behaviours/practices in the family and community	i) The teacher to guide students using questions and answers to outline ways of eradicating irresponsible sexual behaviour in the family, school and community. ii) The teacher to guide students to summarise the major ideas and points on the ways of eradicating irresponsible sexual behaviour and practices	• Video tapes, Cassettes pictures and charts showing people with different sexual behaviour. • Texts depicting cases of different sexual behaviour. • Texts depicting cases of sexuality and sexual behaviour. • Pictorial charts	How well can the student suggest ways of eradicating irresponsible sexual behaviours/practices in the family and community?	
		5. mention appropriate life skills required to cope with adolescent sexuality and sexual behaviour.	i) Students in groups using guidelines to role play on appropriate use of life skills to cope with adolescent sexuality and sexual behaviour. ii) Students in their groups to outline key messages in the role-play and mention the appropriate life skills required to cope with adolescent sexuality and sexual behaviour.	• Video tapes, pictures, photographs and charts showing different life skills required to cope with adolescent sexuality and sexual behaviour.	Is the student able to mention accurately appropriate life skills required to cope with adolescent sexuality and sexual behaviours?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to lead plenary discussion and make clarifications on appropriate life skills required to cope with adolescent sexuality and sexual behaviour such as self esteem, problem solving and decision making skills.			
	6.8 Family Planning and Contraception	The student should be able to: I. explain the concepts of family planning and contraception.	i) Students to discuss on the concepts of family planning and contraception. ii) The teacher to invite a guest speaker (health specialist) to talk on family planning and contraception and their advantages and disadvantages iii) Students in groups to observe and examine various family planning devices displayed. iv) The teacher to guide students to summaries major ideas in the guest speaker presentation and make conclusion on the meaning and importance of family planning and contraception	• Various family planning devices (condoms, Intra uterine contraceptive device IUD cap or diaphragm, contraceptive pills, spermicide and the calendar • Charts, pictures, photographs of family planning devices.	Can the student explain accurately concepts of family planning and contraception?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. state social cultural practices which enhance family planning.	i) Students in groups to discuss on social cultural practices enhancing family planning. ii) The teacher to organize the students responses and use them to lead a class discussion.	• Samples of contraceptives. • Charts/pictures of various contraceptives • Radio cossets/video tapes • Texts on merits and demerits of family planning	How correctly can the student state social cultural practices which enhance family planning?	
		3. outline the importance of male involvement in family planning.	i) Students using guidelines to role play on the importance of male involvement in family planning. ii) The teacher to lead class discussion the importance of male involvement in family planning	• Charts/texts on importance of male involvement in family planning • Radio cassettes • Video tapes • Samples of contraceptives.	Is the student able to outline the importance of male involvement in family planning?	
	6.9 Maternal and Child Care	The student should be able to: 1. explai n the concept of maternal and child care.	i) Students to discuss the importance of maternal and child care. ii) Teacher to organize the students' responses and use them to lead a discussion on the concept of maternal and child care	• Charts, photographs, pictures illustrating healthy mother and child. • Samples of proper diet for lactating mother and child	Can the student explain correctly the concept of maternal and child care'?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
				• Samples of powdered milk (e.g Lactogen) • Video tapes • Picture or photographs of a women breast feeding her child	How correctly can the student state social cultural practices which enhance family planning?	
		2. mention socio-cultural factors which affect maternal and child care in the family and community	i) The teacher to assign group tasks to students to investigate socio-cultural factors which affect maternal and child care in the family and community. ii) Students to present group tasks for plenary discussion and the teacher to guide students to summarize their responses and make any necessary corrections and clarifications	• Pictures, photographs charts showing healthy unhealthy mother and child • Samples of infant formula e.g 526 Lactogen) • Video tapes • Video tapes	Can the student mention the socio-cultural factors which affect maternal and child care in the family and community?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. suggest appropriate ways of providing maternal and child care for people living with HIV/AIDS (PLWHA)	i) Students to discuss on the ways of providing appropriate maternal and child care for people living with HIV/AIDS ii) Teacher to organize the students responses and use them to lead a discussion on the ways of providing appropriate maternal and child care for people living with HIV/AIDS (PLWHA) iii) The teacher to invite a guest speaker to talk on way of providing appropriate maternal and child care for people living with HIV/AIDS.	• Charts, pictures and photographs of women and children living with HIV?AIDS. • Samples of proper diet for mother and child living with HIV/AIDS. • Video tapes showing ways of providing appropriate maternal and child care for people living with HIV/AIDS	Is the student able to suggest appropriate ways of providing maternal and child care for people living with HIV/AIDS (PLWH)?	

FORM FOUR

CLASS COMPETENCES

By the end of Form Four, the student should have ability to:

1. make appropriate use of biological knowledge, concepts and principles in solving various problems in daily life;
2. perform practical activities in growth processes, genetics and evolution;
3. demonstrate appropriate use of genetic principles to improve animal, crop production and resolve socio-cultural conflicts;
4. demonstrate positive attitudes towards personal, community and social values as well as resolving health related problems;
5. group organisms according to their similarities and differences.

CLASS OBJECTIVES

By the end of Form Four Course, the student should be able to:

1. acquire basic knowledge, skills, concepts, principle and mechanisms of physiological processes in plants and animal;
2. develop practical skills in studying growth processes, genetics and evolution;
3. apply knowledge, skills and principles of genetics in improving plant and animal breeds as well as resolving socio-cultural conflicts (eg. Marital conflicts and child rejection);
4. develop positive attitude, towards. counseling and voluntarytesting (CVT) and taking care of people living with HIV/AIDS;
5. classify organisms in their respective kingdoms, phylum and class.

