

**MINISTRE DES ENSEIGNEMENTS SECONDAIRES**  
*MINISTRY OF SECONDARY EDUCATION*

**INSPECTION GENERALE DES ENSEIGNEMENTS**  
*INSPECTORATE GENERAL OF EDUCATION*

**BIOLOGY SYLLABUS**  
*Forms 3, 4 and 5*



*Observer son environnement pour mieux orienter ses choix de formation et réussir sa vie*

**INSPECTION DE PEDAGOGIE CHARGEE DE L'ENSEIGNEMENT DES SCIENCES**  
*INSPECTORATE OF PEDAGOGY IN CHARGE OF SCIENCES*

**December 2014**

REPUBLIQUE DU CAMEROUN  
*Paix - Travail – Patrie*

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MINISTERE DES ENSEIGNEMENTS  
SECONDAIRES

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INSPECTION GENERALE DES ENSEIGNEMENTS  
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REPUBLIC OF CAMEROON  
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MINISTRY OF SECONDARY EDUCATION

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INSPECTORATE GENERAL OF EDUCATION  
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Order N° 419/14 /MINESEC/ IGE ..... *Eup* = 9 DEC 2014

To outline the syllabuses for Form III, Form IV and Form V of Secondary General Education.

THE MINISTER OF SECONDARY EDUCATION,

**Mindful of the Constitution;**

**Mindful of the Law N° 98/004 of 14 April 1998 to lay down Guidelines for Education in Cameroon;**

**Mindful of Decree N°2011/408 of 9 December 2011 to reorganise the Government;**

**Mindful of Decree N°2011/410 of 9 December 2011 to form the Government;**

**Mindful of Decree N°2012/267 of 11 June 2012 to organise the Ministry of Secondary Education;**

**HEREBY ORDERS AS FOLLOWS:**

**Article 1:** The syllabuses for Form III, Form IV and Form V of Secondary General Education shall be outlined as follows:

## PREFACE

### SYLLABUSES FOR 21ST CENTURY CAMEROON

At the beginning of this millennium, as Cameroon chooses to become an emerging nation by the year 2035, its secondary education sector faces many challenges. It should:

- Offer quality training and education to most young Cameroonians within a context marked by large classes in primary education;
- Prepare them for smooth insertion into a more demanding job market worldwide, through a pertinent teaching /learning process.

In addition, training tools have significantly evolved in their conception and implementation. A school that was mostly based on contextualised knowledge acquisition has given room, all over the world, for a school that aims at empowering learners to help them cope with complex and diversified real life situations. Instead of a school cut off from society, we now have a school deeply rooted in a society that takes into account sustainable development, local knowledge and cultures.

The implementation of this new school ,prescribed by the Law to lay down guidelines for education in Cameroon, and the necessity for socio-professional insertion require the adoption of a pedagogic paradigm for the development of syllabuses relating to **“The competence based approach with an entry through real life situations “**.

In this perspective, new syllabuses for Secondary General Education, those of Teacher Education and Training Referentials for Technical Education are part of this great change for the re-dynamisation of our education system. They are in line with the implementation of the provisions of Growth and Employment Strategy Paper (DSCE) which, by the year 2020, specifies the minimum amount of knowledge which each Cameroonian is supposed to possess by the time they leave the first cycle of secondary education.

These syllabuses define essential competencies that should be acquired by learners within the first cycle of secondary education, in terms of knowledge, know how and attitudes. They equally define the framework that will enable teachers to organise their pedagogic activities.

While congratulating all those who designed these syllabuses, I hereby exhort all the members of the education family, notably teachers, to acquaint themselves with the new paradigm, to effectively implement it and make the Cameroon education system successful.

  
The Minister of Secondary Education  
*Louis Bahes Bahes*

## FIRST CYCLE SYLLABUS REVIEW

### A PARTICIPATORY AND INNOVATIVE APPROACH

The syllabuses that were drawn up by the Inspectorate General of Education in the Ministry of Secondary Education since 2012 are in accordance with the major guidelines for education in general and secondary education in particular as they are enshrined both in the 1998 law to lay down guidelines for education in Cameroon and in the 2009 Growth and Employment Strategy Paper(DSCE) .

These orientations could be summarised, amongst others, to train within the framework of an emerging Cameroon in the year 2035, citizens that will have a good mastery of the two official languages (English and French), deeply rooted in their cultures but open to a world in search for sustainable development and dominated by Information and Communication Technologies.

Conceived in the various Inspectorates of Pedagogy, and later introduced for trialling in secondary and high schools during the 2012/2013 school year, these syllabuses were developed with the contributions of classroom teachers and teacher trade unionists.

The new syllabuses had to undergo many changes:

- a shift from a skill based approach to a competence based approach through real life situations;
- a shift from a school cut off from society to one that prepares citizens for a smooth insertion into socio-cultural and economic activities ;
- a shift from an evaluation of knowledge to that of competences necessary to sustainable development.

When these new changes and orientations were taken into account, they naturally led to a shift of paradigm within the curriculum reform process. The option we have adopted is the competence based approach through real life situations.

The syllabuses of the first cycle of Secondary General Education are broken down into 5 areas of learning, each of them containing a given number of disciplines as shown in the table below.

Areas of learning	Disciplines
1- Languages and Literature	<ul style="list-style-type: none"><li>- French</li><li>- English</li><li>- Living Languages II</li><li>- Ancient Languages</li></ul>

	<ul style="list-style-type: none"> <li>- Literature(in English and in French)</li> </ul>
2- Science and Technology	<ul style="list-style-type: none"> <li>- Mathematics</li> <li>- The Sciences( Physics, Chemistry, Technology, Life and Earth Sciences)</li> <li>- Computer Science</li> </ul>
3- Social Sciences/Humanities	<ul style="list-style-type: none"> <li>- History</li> <li>- Geography</li> <li>- Citizenship Education</li> </ul>
4- Personal Development	<ul style="list-style-type: none"> <li>- Sports and Physical Education</li> <li>- Manual Labour</li> </ul>
5- Arts and National Cultures	<ul style="list-style-type: none"> <li>- National Languages</li> <li>- National Cultures</li> <li>- Arts</li> </ul>



For 4<sup>ème</sup> and 3<sup>ème</sup> (Francophone sub-system of education), the weekly workload and the quota as compared to the total number of hours on the time table (35 h) are displayed in the table below:

Domaines d'apprentissage	Volume horaire	Quota
Langues et Littérature	11 heures	31,42%
Sciences et Technologies	11 heures	31,42%
Sciences Humaines	06 heures	17,14%
Arts et cultures nationales	03 heures	08,57%
Développement personnel	03 heures	08,57%

For the Anglophone sub-system of education (Form III, Form IV and Form V) the same information is summarized in the table below:

Areas of learning	Weekly workload	Quota
Languages et Literature	11 hours	31,42%
Sciences et Technology	11 hours	31,42%
Social Sciences	06 hours	17,14%
Art, national languages and cultures	03 hours	08,57%
Personal development	03 hours	08,57%



L'Inspecteur Général des Enseignements

Dr Evelyne MPOUDI NGOLLE

## END - OF - FIRST CYCLE LEARNER'S EXIT PROFILE

The first cycle of Secondary General Education admits young graduates from primary schools aged between ten and fourteen. Its general objectives are not only to build intellectual, civic and moral skills in these children but also competences and fundamental knowledge which will either enable them to foster their education in the second cycle, or to prepare them for a smooth insertion into the job market after professional training.