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
1.0 GROWTH	1.1 Concept of Growth	The student should be able to: 1. explain the concept of growth.	i) Students to discuss in groups the meaning and importance of growth. ii) The teacher to lead a class discussion on the meaning and importance of growth.	• Charts / diagrams /pictures showing developmental stages of plants and animals. • Real objects	Is the student able to explain the concept of growth?	2
		2. Investigate internal and external factors affecting growth in plants and animals.	i) The teacher to guide students through questions and answers to mention internal and external factors affecting growth in plants and animals. ii) Students guided by the teacher to carry out experiments to investigate internal and external factors affecting growth in plants and animals. iii) The teacher to make reflection of the experiment and clarify main points.	• Organic and Inorganic fertilizers • Pesticides and Herbicide • Water • Sunlight • Rope/thread • Young potted plants • Ruler/tape measures • Small animals • A variety of food substances.	Can the student investigate internal and external factors affecting growth in plants and animals practically?	
	1.2 Mitosis and Growth	The student should be able to; 1. explain the concept of mitosis.	i) The teacher to guide students in groups to discuss the concept of mitosis	• Charts/Models /photographs/Diagrams/slides showing stages of mitosis.	Is the student able to explain the concept of mitosis?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to present their tasks and the teacher to make clarification and conclusion	• Microscope slides • Microscope of mitosis.		
		2. illustratc stages of mitosis	i) The teacher to guide students in groups to discuss stages of mitosis. ii) Students to illustrate stages of mitosis diagrammatically and the teacher to reflect on the drawings and make necessary clarifications.	• Charts/models /photographs/diagrams/slides showing stages of Mitosis • Microscope slides • Microscope	Can the student illustrate correctly stages of mitosis?	
		3. explain the significance of mitosis in growth	i) The teacher to guide students in groups to discuss the significance of mitosis in growth. ii) Students to present their group tasks in a plenary discussion. iii) Teacher to reflect on the presentations and make clarification	• Charts/models /photographs/diagrams/slides showing stages of mitosis • Microscope slides • Microscope	How accurately can the student explain the significance of Mitosis in growth?	
	1.3 Growth and Developmental stages in Human	The student should be able to: 1. explain the concepts of growth and development in human being.	i) Students to discuss the meaning of diffuse growth in groups.	• Charts / diagram of human growth curve.	Is the student able to explain concepts of growth and development in human being?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
1.0 GROWTH			ii) The teacher to culminate the discussion by highlighting the meaning of diffuse growth. iii) Students to use the highlights to deduce the meaning of diffuse growth and distinctive characteristics.	• Charts / diagrams/pictures showing developmental stages in man		
		2. explain the stages of human post-natal growth and development.	i) Students in groups to observe displayed charts and discuss the stages and changes during human growth and development. ii) The Teacher to clarify on the psychological, physiological, physical and behavioral changes associated with each stage of human growth and development.	• Photographs/ Charts showing stages of human growth from infancy to old age	Can the student explain the stages of human post-natal growth and development?	
		3. explain physiological, psychological and behaviour changes associated with growth and development	i) Students in small groups to discuss physiological, psychological and behaviour changes associated with growth and development in childhood, adolescence, reproductive age, middle and old age.	• Charts on Nutrition, shelter, and other basic needs	Is the student able to explain physiological psychological and behaviour changes associated with growth and development?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to culminate the discussion and clarify major points.			
		4. Outline factors which affect the rate of physical deterioration of human body and services required to meet the needs of an individual at each stage	i) The teacher to lead students in groups to discuss the factors affecting the rate of physical deterioration of human body and services required to meet the needs of an individual at each stage. ii) Students to investigate the factors which affect the rate of physical deterioration of human body and services required to meet the needs of an individual at each staff. iii) The teacher to clarify on the study findings and emphasize that improve to reduce factors which affect the rate of physical deterioration of human body and services required to meet the needs of an individual at each stage will enhance the quality of human life.	• Photographs/ charts/diagrams showing human developmental stages • Charts/pictures varieties of food. • A variety of food substances	Can the student outline the factors which affect the rate of physical deterioration of human body and services required to meet the needs of an individual at each stage?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	1.4 Growth in Flowering Plants	The student should be able to 1. explain the concept of seed germination.	i) The teacher to guide students to explain the concepts of localized growth in plants. ii) Students in groups to observe the germinating seeds and growing regions of a plant for 5 - 7 days and discuss the changes observed. iii) The teacher to culminate the discussion by highlighting the concept of localized growth and germination in flowering plants	• Germinating seeds • Ruler/Tape measure • Rope/Thread • Indian ink • Cotton wool • Retina dishes • Hand lens • Young plants	Is the student able to explain the concept of seed germination?	8
		2. outline changes which occur during seed germination.	i) Students to discuss the changes which occur during seed germination. ii) The teacher to lead a class discussion on the changes which occur during seed germination.	• Extracts/texts on the changes which occur during seed germination	Can the student outline changes which occur during seed germination?	
		3. investigate conditions necessary for seed germination	i) The teacher to guide students to perform an experiment to investigate the conditions necessary for germination and discuss their findings.	• Seeds • Water • Cotton wool • Petri dishes • Indian ink	How accurately can the student investigate conditions necessary for seed germination experimentally?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to deduce from the findings the conditions necessary for germination and present their task in a class discussion. iii) The teacher to reflect on the presentations and point out the conditions necessary for seed germination	• Textual materials	Is the student able to explain the concept of localized growth and germination?	
		4. carry out practical activities to demonstrate epigeal and hypogeal germination.	i) Students in groups to carry out experiments on epigeal and hypogeal germination and report their experiment findings in plenary discussion. ii) The teacher to reflect on students responses and make necessary clarifications	• Diagrams/ drawings on seed germination	Can the student carry out practical activities to demostrate on epigeal and hypogeal germination?	
		5. examine growing regions of a radical and plumule (root and shoot apices)	i) Students in groups to perform experiments to examine the growing regions of a radical and a plumule (root and shoot apices).	• Germinating seeds • Petridishes • Water • Thread/Rope • Ruler • Indian ink	Can the student examine growing regions of a root and a shoot experimentally?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to take measurement of the growing shoot and root periodically and discuss their findings. iii) The teacher to make reflection of the experiment and clarify main points			
2.0 GENETICS	2.1 Concept of Genetics	The student should be able to: 1. explain the concept of genetics.	i) Students in groups to discuss the meaning of genetics, variations and resemblance which exists among members of the same family. ii) The teacher to give conclusion thereby formulate definitions of inheritance and genetics	• Photographs/ pictures showing members of the same family	Is the student able to explain the concept of genetics?	
		2. state common terms used in genetics.	i) The teacher to display all common terms used in genetics. ii) Students to discuss on the meaning of each term and synthesize their responses thereby to formulate definition/meaning of each term	• Charts showing common terms used in genetic	How correctly can the student state common terms used in genetics?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to make clarification and conclusion on the common terms used in genetics			
	2.2 Genetic Materials	The student should be able to: 1. explain the concept of genetic materials.	i) Students to discuss on the meaning of genetic material. ii) The teacher to make clarification and conclusion.	• Models/Charts / pictures showing genetic materials	Is the student able to explain the concept of genetic materials?	
		2. describe the structure and composition of genetic materials. (Deoxyribonucleic acid and Ribonucleic acid)	i) Students in groups to observe models/pictures/photographs of DNA and RNA molecules and discuss its structure and composition ii) Students to draw and label the structure of DNA and RNA molecule. iii) The teacher to lead a class discussion on the structure of DNA and RNA molecules and clarify the students responses.	• Models / diagram / pictures/photography DNA molecule • Plasticine/clay soil/beads for moulding DNA molecule model • Zip	Can the student describe the structure and composition of genetic materials?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. differentiate Deoxyribonucleic acid (DNA) from Ribonucleic acid (RNA)	i) Students in groups to observe Models/pictures/diagrams/ of DNA and RNA and discuss their differences. ii) The teacher to clarify on the differences between DNA and RNA and make conclusion.	• Models / pictures/diagrams of RNA & DNA and DNA molecules	Is the student able to differentiate DNA from RNA?	
	2.3 Principles of Inheritance 2.3.1 Concept of Inheritance	The student should be able to 1. explain the concept of inheritance	i) Students in groups to discuss observable features of members of the same family. ii) The teacher to lead plenary discussion and make clarification and conclusion on the concept of inheritance.	• Pictures / photographs of members of the same family • Flowers and leaves of plants of the same family e.g Okra, Hibiscus ,cotton, bean and pea plants.	Can the student explain the concept of inheritance?	
	2.3.2 Mendelian inheritance	The student should be able to 1. state Mendel's First Law of inheritance	i) The teacher to organize a study visit at school farm or near by peas/bean farm. ii) Students in groups to observe and discuss different parts of the plant (i.e stem length, flower colour, pod colour and shape, and seed colour and shape)	• Mature Pea or beam plant.	Is the student able to state the Mendel's First Law of Inheritance?	8

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to use students findings to lead a class discussion on the characteristics features used to investigate Mendels First law of inheritance . iv) Students to summarize major points and state Mendel's First Law of inheritance.			
		2. illustrate monohybrid crosses and interpret their results of crosses and ratios	i) Students to discuss the meaning of monohybrid crosses and ratios. ii) The teacher to guide students to illustrate using genetic diagrams the monohybrid crosses and ratios.	• Fresh green peas/beans pods • Pictures/ photographs	How accurately can the student illustrate monohybrid crosses and ratios? Can the student accurately interpret the monohybrid crosses and ratios?	
		3. interpret data from monohybrid experiments to demonstrate Mendel's First Law of Inheritance	i) Students in groups using guidelines to interpret data form monohybrid experiments to demonstrate Mendel's First Law of inheritance and discuss their interpretation findings.	• Pea/bean seeds • Beads of two different colors (e.g black and white/red and yellow) • Beakers	Can the student intorpret data from monohybrid experiments to demonstrate Mendel's First Law of Inheritance experimentally?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher use students findings to make clarifications and conclusion.			
		4. illustrate patterns of Inheritance that follow Mendel's First Law of Inheritance	i) The teacher to guide students in groups to diseuss the patterns of inheritance of albinisms, tongue rolling, ABO and Rhesus factors (Rh factor) blood grouping and sickle cell anaemia. ii) Student to present group tasks in a plenary discussion.	• 250gm (1/4kg) of bean or pea seeds • 50 - 100 beads of two different colour (e.g black and white/red and yellow) • Beakers	Is the student able to illustrate patterns of Inheritance that follow Mendel's First Law of Inheritance?	
	2.3.3 Non-Mendelian Inheritance	The student should be able to: 1. explain concepts of incomplete dominance and co dominance.	i) Students in groups to discuss the meaning of Incomplete dominance and co-dominance ii) The teacher to use students' responses to clarify on the meaning of incomplete dominance and co-dominance	• Charts, pictures and photographs showing members of the same family. • Pictures / photographs showing animals with different colour black, white, brown and dotted cow, cat goat or hen.	Is the student able to explain incomplete dominance and co-dominance?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. illustrate patterns of inheritance that deviates from Mendel's First Law of Inheritance	i) Students to discuss on the patterns of inheritance that deviates from the Mendel's First Law of Inheritance. ii) The teacher to organize students responses and use them to describe using genetic diagrams the pattern of inheritance that deviates from the Mendel's First Law of Inheritance. iii) Students to describe patterns of inheritance using genetic diagram.	• Chart, pictures, photographs • Beads of different colours • Beakers	How well can the student illustrate patterns of inheritance that deviates from Mendel's First Law of Inheritance?	
	2.4 Sex Determination and Inheritance	1. describe the mechanism of sex determination and inheritance.	i) Students in group using genetic diagrams to describe the mechanism of sex determination and inheritance. ii) The teacher to make clarification and conclusion on the mechanism of sex determination and inheritance.	• Photographs /pictures showing different animals	Can the student describe the mechanism of sex determination and inheritance?	8