Thus, within the framework of these new syllabuses, the learner is expected , after the first cycle of secondary education, to be able to use his/her competences to solve problems through family of situations relating to domains of life as indicated in the table below:

N°	Domains/Areas of life	Families of situations to be treated in the 1 <sup>st</sup> cycle
1	Family and social life	<ul style="list-style-type: none"><li>• Participation in family life</li><li>• Healthy professional relationships</li><li>• Social integration</li></ul>
2	Economic life	<ul style="list-style-type: none"><li>• Discovery of income generating activities</li><li>• Discovery of the job market, social roles, jobs and professions</li><li>• Self confidence, aspirations, talents, self potential</li><li>• Practising healthy eating habits</li></ul>
3	Environment , health and well being	<ul style="list-style-type: none"><li>• Preservation of the Environment</li><li>• Quest for a healthy life style</li><li>• Choosing and practising a healthy life style</li></ul>
4	Citizenship	<ul style="list-style-type: none"><li>• Mastery of rules and regulations governing the Cameroonian society</li><li>• Discovery of cultural values and customs of the Cameroonian society</li></ul>
5	Media and Communications	<ul style="list-style-type: none"><li>• Discovery of the media world</li><li>• Discovery of Information and Communication Technologies</li></ul>

In order to achieve these objectives, the learner should be able to mobilise , within the various disciplines and constructive areas of learning of the syllabuses, all the pertinent resources in terms of knowledge, know how and attitudes.

The next table gives you a general overview of the afore-mentioned objectives, while the syllabus for each subject unfolds, in details, all the expected competences per level and at the end of the 1<sup>st</sup> cycle.

Areas of Learning	Disciplines	Expected outcomes at the end of the 1 <sup>st</sup> cycles
1-Languages and Literature	<b>Living languages:</b> English, French , German, Italian, Spanish, Chinese, Etc.	<b>French and English , L1</b> Receptive skills: reading and listening Read in an autonomous way, different types of texts related to areas of life as defined in the syllabus; Listen and understand various texts related to the above mentioned areas of life Productive skills: speaking and writing Produce various types of texts , of average length related to these areas of life; Language tools: appropriate use of various language tools in order to produce and read types of texts related to that level;
	English to Francophone learners  French to Anglophone learners	Communicate accurately and fluently using all four basic skills in language learning; Be able to transfer knowledge learnt in class to real life situations out of the classroom; Be able to cope and survive in problem solving situations;
		<b>Living languages II</b> Receptive skills: reading and listening Read and understand simple texts on social life, citizenship, the environment, well being and health, media etc.. Listen and get oral information in order to simply interact during communication situations related the various domains of life. Productive skills: speaking and writing Sing, recite, dramatise , orally answer questions related to the various domains of life as defined in the syllabus; Write short passages on various familiar topics.



	<b>Ancient languages:</b> Latin, Greek <b>National languages</b>  <b>Literature</b> Cameroon Literature; French Literature; Francophone Literature; Other literatures	Develop general knowledge through ancient languages and cultures; know the origins of the French language for linguistic mastery; Carry out elementary tasks in translation.
2-Science and Technology	Mathematics, The Sciences Computer Science	Use mathematic knowledge skills and values with confidence to solve real life problems within the different domains of life; Communicate concisely and unambiguously and develop power of mathematical reasoning (logical thinking, accuracy and spatial awareness).
		<b>The Sciences:</b> Acquire the fundamentals of sciences in order to understand the functioning of the human body, the living world, the earth and the environment; Acquire methods and knowledge to understand and master the functioning of technical objects made by man to satisfy his needs; Demonstrate attitudes to protect his/her health and environment.
		<b>Computer Science :</b> Master the basics of Information and Communication Technologies; Exploit and use ICTs to learn.
3- Social Sciences /Humanities	<b>History</b>  <b>Geography</b>  <b>Citizenship Education</b>	Possess cultural references to better locate events in time and space within a democratic system and become a responsible citizen. <b>History:</b> Acquire a common culture ; be aware of heritage from the past and current challenges; <b>Geography :</b> Develop one's curiosity and knowledge of the world; Get acquainted with landmarks to find your way and fit in the world.

		<b>Citizenship Education:</b> Possess essential knowledge in rights and duties in order to fulfil his/her citizenship.
<b>4- Personal Development</b>	<b>Moral Education;</b>  <b>Home Economics;</b>  <b>Sports and Physical Education</b>  <b>Health Education</b>	Develop his / her physical abilities/skills ; Get ready for physical challenges , save and regain energy after physical efforts; Identify risk factors; possess basic knowledge and principles in hygiene and health education; Demonstrate a sense of self control and appreciate the effect of physical activities. Conceive and draw up sports and cultural animation projects; Acquire methods and develop a high sense of efforts; Conceive, draw up and implement projects that will enable one to project his/her image and feel the well being inspired by self-confidence.
<b>5- Arts and National Cultures</b>	<b>Arts/Artistic Education;</b>  <b>National Cultures</b>	<b>Artistic Education:</b> Observe and appreciate works of art; Carry out an artistic activity; Gradually acquire the love for personal expression and creativity; Possess a mastery of creativity in music, plastic arts and the performing arts. Dramatise, recite texts (poems, tales, proverbs, etc.) relating to various areas of society; Practise the different dramatic genres: sketches, comedy, tragedy, drama, etc.  <b>National languages and Cultures</b> Demonstrate a mastery of Cameroon cultures; Visit the various cultural areas of the country in order to discover their characteristics; Demonstrate a mastery of basic rules in writing Cameroonian languages as well as basic grammatical notions applied to these languages; Demonstrate a mastery of one of the national languages at 3 levels: morpho-syntax, reception and production of simple oral and written texts.

Even though the learners acquire skills in different disciplines, these competences are accompanied by other skills known as cross curricular competences related to intellectual, methodological, social and personal areas of learning.

<b>6- Cross curricular competences</b>	Intellectual and Methodological domains	Solve Problem in a given situation; Use knowledge skills and values with confidence in order to solve real life problems within the different domains of life; With confidence, find useful information to solve problems he/she is faced with; Give his/her opinion ; Support his/her opinion with strong arguments ; Assess him/herself with a view to remediation; Demonstrate basic knowledge in note taking ; Conceive and realise individual projects; Analyse and summarise information, give feedback and report orally or in writing. Develop problem solving approaches; Exploit and use ICTs in his/her activities.
	<b>Social and Personal Domains</b>	Interact positively and assert his/her personality while respecting that of other people; Join team work, fit in a common initiative project /group; Demonstrate interest in cultural activities ; Develop a sense of effort, love for work, perseverance in tasks or activities carried out ; Understand and accept others in intercultural activities; Accept group assessment.

The resources to be mobilised by the learner are found in many disciplines and areas of learning. So it is important to implement these syllabuses not in isolation but as interrelated subjects. These remarks hold both for subject and cross curricular competences. They are so called to show that they should be developed through teaching/learning activities of the different subjects. The development of subject and cross curricular competences concern the entire education family as they are capable of inspiring an educative project and the putting in place of extracurricular activities. The ultimate training goal of these syllabuses, at the end of the first cycle, is to enable the learner to be self reliant, to be able to keep on learning throughout his/her life, to contribute to sustainable development and become a responsible citizen.

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## I. GENERAL INTRODUCTION

In forms 3, 4 and 5 the study of biology is expected to be a continuation involving the deepening of the knowledge (scientific notions), know-how (improved methods and techniques) and further development of attitudes acquired in forms 1 & 2.

It has as main aim to introduce the learner to basic biological concepts, the fascinating nature and variety of life forms, etc in order to guide him/her into pursuing a career in the sciences.