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. explain the concepts of sex linked, sex limited, and sex influenced characters	i) Students in groups to discuss the meaning of sex linked, sex limited and sex influence characters. ii) Students in groups to discuss observable features of animals of different sex (e.g long hair of lion, big comb and plumage of hen, long horns of goat and cow). iii) The teacher to make clarification and conclusion on the concepts of sex linked, sex limited and sex influenced characters.	• Charts, pictures, photographs showing animals of different sex e.g long horned goat/cow big comb and plumage of her	Is the student able to explain the concept of sex linked, sex limited and sex influenced characters?	
		3. explain consequences of sex preference and sex selection.	i) Students to discuss on the consequences of sex preference and sex selection. ii) The teacher to organize the student's responses and use them to lead a discussion on the consequences of sex preference and sex selection.	• Samples of study report on socio-cultural factors influencing sex preference and sex selection.	Is the student able to explain consequences of sex preference and selection?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to invite a guest speaker to talk on sex preference and sex selection and its consequences. iv) Students to summaries major points from the guest speakers presentation that will lead them to explain consequences of sex preference and sex selection		Is the student able to explain the concept of sex linked, sex limited and sex influenced characters?	
	2.5 Variation among Organisms	The student should be able to 1. explain the concept of variation.	i) Students in groups to observe, discuss and record variations exist among members of the same family. ii) The teacher to lead class discussion and make clarifications	• Pictures/ photograph of members of the same family • Real objects	Can the student correctly explain the concept of variations?	4
		2. identify variations among organisms	i) The teacher to guide students through questions and answers to identify variations among organisms. ii) Students in groups to carry out simple experiments on variations among organisms, record their findings.	• Extracts/texts on variations among organisms.	How accurately can the student identify variations among organisms?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. give the meaning of continuous and discontinuous variations.	i) Students in groups to discuss different types of variations. ii) The teacher to lead class discussion on the meaning of, continuous and discontinuous variations.	• Pictures / photographs of members of the same species • Real objects	Is the student able to give the meaning of, continuous and discontinuous variations?	
		4. differentiate continuous from discontinuous variation	i) The teacher to assign group tasks to students to observe and discuss different types of variation existing in organisms around the school surroundings ii) Students to discuss the differences between continuous and discontinuous variation. iii) Using the information collected, the teacher to clarify on the differences between continuous and discontinuous variations.	• Variety of organisms around the school surroundings	Can the student differentiate continuous from discontinuous variation?	
		5. explain causes of variation among organisms.	i) Students to discuss and suggest the possible causes of variation among organisms.	• Variety of organisms showing different variations	Is the student able to explain causes of variation among organisms?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to jot down the students response in the chalk board and give comments and clarifications on the causes of variation among organism.			
	2.6 Genetic Disorders	The student should be able to: 1. give the meaning of genetic disorders.	i) Students in groups to observe the DNA molecules model and discuss the arrangement of bases. ii) The teacher to guide students to alter the sequence of bases of the DNA molecule model and discuss its consequences (genotypically and phenotypically) iii) The teacher to summarise students r3esponses and guide them to formulate proper meaning of genetic disorders	• Models of DNA molecule • Pictures/ photographs showing individuals with different genetic disorders	Can the student give the meaning of genetic disorders? 8	8
		2. cite examples of genetic disorders.	i) Students in groups to discuss various types of genetic disorders (e.g Turner syndrome, Down's syndrome and Mongolia)	• Charts/ Photographs/ac tor of suckled red blood cells,	Is the student able to cite examples of genetic disorders?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead a plenary discussion on the various types of genetic disorders.	• Pictures/ photographs showing people with different types of genetic disorders (e.g Turners' syndrome. Down's Syndrome, or Mongolia, super males, super females, haemophilia and colour blindness)		
		3. explain the causes and effects of genetic disorders.	i) Students in groups to discuss causes and effects of genetic disorders and present their group tasks for plenary discussion. ii) The teacher to lead plenary discussion and give comments and clarification on the causes and effects of genetic disorders	• Sample of chemicals such as caffeine, nicotine. • Samples of drugs • Food preservative • Charts/pictures showing the effect of X-rays, gamma rays and Ultra-Violet light to organisms • Heavy metal e.g Mercury	How accurately can the student explain the causes, and effects of genetic disorders?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	2.7 Application of Genetics	The student should be able to: 1. outline application of genetics in everyday life.	i) Students in groups to discuss on the application of genetics in livestock and crop production. ii) The teacher to organize student's responses and use them to lead a class discussion on the application of genetics in livestock and crop production.	• Pictures/ photographs/charts showing crops and livestock hybrids • Sample of genetically modified food • Pictures/ photographs showing genetically modified food	Can the student outline applications of genetics in Livestock and Crop production?	6
		2 explain the importance of genetics in biological science and related fields.	i) Students in groups to discuss the importance of genetics in biological science and related fields ii) The teacher to use student responses to discuss and make clarification on the importance of genetics in biological science and related fields.	• Pictures, photographs and charts showing crop and livestock hybrid. • Pictures/ Photographs showing genetically modified organisms. • Samples of genetically modified food.	Is the student able to explain the importance of genetics in biological science and related fields?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
3.0 CLASSIFICATION OF LIVING THINGS	3.1 Kingdom Animalia	The student should be able to: 1. explain general and distinctive features of the Kingdom Animalia	i) The teacher to display live preserve animal specimens and students to group according to their similarities and differences. ii) Students in groups using guiding questions to observe the collected and displayed organisms, identify and record their common characteristics. iii) The teacher to lead students in a class discussion on the general and distinctive features of the kingdom Animalia and make clarifications.	• A variety of animals • Pictures and charts of organisms in kingdom Animalia • Charts of characteristics of Kingdom Animalia	Is the student able to explain correctly the general and distinctive features of the Kingdom Animalia?	2
		2. mention the major phyla of the kingdom Animalia	i) The teacher to guide students to observe and group organisms according to their similarities and differences.. ii) Students to classify organisms to their respective phyla and the teacher to clarify on students misconceptions.	• A variety of animals • Charts, diagrams and pictures of different animals. • Charts showing characteristics of phyla of Kingdom Animalia.	How accurately can the student mention the major phyla of the Kingdom Animalia?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	3.1.1 Phylum Platyhelminthes	The student should be able to: 1. explain the general and distinctive features of the phylum Platyhelminthes.	i) Students using hand lens to observe preserved specimens of flatworms and record their physical features. ii) The teacher to lead a class discussion on the general and distinctive features of phylum Platyhelminthes. iii) Students to outline the general and distinctive features of phylum Platyheliminthes and the teacher to make clarifications.	• Preserved specimens • Preserved tapeworms, liverfluke • Diagrams/ pictures of flat worms e.g planaria liver fluke, tapeworms • Hand lenses	Is the student able to explain with examples the general and distinctive features of the phylum Platyhelminthes?	2
		2. describe the structure of organisms under the phylum Platyhelminthes.	i) Students in groups using hand lenses to observe the tapeworm *Taenia* and record its distinctive features. ii) The teacher to lead a plenary discussion about the structure and general and distinctive features of a tapeworm (*Taenia*).	• Pictures of flat worms (Taenia, liver fluke, Planaria • Charts of the general and distinctive features of phylum Platyhelminthes	How accurately can the student describe the structure of tapeworm (*Taenia*)?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teachers to guide students to describe the structure of *Taenia* (tapeworm) and give clarifications. iv) Student to draw a well labeled diagram of a tapeworm.	• Preserved specimen of flatworms • Charts of the general and distinctive features of *Taenia* (Tapeworm)		
		3. explain the advantages and disadvantages of *Taenia* (Tapeworm)	i) The teacher to lead students to discuss the advantages and disadvantages of flatworms. ii) Students to outline the advantages and disadvantages of Tapeworms	• Pictures/ preserved specimen of Tape worms	Is the student able to explain the advantages and disadvantages of *Taenia* (tapeworm)	
	3.1.2 Phylum Aschelminthes (Nematoda)	The students should be able to: 1. explain general and distinctive features of the phylum Aschelminthes	i) Students in groups to observe preserved round worms or pictures and diagrams of round worms and record their distinctive characteristics. ii) The teacher to guide students to discuss in a plenary the distinctive features of round worms and give clarifications	• Preserved specimen of round worms (*Ascaris*), hookworms. • Hand lenses • Pictures, charts or photographs of roundworms	Is the student able to explain correctly the general and distinctive features of the phylum Aschelimnthes (Nematoda)?	4