The design and teaching of the present syllabus is centred on the Competency-Based Approach (CBA) with real life situations or problems as entry points. CBA is rooted in the constructivist approach in which the learner is the principal actor in his/her learning with the teacher assuming the role of a facilitator. This approach is in total rupture with the teacher-centred approach in which the learner is considered a tabula rasa to be filled with wisdom by the teacher.

There is therefore need for the teacher to break away from the traditional chalk and talk practice to one of facilitation in which a conscious effort is constantly made to link school learning with real life situations. Such an approach will demonstrate the usefulness and relevance of school knowledge to the learner who takes the lead and full responsibility for his/her own learning. Placing the learner at the centre of his/her own learning is a conscious technique to guide him/her to appropriate autonomy, self-reliance, creativity, discipline, the spirit of enterprise and the taking of initiative in seeking solutions to life challenges in an ever changing economic, socio-cultural, technologic and political environment. Teachers are therefore called upon to take up the challenge by making their humble contributions towards the development of the 21<sup>st</sup> Century Cameroonian and beyond.

## 2. COMPETENCIES THAT THE SYLLABUS WOULD DEVELOP IN THE LEARNER

**In the fields of societal and family life:** The syllabus seeks to inculcate in the learner psychosocial competencies (life skills) for meeting with the exigencies of community life and responsible citizenship.

**In the economic domain:** It will enable the learner to acquire competencies in the production of consumer goods necessary for good health, wellbeing and comfort.

**In the field of environmental education:** It will enable the learner to reinvest the knowledge acquired in environmental conservation leading to the maintenance of the natural equilibrium and conservation which are life-wires for sustainable development.

### 3. PRESENTATION OF THE FAMILIES OF SITUATIONS COVERED BY THE SYLLABUS

Nº	MODULE	FAMILY OF SITUATIONS	CLASS
I	The living world	• Supply of man's needs in animal and plant resources	Form 3
II	Health education	• Improving plant, animal and human health	
III	Environmental education	• Managing the environment and ecological relationships	
I	The living world	• Supply of man's needs in animal and plant resources	Form 4
II	Health education	• Invasion of the environment by pathogenic microorganisms • Prevalence of deficiency diseases and accidents linked to the physiology of the living system • Hygiene of the living systems	
III	Environmental education	• Managing nutritional relationships in ecosystems	
I	The living world	• Supply of man's needs in animal and plant resources • Recurrence of genetic anomalies and new character traits in the population	Form 5
II	Health education	• Improving human health	
III	Environmental education	• Managing relationships in ecosystems	

### 4. READING AND UNDERSTANDING THE SYLLABUS

The syllabus is presented in a tabular matrix made up of three major columns:

- The first column is the **Contextual Framework** which is sub-divided into *families of situations* and *examples of real life situations* or problems requiring the mobilisation of appropriate competencies to seek solutions to them. The families of situations and examples of real life situations are only examples and are in no way exhaustive. Teachers can draw from these examples to identify and define other situations with local specificities and relevance.
- The second column is the **Competencies**, made up of *categories of actions* and *examples of actions*: These are groups of some actions which are related to the mastery of the competencies expected for each module. Again these categories and groups of actions are not exhaustive.
- The third column is the **Resources** and consists of the *essential or core knowledge* which gives all the set of cognitive, psychomotor and affective resources which the learner needs to mobilise so as to successfully treat a family of situations. It is divided into four components: the *subject content*, the *aptitude* (skills or know-how), *attitudes* to be displayed as well as *other resources* (material, human, financial, etc.) necessary for the acquisition of the competencies.

The matrix appears as in the following table:

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Families of Situations	Examples of Situations	Categories of Actions	Examples of Actions	Content (Core Knowledge)	Aptitude (Skills)	Attitudes	Other Resources

## 5. EVALUATION OF THE OUTCOME OF THE BIOLOGY SYLLABUS

The overall goal of this syllabus is to evaluate the ability of the learner to construct, appropriate and reinvest scientific knowledge and methods to seek solutions to real life situations in different context.

Evaluation will be conducted at two levels:

- i. evaluation of the scientific methods acquired and knowledge constructed and appropriated; and
- ii. evaluation of the competencies developed by the learner (see the teacher's guide for details).

These would include among others the ability to:

- recall simple scientific facts, principles and concepts;
- explain scientific facts, concepts and principles in one's own words;
- use and care for equipment;
- design and use experiments to verify or demonstrate scientific concepts;
- be autonomous and assertive;
- be creative and innovative;
- apply scientific knowledge and methods in problem-solving;
- organise material and present ideas in a clear and logical manner;
- handle patterns in scientific knowledge and show prove of the appropriation of critical, imaginative and inferential thinking skills;
- initiate action in seeking solutions to daily life problems;
- communicate efficiently and interact effectively with other members of the community.

In any case, emphasis should be placed where necessary on the appropriation of psychosocial competencies inherent in each module.

## 6. TIME ALLOCATION AND OVERVIEW OF THE MODULES

This syllabus will be taught in 75hours giving a total of 90 periods of 50 minutes each at the rate of three lessons (periods) per week. Considering holidays, certificate examination time and other interruptions within the academic year, the teacher is advised to programme his/her teaching over 26 weeks with 60% of the work in the first term, 30% in the second term and 10% in the third term. It should be noted that emphasis is on introduction of basic concepts, appreciation of the

broad variety of life forms, skills, and the development of competencies that should culminate in a motivation for the learner to seriously consider the taking up of a career in the sciences.

The three modules that make up the biology syllabus and the relative duration to spend on each of them are as presented in the table below:

#### 7. PRESENTATION OF THE MODULES AND RELATIVE DURATION/PERIOD OF TEACHING OF EACH MODULE

CLASS	MODULE 1	MODULE 2	MODULE 3
Form 3	34 Hours/42 Periods	25Hours/30Periods	15Hours/18Periods
Form 4	25 Hours/30 Periods	40Hours/48Periods	10Hours/12Periods
Form 5	35 Hours/42 Periods	30Hours/36Periods	10Hours/12Periods

# **FORM THREE (3) SYLLABUS**



## SYNOPSIS OF THE MODULES, CATEGORIES OF ACTION, EXAMPLES OF ACTIONS AND RELATIVE DURATION/PERIODS

TITLE OF MODULE	CATEGORIES OF ACTION	DURATION/PERIOD
THE LIVING WORLD	<b>Conserving life and life process</b> Appropriating knowledge of : <ul style="list-style-type: none"> <li>– the properties and nature of water and explaining their uses to living organisms and man;</li> <li>– the water cycle and relating it to other cycles in nature and Mathematics (life cycle, CO<sub>2</sub> cycle, N<sub>2</sub> cycle, circle, etc);</li> <li>– the mechanisms of movement of substances into and out of living systems and explaining the maintenance of life processes by such mechanisms.</li> </ul> Applying knowledge from the conservation of life processes in agricultural practices and healthy living.	10 periods
	<b>Appreciating the nature and vast variety of life forms</b> <ul style="list-style-type: none"> <li>– classifying organisms using criteria;</li> <li>– identifying the application of the concept of classification in other sciences;</li> <li>– using knowledge of structure to distinguish the many varieties of life form;</li> <li>– using knowledge of structure and life cycle to explain the adaptations of life forms to their survival</li> <li>– applying knowledge of life cycles in the elimination of harmful organisms;</li> <li>– applying knowledge of life cycle in enhancing plant and animal productivity;</li> <li>– designing projects for eliminating harmful species or viruses and organisms.</li> </ul>	24 periods
	<b>Improving the quantity and quality of human food yield in plant and animal resources</b> <ul style="list-style-type: none"> <li>– eliminating food crop nutrient deficiencies;</li> <li>– eliminating farm animal nutrient deficiencies;</li> <li>– preparing animal feed for a selected farm animal of the locality such as chicken, pig, rabbit, etc.</li> </ul>	08 periods
HEALTH EDUCATION	<b>Promoting good health</b> <ul style="list-style-type: none"> <li>– explaining variations in nutritional needs of men and women based on the average recommended daily intake for a healthy person;</li> <li>– estimating the calorific value of an identified local meal;</li> <li>– designing a project to improve on the nutritional value of an identified local meal.</li> </ul>	06 periods

<b>HEALTH EDUCATION</b>	<b>Preventing/eliminating the transmission of diseases of food crops, farm animals and humans including HIV/AIDS, STIs and Ebola</b> <ul style="list-style-type: none"> <li>Combating food crops and farm animal disease and their vectors (Phytophthora infestans, tomato rot, corn smut, Newcastle, black quarter, etc.)</li> <li>Combating animal and human diseases (HIV/AIDS, Ebola, malaria, cholera, dysentery, etc.)</li> <li>Removal and destruction of food crop and animal pests (weevils, weeds, ticks, lice, jiggers, etc.)</li> <li>Avoiding the consumption of junk food</li> <li>Avoiding the buying of street side medications</li> </ul>	12 periods
	<b>Rejecting risky behaviours to prevent the transmission of HIV/AIDS, STIs and Ebola</b> <ul style="list-style-type: none"> <li>Identifying and rejecting risky sexual behaviour (idling, having pre-mature sexual intercourse, unprotected sex, prostitution, abortion, etc.)</li> <li>Adopting responsible sexual behaviour;</li> <li>Learning to say no to irresponsible and none protected sexual advances;</li> <li>Consulting medical personnel and receiving complete treatment in the event of illness;</li> <li>developing and appropriating healthy interpersonal relationships.</li> </ul>	12 periods
<b>ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT</b>	<b>Enhancing food production while conserving the environment</b> <ul style="list-style-type: none"> <li>Conserving the Interdependence of organisms and ecological balance in the environment;</li> <li>Exploiting knowledge of social relationships (such as between Honey bees and honey production, termites, etc) to enhance man's food supply</li> <li>Producing organic manure through composting;</li> <li>Explaining the advantages and disadvantages of organic and nonorganic fertilisers;</li> <li>Identifying and avoiding adverse effects of nonorganic fertilisers on the environment.</li> </ul>	18 periods

# OUTLINE OF THE SYLLABUS FORM 3

## MODULE ONE: *THE LIVING WORLD*

**TIME ALLOCATION: 35H (42 PERIODS)**

### INTRODUCTION TO THE MODULE

As an integral part of the living world Man must provide his needs (air, food and shelter, etc) by exploiting the natural world through the practice of agriculture, animal husbandry, and the transformation of products in such a way as to maintain the delicate ecological equilibrium.

It is therefore, necessary for man to understand the functioning of the living system, appreciate the sheer vastness of life forms opened to his exploitation as well as their reproductive capacities in order to better conserve life and life processes and to improve on the quantity and quality of food yield in plant and animal resources.

From this point of view the teacher ought to facilitate the construction and appropriation by the learner of knowledge and competencies linked to:

- knowledge of specific scientific facts, terminologies, concepts, conventions, trends and sequences including biogeochemical cycles – water Cycle and relating same to CO<sub>2</sub>, N<sub>2</sub>, cycles as well as the concepts of circles and life cycles, etc
- the movement of substances into and out of organisms as well as the mechanisms involved;
- the explanation of the maintenance of life processes by such mechanisms; and
- the application of such knowledge to improve agricultural practices and healthy living.

Additionally, the learner should construct and appropriate knowledge and skills in general and basic notions of:

- placing objects into groups using similarities in characteristics and identifying the application of such concepts in other fields of sciences and in society;
- adaptations of life forms to their survival; and
- using knowledge of life cycles and nutritional requirements to eliminate harmful organisms or enhance the productivity of useful ones.

### CONTRIBUTION TO THE GOALS OF THE CURRICULUM

The competencies that the learner will develop from this module will enable him/her:

- appropriate knowledge of the basic concepts of life processes, the vast variety of life forms and their means of survival; the scientific way of constructing knowledge and solving problems; plant and animal production; conservation skills in general and agricultural and animal breeding methods, techniques, and practices;
- clarify, consolidate and organise the learning acquired in forms 1 and 2 in order to better exploit them in the latter years of study and to better manage the environment.

This module could provide future career in the fields of biomedicines, agronomy, environmental education, teaching, etc

### CONTRIBUTION TO SOCIETAL LIFE

- This module enables learners to develop in them critical thinking skills, creativity and the scientific spirit of self-reliance and team work.

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Examples of Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
<b>SUPPLY OF MAN'S NEEDS IN ANIMAL AND PLANT RESOURCES</b>	Insufficient knowledge of the functioning of living processes	Understanding cellular exchanges to better conserve life	<p>Appropriating knowledge of the:</p> <ul style="list-style-type: none"> <li>properties and nature of water to explain its importance to living organisms and man;</li> <li>self maintaining nature of the water cycle to explain its role in conserving life;</li> <li>concept of cycles to explain its application in the same field as well as other fields of sciences (Mathematics – circles), (Biology - life cycle, CO<sub>2</sub> cycle, N<sub>2</sub> cycle, relationship between plants and animals, etc);</li> <li>mechanisms of movement of substances into and out of living systems to explain the maintenance of life processes.</li> </ul> <p>Applying knowledge from the conservation of life processes in agricultural practices and healthy living.</p>	<p><b>1.0. Introduction (Review of the concept of the cell)</b></p> <p><b>What is water? (Definition and properties).</b></p> <p><b>2.0. Importance of water to living organisms including its uses to man.</b></p> <p><b>3.0. The water cycle</b></p> <p><b>4.0. Application of the concept of cycles to the same field and other fields of sciences</b></p> <p><b>5.0. Cellular exchanges in different conditions.</b></p> <p><b>5.1. Diffusion, Osmosis, Facilitated transport, Active transport</b></p> <p><b>5.2. Experiments to demonstrate diffusion and osmosis</b></p> <p><b>5.3. Isotonic, hypotonic and hypertonic environments</b></p> <p><b>5.4. Transpiration, root pressure, turgor pressure, wilting and plasmolysis and their applications in living processes.</b></p>	<ul style="list-style-type: none"> <li>Introduce and Define water stating its properties</li> <li>Brainstorm to identify the ways in which water is useful to living organisms and man</li> <li>Construct the water cycle</li> <li>Identify applications of the concept in the same field of sciences and in other fields such as Mathematics; Chemistry, Physics and the society.</li> <li>Define cellular exchange; Diffusion, Osmosis, Facilitated transport, Active transport</li> <li>Define and distinguish between isotonic, hypotonic and hypertonic milieus</li> <li>Define transpiration and brainstorm to identify the factors affecting it</li> <li>What is the importance of transpiration to plants?</li> <li>Explain the mechanisms and importance of root pressure and turgor pressure</li> <li>Brainstorm to identify the importance of transpiration, root pressure and turgor pressure to agriculture</li> <li>Project work to demonstrate application of concepts in life processes</li> </ul>	<ul style="list-style-type: none"> <li>-Curiosity and sense of observation</li> <li>-Interest in scientific investigations</li> <li>-Patience</li> <li>-Love for nature</li> <li>-Team spirit and cooperation</li> <li>-Decision making and critical spirit</li> <li>-Creative thinking</li> <li>-Logical reasoning</li> <li>-Methodological action</li> <li>-Problem solving</li> <li>-Management and respect for the environment</li> </ul>	<ul style="list-style-type: none"> <li>-Didactic materials – charts, models, -biology related fields, companies, Professionals</li> </ul>