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. describe the structure of organisms under the phylum Aschelminthes	i) Students using hand lenses to observe and identify posterior and anterior ends of a roundworm. ii) The teacher to guide the students to identify anterior and posterior ends of *Ascaris* and describe their distinctive features. iii) Students to draw and label a diagram of the roundworms (*Ascaris*).	• Preserved specimen of *Ascaris* • Charts, Pictures and diagrams of *Ascaris* • Handlens	Can the student describe accurately the structure of *Ascaris* (round worms)?	
		3. outline the advantages and disadvantages of roundworms.	i) Students in groups to discuss the advantages and disadvantages of the phylum Aschelminthes and present their work in a plenary session. ii) The teacher to reflect on the presentations giving comments and clarification.	• Charts of phylum Aschelminthes Earthworms	How correctly can the student outline the advantages and disadvantages of roundworms?	
	3.1.3 Phylum Annelida	The student should be able to 1. explain general and distinctive features of the phylum Annelida.	i) Students to observe organisms under the phylum Annelida (earthworm and leeches) and discuss their characteristic .	• Diagrams and pictures/photo graphs of leeches and earthworms	Is the student able to explain accurately the general and distinctive features of the phylum *Annelida*?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead plenary discussion on the general and distinctive feature of the phylum Annelida.	• Chart to show the structure of leeches and earthworms. • Preserved specimens of annelids		
		2. describe structure of organism under the phylum Annelida (Earthworm).	i) Students using hand lens to observe preserved and live specimens of earth worms to identify body parts. ii) Students in groups to record their observations, draw and label diagram of an earthworm to show its external features. iii) The teacher to lead a plenary discussion on the structure of the earthworm.	• Live or preserved earthworms. • Diagrams and pictures of earthworm. • Hand lens	Can the student accurately describe the structure of the organism under the phylum Annelida?	
		3. explain the advantages and disadvantages *Lumbricus* (earthworm)	i) Students in groups to discuss advantages and disadvantages of *Lumbricus* (earthworm). ii) The teacher to lead a class discussion on the advantages and disadvantages of earthworms.	• Pictures, diagram or photographs showing earthworm. • Live or preserved specimen. • Hand lens	Is the student able to explain the advantages and disadvantages of *Lumbricus* (earthworm)?.	

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	3.1.4 Phylum Arthropoda	The student should be able to: 1. explain general and distinctive features of the phylum Arthropoda.	i) The teacher to lead a plenary discussion on general and distinctive features of phylum Arthropoda. ii) Students in groups using guiding questions to observe and record the distinctive and general features of the collected/displayed specimens of Arthropods.	• Pictures Diagrams of arthropods • Preserved or live specimens of varieties of Arthropods • Hand lens	How accurately can the student explain the general and distinctive features of the phylum Arthropoda?	4
		2. mention classes of the phylum Arthropoda.	i) Students in groups to observe variety of arthropods and groups them according to their similarities and differences. ii) The teacher to lead a plenary discussion and make necessary clarifications o A variety of arthropods (live or preserve specimens)	• Pictures and photographs of variety of arthropods • Chart of classes of arthropods • Hand lens	Can the student accurately mention the classes of the phylum Arthropoda?	
		3. cite examples of organisms under each class of the phylum Arthropoda	i) Using guidelines students to collect variety of organisms belonging to each class of the phylum Arthropoda.	• Variety of organism of each class of the phylum Arthropoda	How accurately can the student cite examples of organisms under each class of the phylum Arthropoda?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students in groups to discuss the characteristic features of organisms under each class and cite examples of organisms belonging to each class.			
		4. explain distinctive features of each class of the phylum Arthropoda	i) Students in groups to discuss the general and distinctive characteristics of one of the five classes of phylum Arthropoda. ii) The teacher to guide the students in their groups to discuss and come up with the correct general and distinctive characteristics of the respective class.	• A variety of Arthropods (live or preserved specimens) • Charts, pictures, photographs showing varieties of Arthropods	Is the student able to explain distinctive features of each class of the phylum Arthropoda?	
		5. describe structures of representative organisms under each class.	i) Students in groups to observe organisms of each of the phylum Arthopoda and discuss their charactcristic features. ii) Students to draw well labeled diagrams of representative organisms under each class of the phylum Arthropoda.	• Varieties of organisms of each class of the phylum arthropod. • Charts/pictures /photographs showing of Arthropods.	Can the student describe the structures of representative organisms under each class?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			iii) The teacher to lead a plenary discussion and reflect on students responses to make general comments and clarifications.			
		6. explain the advantages and disadvantages of the organisms under each class of phylum Arthropoda.	i) The teacher to guide students in groups to discuss the advantages and disadvantages of each class of the phylum Arthropoda. ii) Students to present their group tasks in a plenary session and the teacher to reflect on the students responses and give clarifications	• Chart showing advantages and disadvantage of each class of phylum arthropods • A variety of Arthropods (live or preserved species).	How accurately can the student explain the advantages and disadvantages of each class of the phylum Arthropoda?	
	3.1.5 Phylum Chordata	The student should be able to I. explain general and distinctive characteristic features of the phylum Chordata.	i) The teacher to guide students to observe a variety of common chordates and record their observations. ii) Students to present their responses in plenary for discussion iii) The teacher to guide students in a class discussion to outline the general and distinctive features of phylum Chordata	• Pictures, charts or showing varieties of common chordates e.g mice, frog, lizard, birds, fish, snake, mouse and rats • Live or preserved specimen of chordates e.g frog, fish, lizard rats and birds.	Is the student able to explam the general and distinctive characteristic features of the phylum Chordata?	8