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
<b>SUPPLY OF MAN'S NEEDS IN ANIMAL AND PLANT RESOURCES</b>	Insufficient knowledge of the variety of life forms	Understanding the nature and variety of life forms to better live with them	<ul style="list-style-type: none"> <li>– Classifying organisms using criteria;</li> <li>– Identifying the application of the concept of classification in other sciences;</li> <li>– Using knowledge of structure to distinguish the many varieties of life form;</li> <li>– Using knowledge of structure and life cycle to explain the adaptations of life forms to their survival</li> <li>– Applying knowledge of life cycles in the elimination of harmful organisms;</li> <li>– Applying knowledge of life cycle in enhancing plant and animal productivity;</li> <li>– Cultivation and rearing of local plant and animal species for human consumption.</li> <li>– designing projects to eliminate or control harmful species and pests.</li> </ul>	<ol style="list-style-type: none"> <li><b>1. Introduction to the concepts of criteria and classification</b></li> <li><b>2. Reasons for classifying living organisms</b></li> <li><b>3. General characteristics, structure, life cycle and biological importance of (Two locally specific examples of one representative of each of the following kingdoms:</b> <ol style="list-style-type: none"> <li><b>a. Prokaryotae (Virus, Bacterium)</b></li> <li><b>b. Protoctista (Amoeba, Spirogyra)</b></li> <li><b>c. Fungi (Yeast, Mushroom)</b></li> <li><b>d. Animalia</b></li> <li><b>e. Plantae</b></li> </ol> </li> </ol> <p><b>Except for Prokaryota, e Protoctista and Fungi the examples chosen should include one harmful and one useful species)</b></p> <ol style="list-style-type: none"> <li><b>1. The cultivation and rearing of one each of the following organisms:</b> <ol style="list-style-type: none"> <li><b>a. Monocot (e.g. maize, sorghum, or millet, etc);</b></li> <li><b>b. Dicot (e.g. coffee, or cocoa, etc);</b></li> <li><b>c. Snail (the edible land snail)</b></li> <li><b>d. Fish (e.g. Tilapia, or mudfish);</b></li> <li><b>e. Bird (e.g. fowl);</b></li> <li><b>f. Mammal :</b> <ol style="list-style-type: none"> <li><b>i. Herbivores e.g. goat, sheep or cow ;</b></li> <li><b>ii. Omnivore e.g. pig</b></li> </ol> </li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>• Explain why life forms are classified;</li> <li>• Apply knowledge of criteria and classification to other areas of life;</li> <li>• Apply knowledge of criteria to group life forms into harmful and useful types;</li> <li>• Relate knowledge of structure and life cycle to the: adaptation of life forms to their survival; elimination of harmful organisms and the enhancement of their productivity;</li> </ul> <p><b>Project:</b></p> <p>Learners apply knowledge of life cycles and other characteristics to draw up a plan(s) on the elimination or control of locally specific harmful viruses and organisms such as HIV, Ebola, Mosquito, housefly, etc and share such plan(s) with their classmates. Develop steps and strategies in the implementation of their plan(s)</p>	<ul style="list-style-type: none"> <li>-Curiosity and sense of observation</li> <li>-Interest in scientific investigations</li> <li>-Patience</li> <li>-Love for nature</li> <li>-Team spirit and cooperation</li> <li>-Decision making</li> <li>- critical and inferential thinking</li> <li>-Creative thinking</li> <li>-Logical reasoning</li> <li>-Methodological action</li> <li>-Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>-Didactic materials, - specimens – charts, models, -biology related fields, companies,</li> <li>Professionals</li> </ul>



CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
SUPPLY OF MAN'S NEEDS IN ANIMAL AND PLANT RESOURCES	Insufficient consumable resources	Improving the quantity and quality of plant and animal food resources	<ul style="list-style-type: none"> <li>– preventing food crop nutrient deficiencies;</li> <li>– Practicing the correct application of different types of fertilisers</li> </ul>	<ol style="list-style-type: none"> <li><b>1. Major and minor plant nutrients.</b> <ol style="list-style-type: none"> <li><b>a. Major e.g. N,P,K, Ca, Mg</b></li> <li><b>b. Minor e.g. Cu, Zn, Mo, Fe</b></li> <li><b>c. Importance of N,P,K, and deficiency symptoms in plants</b></li> <li><b>d. Sources of plant nutrients</b></li> <li><b>e. Effects of nutrient deficiency</b></li> </ol> </li> <li><b>2. Types of fertilizers (to be treated as sources of plant nutrients):</b> <ol style="list-style-type: none"> <li><b>a. Organic</b></li> <li><b>b. Inorganic</b></li> </ol> </li> <li><b>3. Methods of Fertilizer application: (broadcasting drilling, ringing top dressing, side dressing).</b></li> </ol>	<ul style="list-style-type: none"> <li>• Classify plant nutrients into major and minor nutrients;</li> <li>• Discuss the differences between major and minor plant nutrients;</li> <li>• Discuss the roles of nitrogen, phosphorus and potassium (N. P. K) in plant growth and development;</li> <li>• Identify the various sources of plant nutrients;</li> <li>• Describe Nitrogen, Phosphorus and Potassium deficiency symptoms in the plants;</li> <li>• Identify plants with symptoms of N, P,K deficiencies in the locality;</li> <li>• Brainstorm to identify and discuss the biological effects of nutrient deficiency in crop production;</li> <li>• Identify the various types of fertilizers giving examples of their uses;</li> <li>• Practice how to apply fertilisers to crops correctly.</li> </ul>	<ul style="list-style-type: none"> <li>-Curiosity and sense of observation</li> <li>-Interest in scientific investigations</li> <li>-Patience</li> <li>-Love for nature</li> <li>-Team spirit and cooperation</li> <li>-Decision making</li> <li>- critical and inferential thinking</li> <li>-Creative thinking</li> <li>-Logical reasoning</li> <li>-Methodological action</li> <li>-Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>-Didactic materials, - specimens – charts, models, -biology related fields, companies</li> </ul>
			<ul style="list-style-type: none"> <li>– preventing farm animal nutrient deficiencies;</li> <li>– preparing farm animal feed</li> <li>– feeding farm animals</li> <li>– caring for the shelter of farm animals</li> </ul>	<ol style="list-style-type: none"> <li><b>4. Balance dieting in farm animals</b></li> <li><b>5. Dietary needs of farm animals such as chicken, pig, rabbit, etc.:</b> <ol style="list-style-type: none"> <li><b>a. Composing animal feed for</b> <ol style="list-style-type: none"> <li><b>i. Growing farm animals,</b></li> <li><b>ii. Fattening farm animals</b></li> <li><b>iii. Reproducing farm animals</b></li> </ol> </li> <li><b>b. Variations in dietary needs of different age and categories of farm animals</b></li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>• Distinguish quantity and quality of feed for different groups of farm animals (growers, fatteners and reproducers, etc.)</li> </ul> <p><b>Project:</b> Students in groups: Choose a category of farm animals common to your locality and prepare its feed. Make a list of all the materials that you need. List all the precautions that must be taken in your preparation process. Explain how you can ensure the quality of your feed. Share your work in class with your classmates.</p>		<ul style="list-style-type: none"> <li>Animal farmers</li> <li>Veterinary technician,</li> <li>Agricultural extension workers and animal husbandry experts</li> </ul>

## MODULE TWO: HEALTH EDUCATION

**TIME ALLOCATION: 25H (30 PERIODS)**

### INTRODUCTION TO THE MODULE

Improving plant and animal health is essential for the improvement of human health as well. Good health is therefore an indispensable requirement for the continuity of the human species. It is therefore necessary to help the learner to construct and appropriate knowledge concepts, techniques, methods and attitudes linked to ensuring the health of plants and animals whose products constitute food and other resources for human beings. This would enable the learner to appreciate the importance and the fragility of life in order to adopt behaviours that would safeguard and protect their own life and that of members of their community. The module should reinforce the basic elements of experimentation in the learner and help him/her find solutions to daily life health problems and nutritional challenges.