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2.mention classes of the phylum Chordata.	i) Using question and answers, the teacher to lead students to identify different groups within the phylum Chordata. ii) Students in groups to discuss on different classes of the phylum Chordata. iii) The teacher to lead plenary discussion and give necessary clarifications.	• Charts/pictures /photographs of different chordates in their respective classes. • Varieties of chordates (live or Preserved specimens).	Can the student mention the classes of the phylum Chordata?	
		3. explain distinctive features of each class of the phylum Chordata.	i) The teacher to organize students into groups and assign each group a task of collecting information from relevant textual materials about classes of phylum Chordata. ii) Students to present their findings in a plenary session.	• Charts/pictures /photographs showing different chordates, in their respective classes • Varieties of chordates (live or preserved specimens)	Can the student correctly explain the distinctive characteristics of each class of phylum Chordata?	
		4. describe structure of representative organisms in each class of phylum Chordata.	i) Students individually to describe the features of some common chordates. draw and label them to show their external features.	• Live or preserved specimens of Tilapia (fish), birds, frog,/road lizard and rat mouse lizard and rat /mouse	How correctly can the student describe the structure of representative organisms from each class of phylum Chordata?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to guide students individually to draw and label the named organisms to show their external features.			
		5. outline the advantages and disadvantages of the organisms under each class of phylum Chordata.	i) The teacher to guide students to discuss in groups the advantages and disadvantages of each class of the phylum Chordata. ii) Students to tabulate the advantages and disadvantages of each class of phylum Chordata.	• Live or preserved specimens of different chordates. • Charts/pictures /photographs showing different chordates.	Is the student able to outline the advantages and disadvantages of organisms under phylum Chordata?	
	4.0 EVOLUTION	4.1 Concept of Organic Evolution	The students should be able to: explain the concept of organic evolution i) The teacher to lead students through questions and answers to give the meaning of organic evolution ii) Students to discuss the meaning of organic evolution.	• VIPP cards on the concept of organic evolution	Is the student able to explain the concept of organic evolution?	2

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	4.2 Theories of the Origin of life	The student should be able to 1. outline the basic ideas about the origin of life.	i) The teacher to prepare cards or texts on the basic ideas about the origin of life. ii) Students using the prepared cards or texts to discuss in small groups the basic ideas about the origin of life and present their task. iii) The teacher to lead a class discussion, give general comments and make conclusion.	• V.I.P Cards • Texts extracted from variotus sources on the basic ideas about the origin of life	To what extent can the student outline the basic ideas about the origin of life?	4
		2. state the theories of the origin of life.	i) Using guiding questions, students to discuss in small groups the theories of the origins of life such as special creation, spontaneous generation and steady state theories. ii) Students to present group tasks in plenary discussion and the teacher to guide them in summarizing the major ideas.	• Texts extracted from various sources explaining theories of the origin of life.	Can the student state the theories of the origin of life?	

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	4.3 Theories of Organic Evolution 4.3.1 Lamarckism	The student should be able to 1. state Lamarck's theory of evolution	i) The teacher to lead a class discussion on the major ideas of the Lamarck's theory of evolution. ii) Students to summarize the major ideas of Lamarck's theory of evolution.	• V.I.P.P cards on the major idea of Lamarck's theory	How correctly can the student state Lamarck's theory of evolution?	2
		2. explain Lamarck's observations and deductions	i) Using questions and answers, the teacher to lead students to point out the Lamarck's observation and deductions. ii) Students to summarize their responses on the Lamarck's observations and deductions.	• Chart on the Lamarck's observation and deductions	Is the student able to explain Lamarck's observations and deductions?	
		3. outline merits and demerits of Lamarck's theory of evolution.	i) Students to brainstorm on the merits and demerits of Lamarck's theory of evolution. ii) The teacher to guide students to organize and summarize their responses on the merits and demerits of Lamarck's theory of evolution	• A chart on the merits and demerits of Lamarck's theory of evolution	Can the student outline the merits and demerits of Lamarck's theory of evolution?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	4.3.2 Darwinism	The student should be able to 1. state Darwin's theory of evolution.	i) The teacher to lead a class discussion on the major idea of Darwin's theory of evolution. ii) Students to summarize the major ideas in order to state Darwin's theory of evolution.	• V.I.P.P cards on the Darwin's theory of evolution.	Is the student able to state Darwin's theory of evolution?	4
		2. outline Darwin's observations and deductions.	i) The teacher to guide students in groups to discuss Darwin's observations and deductions using guiding questions. ii) Students to present group tasks in plenary discussion and the teacher to guide them to summarize their responses and make conclusion	• A chart showing summary of Darwin's observations and deductions.	To what extent is the student able to outline Darwin's observations and deductions?	
		3. explain the theory of natural selection in relation to the mechanism of evolution.	i) Students to discuss in groups and make presentations on the major ideas in the theory of natural selection in relation to the mechanisms of evolution.	• A chart showing major ideas of the theory of natural selection.	How accurately can the student explain the theory of natural selection in relation to the mechanisms of evolution?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) The teacher to lead plenary discussion and guide students to summarize major ideas. make clarifications and conclusion.			
		4. explain merits and demerits of Darwin's theory.	i) Students to discuss in groups the merits and demerits of Darwin's theory of evolution using guiding questions. ii) Students to present in plenary their group tasks and the teacher to guide them to summarize and record major points on merits and demerits of Darwin's theory of evolution.	• Manila sheet showing tabulation of merits and demerits of Darwin's theory of evolution	Is the student able to explain the merits and demerits of Darwin's theory of evolution?	
	4.4 Evidence of Organic Evolution	The student should be able to 1. mention sources of evidence which support organic evolution.	i) The teacher to guide students through questions and answers to list down sources of evidence of organic evolution. ii) The teacher to lead a class discussion on the sources of evidence of organic evolution.	• Photographs of remains of plants and animals in rocks.	Can the student mention sources of evidence which support organic evolution?	6