### CONTRIBUTION TO THE CURRICULUM

The competences acquired would enable the learner to improve the management of his/her health and nutritional needs.

### CONTRIBUTION TO SOCIETAL LIFE

- This module will develop in the learner skills in interpersonal relationship, self esteem, communication, decision making, critical thinking and scientific spirit,
- At the same time it provides important resources for a more efficient and global solving of daily life problems.

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
IMPROVING PLANT, ANIMAL AND HUMAN HEALTH	Variations in nutritional and calorific requirements of human beings	Preventing deficiency in nutritional and calorific requirements of humans	<ul style="list-style-type: none"> <li>Identifying nutritional and calorific requirements of males and females</li> <li>Determining the Reference Intake (RI) or Guideline Daily Amount (GDA) for men and women</li> </ul>	<ol style="list-style-type: none"> <li><b>Revision of concept of balanced diet</b></li> <li><b>Classes of food (concept of classification) and their importance</b></li> <li><b>Nutritional and calorific requirements of men, women, children, pregnant women</b></li> <li><b>Definition and importance of the Reference Intake (RI) or Guideline Daily Amounts (GDA) for men, women and children</b></li> </ol>	<ul style="list-style-type: none"> <li>Explaining the variations in these nutritional and calorific requirements of men and women;</li> <li>Explaining the importance of the Reference Intake (RI) or Guideline Daily Amounts (GDA) for men and women;</li> </ul>	-Curiosity and sense of observation -Interest in scientific investigations -Patience -Love for nature -Team spirit and cooperation -Decision making - critical and inferential	-Didactic materials, - specimens – charts, models, -biology related fields, companies  Health and nutritional experts Groceries Food stores
			<ul style="list-style-type: none"> <li>Estimating the calorific value of an identified local meal;</li> <li>Sensitising people on the importance of proper feeding</li> </ul>	<ol style="list-style-type: none"> <li><b>Estimation of the calorific value of RI or GDA</b></li> <li><b>Estimation of the calorific value of a commonly eaten local meal</b></li> </ol>	<ul style="list-style-type: none"> <li>Making appropriate choices and correct consumption of meals;</li> <li>Meal planning;</li> </ul>		

IMPROVING PLANTS, Animal AND HUMAN HEALTH			<ul style="list-style-type: none"> <li>designing a project to improve on the calorific value of an identified local meal for men or women</li> </ul>	<b>7. Project design and implementation</b>	<ul style="list-style-type: none"> <li>Educating local community on healthy feeding through sensitisation.</li> </ul>	thinking -Creative thinking -Logical reasoning	and markets
	Prevalence of diseases of food crops, farm animals and humans including HIV/AIDS, STIs and Ebola	Preventing/eliminating the transmission of diseases of food crops, farm animals and humans including HIV/AIDS, STIs and Ebola	<ul style="list-style-type: none"> <li>Combating food crops and farm animal disease and their vectors (Phytophthora infestans, tomato rot, corn smut, Newcastle, black quarter, etc.)</li> <li>Combating animal and human diseases (HIV/AIDS, Ebola, malaria, cholera, dysentery, etc.)</li> <li>Removal and destruction of food crop and animal pests (weevils, weeds, ticks, lice, jiggers, etc.)</li> <li>Avoiding the consumption of junk food</li> <li>Avoiding the buying of street side medications, and fake traditional medicines</li> </ul>	<b>8. Mode of transmission, control and elimination including the life cycles where applicable of potato blight, tomato rot, corn smut, malaria, cholera, dysentery</b> <b>9. Personal hygiene rules</b> <b>10. Auto-medication</b> <ol style="list-style-type: none"> <li>Definition</li> <li>Disadvantages or consequences</li> <li>Consequences of fake traditional medicines sold in transport vehicles</li> </ol>	<ul style="list-style-type: none"> <li>Practising personal hygiene</li> <li>Adopting the practice of consulting health personal in approved health institutions;</li> <li>Rejecting auto-medication and fake traditional medicines.</li> </ul>	- Methodological action -Problem solving	
	Prevalence of HIV/AIDS, STIs and the deadly infectious Ebola	Rejecting risky behaviours that facilitate the transmission and propagation of these killers	<ul style="list-style-type: none"> <li>Identifying and rejecting risky sexual behaviour (idling, having pre-mature sexual intercourse, unprotected sex, prostitution, abortion, etc.)</li> <li>Adopting responsible sexual behaviour;</li> <li>Learning to say no to irresponsible and none protected sexual advances;</li> <li>Avoiding cultural practices, rituals and mourning habits that predisposes someone to Ebola infection;</li> <li>Avoiding nutritional preferences and consumption of bats, monkeys and bush meat.</li> <li>Consulting medical personnel and receiving complete treatment in the event of illness.</li> </ul>	<b>1. Define risky behaviour</b> <ol style="list-style-type: none"> <li>Common risky behaviour to avoid</li> <li>Protective behaviour to adopt</li> </ol> <b>2. Define Ebola</b> <ol style="list-style-type: none"> <li>Signs and symptoms</li> <li>Life cycle and transmission</li> <li>Incubation period</li> <li>Managing Ebola</li> </ol>	<ul style="list-style-type: none"> <li>Developing sexually responsible behaviour</li> <li>Saying no to love advances</li> <li>Avoiding risky behaviour of all types</li> <li>Developing self-esteem and self-assertion</li> <li>Practising personal hygiene rules</li> <li>Taking informed decision</li> </ul>	Psychosocial competencies such as: taking firm decisions, critical and inferential thinking skills, skills in interpersonal relationships, creativity, negotiation skills, self assertion, problem-solving	-Didactic materials, - specimens – charts, models, -biology related fields, Health and nutritional institutions and experts
	Prevalence of intestinal infections	Eliminating intestinal worms	<ul style="list-style-type: none"> <li>Adopting hygiene rules in feeding</li> <li>Washing fruits and vegetables before consumption</li> <li>Consulting medical personnel in case of illness and taking medicines as prescribed by medical authorities</li> <li>Cooking pork properly before consumption</li> </ul>	<b>3. Intestinal worms (Tapeworm and Ascaris)</b> <ol style="list-style-type: none"> <li>Structure, life cycles, transmission and prevention</li> <li>Adaptation to their mode of life</li> </ol>	<ul style="list-style-type: none"> <li>Practising personal hygiene</li> </ul>	Problem-solving	Biology related fields; Health and nutritional institutions and experts.

## **MODULE THREE: ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT**

**TIME ALLOCATION: 15H (18 PERIODS)**

### **INTRODUCTION TO THE MODULE**

The importance of this module resides in the fact that all organisms including mankind are in a permanent state of dynamic interaction with one another and their environment in an effort to obtain their basic survival needs. In this interaction a natural equilibrium is established which sustains life. Understanding and conserving this equilibrium therefore is important to ensure stress free existence and optimal benefit from the resources of the environment. This module therefore takes into consideration the conservation of social interactions between organisms as well as the substratum on which all depend. Considering the importance of these relationships to the maintenance of life, it is therefore necessary to help learners develop and appropriate knowledge of the role of major life processes such as photosynthesis and respiration in the mutual sustenance of plant, animal and human lives.

### **CONTRIBUTION TO THE CURRICULUM**

- The skills the learner will acquire in this module will better equip him/her for the sustainable management of his/her environment.
- This module would also invoke the love for careers in conservation, environmental engineering, agronomy, teaching and environmental education, etc.

### **CONTRIBUTION TO SOCIETAL LIFE**

This module will develop in the learner skills linked to:

- communication and interpersonal relationships;
- decision making, critical thinking, scientific mindedness and self esteem;
- identification of needs and definition of values.

These skills are indispensable in appropriating knowledge in the other sciences as well as other areas of learning.

This module also provides essential resources for the appropriation of the content of environmental education, sustainable development, and health education.

MO DUL E	CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
	Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT	MANAGEMENT OF THE ENVIRONMENT AND ECOLOGICAL INTERRELATIONSHIPS	UNSUSTAINABLE MANAGEMENT OF NATURAL RESOURCES	Enhancing food production while conserving the environment	<ul style="list-style-type: none"> <li>Conserving the Interdependence of organisms and ecological balance in the environment;</li> <li>Exploiting knowledge of social relationships (such as between Honey bees and honey production, termites, etc) to enhance man's food supply</li> <li>Producing organic manure through composting;</li> <li>Explaining the advantages and disadvantages of organic and nonorganic fertilisers;</li> <li>Identifying and avoiding adverse effects of nonorganic fertilisers on the environment.</li> </ul>	<ol style="list-style-type: none"> <li><b>Define interdependence and ecological balance</b></li> <li><b>Interdependence between plants and animals (Photosynthetic and Respiratory interdependence, nutritional interdependence, energy interdependence, etc.)</b></li> <li><b>Social organisation as an example of interspecific interdependence</b> <ol style="list-style-type: none"> <li><b>Honey bee colony (organisation of the cast structure and division of labour)</b></li> <li><b>Termite colony</b></li> <li><b>Application of the concept of social organisation in other areas of Biology and other sciences including the society</b></li> <li><b>Biological importance of social organisations</b></li> </ol> </li> <li><b>Impact of fertilisers on the soil:</b> <ol style="list-style-type: none"> <li><b>Organic and nonorganic fertilisers</b></li> <li><b>Definition and types</b></li> <li><b>Production (Composting for organic and Industry for nonorganic)</b></li> </ol> </li> <li><b>Differences between organic and nonorganic fertilisers</b></li> <li><b>Effects of organic fertilisers on the soil and the environment</b></li> </ol>	<ul style="list-style-type: none"> <li>Develop and adopt environmentally friendly behaviours</li> <li>Minimise the adverse effects of chemical fertilizers on the environment.</li> </ul>	Psychosocial competencies such as: taking firm decisions, critical and inferential thinking skills, problem-solving, creativity	<ul style="list-style-type: none"> <li>Didactic materials, - specimens – charts, models, -biology related fields, Environmentalists and conservators Personnel of the ministry of forest and fauna</li> </ul>



# **FORM FOUR (4) SYLLABUS**

## **SYLLABUS OUTLINE FORM 4**

### **BRIEF PRESENTATION OF THE MODULES**

#### **MODULE ONE: *THE LIVING WORLD***

**TIME ALLOCATION: 20H (24 PERIODS)**

##### **INTRODUCTION TO THE MODULE**

This module treats:

- The nutritional requirements of plants and animals;
- How plants obtain and elaborate raw foods;
- Classes of foods and how animals obtain and elaborate foods

It involves simple explanations of these concepts using concrete examples of life situations to buttress the way in which living system function in the production and consumption of energy from matter in the environment.

From this point of view the teacher ought to facilitate the construction and appropriation by the learner of knowledge and competencies linked to:

- knowledge of specific scientific facts, terminologies, concepts, conventions, trends and sequences including biogeochemical cycles – water Cycle and relating same to CO<sub>2</sub>, N<sub>2</sub>, cycles as well as the concepts of circles and life cycles, etc
- the movement of substances into and out of organisms as well as the mechanisms involved;
- the explanation of the maintenance of life processes by such mechanisms; and
- the application of such knowledge to improve agricultural practices and healthy living.

##### **CONTRIBUTION TO THE GOALS OF THE CURRICULUM**

Access to the general knowledge on movement into and out of cells as well as feeding in organisms was introduced in the preceding classes. These notions are capitalised upon and completed in this class to provide a broad base understanding of the functioning of the living system. The competencies that the learner will develop from this module will enable him/her:

- appropriate knowledge of the basic concepts of the functioning of life processes and plant and animal production;
- clarify, consolidate and organise the learning acquired in form 3 in order to better exploit them in the latter years of study.

This module could provide future career in the fields of food sciences, agronomy and teaching, etc.

##### **CONTRIBUTION TO SOCIETAL LIFE**

This module enables learners to develop in psychosocial skills necessary for living in an ever changing environment.

## SYNOPSIS OF CATEGORIES OF ACTION, CORE KNOWLEDGE AND ESTIMATED DURATION IN PERIODS

Category of actions	Core Knowledge	Estimated duration in periods
Improving food production by constructing and appropriating knowledge of the mechanisms of functioning of living organisms	I.0. NUTRITION IN PLANTS	3
	I.1.Nutritional requirements of plants	
	I.2. How plants obtain raw nutrients	
	(Transport: mechanisms of uptake of raw nutrients from the soil and air; mechanisms of movement of raw nutrients to leaves (transpiration and transpiration pull);	6
	Factors affecting rate of transpiration);	
	Importance of transpiration	
	I.3. How plants transform raw nutrients.	3
	(Photosynthesis and translocation mechanism simply treated)	
	I.4. Fate of translocated food (usage by plant, excretion of wastes after usage, storage of excess – food reserves, etc).	
	2.0. Classes of food, water, mineral elements, vitamins, oxygen, energy, etc – their sources and importance).	4
	2.1. Chemical composition of carbohydrates, Proteins and Lipids	
	2.2. Deficiency effects of vitamins, mineral salts and roughage	
	2.3. Enzymes and their characteristics	2
	2.4. Role of enzymes in digestion	
	2.5. Structure and adaptive functions of the different parts of the alimentary canal (mouth & teeth; stomach; small intestine; in carnivores, herbivores and omnivores)	3
2.6. Physical and chemical digestion in herbivores, omnivores, carnivores and birds	3	
2.7. Fate of the products of digestion		
TOTAL	24 PERIODS	