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		2. Explain evidence of organic evolution	i) Students in groups to observe pictures or photographs and discuss the evidences of organic evolution. ii) Students to present their group tasks in plenary discussion and the teacher to guide them to summarize major points and make clarifications.	• Photographs/ pictures of fossils in the rock strata	Can the student adequately explain the evidence of organic evolution?	
		3. Investigate evidences and application of organic evolution in the real life situation.	i) The teacher to organize a study tour to the archives historical sites which show the evidences of organic evolution. ii) Students in groups to discuss the major findings from the study tour, prepare a report and present in plenary discussion. iii) The teacher to lead plenary discussion, guide students to summarize their findings and make conclusion.	• Photographs /pictures of fossils in the rocks	How correctly can the student investigate evidences and application of organic evolution in real life situation?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
5.0 HUMAN IMMUNO DEFICIENCY VIRUS (HIV)/ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS) AND SEXUALLY TRANSMITTED INFECTIONS (STIs)	5.1 Relationship between HIV, AIDS and STIs	The student should be able to: 1. distinguish between HIV.AIDS and STIs.	i) The teacher to guide students to brainstorm on the differences between HIV, AIDS and STIs ii) Students to record the correct responses and tabulate the differences between HIV, AIDS and STIs.	• Reports from UNAIDS, NACP and TACAIDS • Charts on AIDS in Africa	Is the student able to distinguish between HIV/AIDS and STIs?	6
		2. explain the relationship between HIV and STIs.	i) The teacher to lead a class discussion on relationship between HIV and STIs focusing on similarities, differences, mode of transmission and effects. ii) Students to record and summarize major ideas on the relationship between HIV and STIs.	• Reports on HIV/AIDS and STIs • Charts on AIDS in Africa/World/Tanzania	Is the student able to explain the relationship between HIV and STIs?	
		3. investigate the impact of HIV/AIDS and STI in the community.	i) The teacher prepare guidelines for students to investigate the impact of HIV/AIDS and STIs in the community.	• Real objects • Samples of study reports on impacts of HIV/AIDS/ STIs	Can the student investigate the impact of HIV/AIDS and STIs in the community?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
			ii) Students to carry out an investigation on the impact of HIV/AIDS and STIs in the community. iii) Students to analyze their finding and present study reports in a plenary session and clarify where necessary.			
	5.2 Management and Control of HIV/AIDS and STIs	The student should be able to: 1. outline ways of managing and controlling HIV, AIDS and STIs. 2. mention the life skills needed for home based care for PLWHA.	i) The teacher to lead students to discuss ways of management and control of HIV, AIDS and STIs. ii) Students to present their task in a plenary discussion and the teacher to make necessary clarifications. i) The teacher to prepare extracts from or magazines on the management of HIV/AIDS/STIs . ii) Students in groups to discuss life skills needed for management and control of HIV/AIDS and STIs.	• Mammal on management HIV/AIDS and STIs • Reports on HIV/AIDS and STIs • Extracts/texts on HIV/AIDS and STIs • Life skill manual • Extracts/texts on Life skills for Management of HIV/AIDS and STIs • FLE Biology Teachers Guide Form III & IV	Is the student able to outline ways of managing and controlling HIV/AIDS and STIs? Can the student mention the appropriate life skills needed for home based care for PLWHA.	

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			iii) Students in groups to role play how to use different life skills in the management and control of HIV/AIDS and STIs. iv) The teacher to lead students to reflect on role-plays and summarize major ideas in the management and control of HIV/AIDS/STIs.		Is the student able to outline ways of managing and controlling HIV/AIDS and STIs?	6
		3. mention precautions to be taken when handling people living with HIV/AIDS (PLWHA) and STIs.	i) Students in groups to discuss on the necessary precautions when handling HIV infected people and those with STIs/STDs. ii) Students to share their group work in a plenary session. iii) The teacher to guide students to prioritize the mentioned precautions for handling people with STIs and those living with HIV/AIDS.	• Brochures and fliers on methods of handling people living with HIV/AIDS • Charts on HIV/AIDS/STIs in Africa/World/Tanzania • FLE Biology Teacher Guide for form III & IV	Can the student mention the appropriate life skill needed for management and control of HIV/AIDS and STIs	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
	5.3 Counselling and voluntary Testing (CVT)	The student should be able to 1. explain the concept of counseling and voluntary testing.	i) Students in group to discuss the meaning and importance of counseling voluntary and testing. ii) Students to present their group tasks in a plenary discussion and the teacher to give clarifications where necessary.	• CVT manual • Reports on HIV/AIDS/ STIs	Is the student able to explain the concept counselling and voluntary testing (CVT)?	
		2. outline the significance of cvt in the control and prevention of HIV/AIDS and STIs.	i) The teacher to lead students through questions and answers to outline the significance of CVT in the control of HIV/AIDS/STIs. ii) Students in groups to discuss the significance of CVT in the control and prevention of HIV and STIs. iii) Students to present their tasks in a plenary session and the teacher to give clarifications.	• Manuals on CVT • Reports on CVT	Can the student outline the significance of CVT in control and prevention of HIV and STIs?	

TOPIC	SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEANING STRATEGIES	TEACHING/ LEARNING RESOURCES	ASSESSMENT	NO. OF PERIODS
		3. explain the procedures and techniques of CVT for HIV/AIDS	i) The teacher to provide guidelines on the procedures and techniques of counseling voluntary and testing. ii) Students in groups to discuss the procedures and techniques for CVT and record the main ideas. iii) Students to share their findings and observations in plenary discussion.	• Manuals on counseling voluntary and Testing for HIV/AIDS/ STIs • Extracts/texts on procedures and techniques of CVT	Is the student able to explain the procedures and techniques for counseling voluntary and testing?	

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