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Examples of Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
<b>SUPPLY OF MAN'S NEEDS IN ANIMAL AND PLANT RESOURCES</b>	Insufficient knowledge of the functioning of living processes	Improving food production by constructing appropriating knowledge of the mechanisms of functioning of living organisms	<ul style="list-style-type: none"> <li>Identify plant needs in nutrients (H<sub>2</sub>O, mineral elements, CO<sub>2</sub> and sunlight energy)</li> <li>Prevent plant nutrient deficiency and diseases.</li> <li>Practice experimental growing of plants in different nutrient media.</li> <li>Prevent plant wilting due to excessive water loss.</li> <li>Identify plant photosynthetic               <ul style="list-style-type: none"> <li>Needs: (chlorophyll, water, carbondioxide)</li> <li>Products(sugars and O<sub>2</sub>)</li> <li>Fate of these products</li> <li>Role in the life of green plants and all other organisms</li> </ul> </li> </ul>	<b>I.0. NUTRITION IN PLANTS</b> <b>I.1.Nutritional requirements of plants</b> <b>I.2. How plants obtain raw nutrients (Transport: mechanisms of uptake of raw nutrients from the soil and air; mechanisms of movement of raw nutrients to leaves (transpiration and transpiration pull); Factors affecting rate of transpiration); Importance of transpiration</b>  <b>I.3. How plants transform raw nutrients. (Photosynthesis and translocation mechanism simply treated)</b>  <b>I.4. Fate of translocated food (usage by plant, excretion of wastes from usage, storage of excess – food reserves, etc).</b>	- Experimental demonstration of: <ul style="list-style-type: none"> <li>plant growth in different nutrient media;</li> <li>plant growth in the presence or absence of sunlight;</li> <li>root and turgor pressures</li> <li>capillarity, cohesive and adhesive forces;</li> <li>transpiration stream (Potometer experiment);</li> <li>translocation mechanism (ring experiment)</li> </ul> - Explain the importance of the leaves and chlorophyll as the factory for plant food production - Represent the process of photosynthesis by a summary equation Experimental demonstration that: <ul style="list-style-type: none"> <li>starch is present in green leaves;</li> <li>chlorophyll, light and carbondioxide are needed for photosynthesis</li> <li>and O<sub>2</sub> is produced.</li> </ul> - Identify the application of the concepts in plant nutrition in other areas of the sciences and society.	-Curiosity and sense of observation -Interest in scientific investigations -Patience -Love for nature -Team spirit and cooperation -Decision making and critical spirit -Creative thinking -Logical reasoning -Methodological action -Problem solving -Management and respect for the environment	-Didactic materials – charts, models, -biology related fields,  Agricultural professionals

<p style="text-align: center;"><b>SUPPLY OF MAN'S NEEDS IN ANIMAL AND PLANT RESOURCES</b></p>	<p style="text-align: center;">Insufficient knowledge of the functioning of living processes</p>	<p style="text-align: center;">Improving food production by appropriating knowledge of the mechanisms of functioning of living organisms</p>	<ul style="list-style-type: none"> <li>– Identify the nutritional needs of Man</li> <li>– Prevent human nutrient deficiency and diseases.</li> <li>– Prevent over feeding and underfeeding diseases in Man.</li> <li>– Adopt healthy feeding habits</li> <li>– Preventing constipation, gastro-intestinal ulcers and dental caries</li> <li>– Take appropriate care of the mouth and teeth</li> <li>– Identify nutritional needs of common domestic animals such as goats, sheep, cow, fowls, rabbits, guinea pigs</li> <li>– Prevent common domestic animal nutrient deficiency and diseases</li> <li>– Improve the nutritional intake of common domestic animals such as goats, sheep, cow, pigs, fowls, rabbits, guinea pigs</li> <li>– Identify the composition of and prepare feed for a balance diet for common domestic animals such as goats, sheep, cow, fowls, rabbits, guinea pigs from locally available plant and animal resources</li> <li>– Producing hay for feeding cattle in the dry seasons or during drought.</li> </ul>	<p><b>2.0. Classes of food, water, mineral elements, vitamins, oxygen, energy, etc – their sources and importance).</b></p> <p><b>2.1. Chemical composition of carbohydrates, Proteins and Lipids</b></p> <p><b>2.2. Deficiency effects of vitamins, mineral salts and roughage</b></p> <p><b>2.3. Enzymes and their characteristics</b></p> <p><b>2.4. Role of enzymes in digestion</b></p> <p><b>2.5. Structure and adaptive functions of the different parts of the alimentary canal (mouth &amp; teeth; stomach; small intestine; in carnivores, herbivores and omnivores)</b></p> <p><b>2.6. Physical and chemical digestion in herbivores, omnivores, carnivores and birds</b></p> <p><b>2.7. Fate of the products of digestion</b></p>	<ul style="list-style-type: none"> <li>– Recognise the need for an adequate and balanced diet in the proper growth and development of organisms.</li> <li>– Experimental demonstration of: <ul style="list-style-type: none"> <li>○ the presence of starch, reducing sugars, proteins and lipids in commonly consumed food items in the locality.</li> <li>○ amylase on starch; bromelin on connective tissue; catalase on hydrogen peroxide in living tissues (plant and animal).</li> </ul> </li> <li>– Recognise the role of different types of teeth in herbivores and carnivores.</li> <li>– Recognise that the structure of different parts of the alimentary canal is solutions to specific problems in herbivorous and carnivorous nutrition.</li> <li>– Appreciate the role of some protozoans and bacteria in the digestion of cellulose.</li> </ul>	<ul style="list-style-type: none"> <li>-Curiosity and sense of observation</li> <li>-Interest in scientific investigations</li> <li>-Patience</li> <li>-Love for nature</li> <li>-Team spirit and cooperation</li> <li>-Decision making and critical spirit</li> <li>-Creative thinking</li> <li>-Logical reasoning</li> <li>-Methodological action</li> <li>-Problem solving</li> <li>-Management and respect for the environment</li> </ul>	<ul style="list-style-type: none"> <li>-Didactic materials – charts, models, -biology related fields,</li> <li>Agricultural professionals</li> </ul>
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## MODULE TWO: HEALTH EDUCATION

**TIME ALLOCATION: 45H (54 PERIODS)**

### INTRODUCTION TO THE MODULE

This module treats:

- Emerging new diseases (HIV/ AIDS and Ebola);
- Disease prevention and the immune response;
- Cardio-vascular diseases and accidents;
- Respiratory and excretory infections and
- The musculo-skeletal deformities and accidents.

### CONTRIBUTION TO THE CURRICULUM

The competences acquired would enable the learner to improve the management of his/her health and nutritional needs.

### CONTRIBUTION TO SOCIETAL LIFE

- This module will develop in the learner psychosocial skills for a fulfilled life.
- At the same time it provides important resources for a more efficient and global solving of daily life problems.
- It offers career options in medicine, pharmacology, sports and teaching

### SYNOPSIS OF CATEGORIES OF ACTION, CORE KNOWLEDGE AND ESTIMATTED DURATION IN PERIOSDS

Category of actions	Core knowledge	Estimated duration in Periods
Protection against emerging diseases	1.0. Emerging diseases	4
	1.1. HIV/AIDS virus (structure, reproduction, life cycle and latent period/incubation period, signs and symptoms, transmission)	
	1.2. Ebola virus (structure, reproduction, life cycle and latent period/incubation period, signs and symptoms, transmission)	
Preventing infection by pathogenic microorganisms	2.0. Prevention of infections	6
	2.1. Behavioural – avoid all contacts with the body fluids of infected or dead persons e.g. washing of corpses; seeking medical care in a formal health unit; etc	
	2.2. Physical barrier/quarantine – quarantine infected persons in the case of Ebola, use condoms in the case of HIV/AIDs, etc.	
	2.3. Chemical – use drugs prescribed by medical authorities, disinfect all utensils and equipment, corpses in the case of Ebola, etc	
	2.4. Serum-therapy and vaccine-therapy (definitions and mechanisms)	
	3.0. The immune responses	4
	3.1. Definition of terms	
	3.2. Specific (cell mediated and mechanisms)	
	3.3. Non-specific (skin, mucous, phagocytosis and mechanisms of functioning)	

Prevention of cardio-vascular accidents and diseases.	4.0. The circulatory system	6
	4.1. Structure and function of the heart and blood vessels (arteries, veins, capillaries)	
	4.2. Structure and functions of blood cells (WBC, RBC, Platelets and Plasma)	
	4.3. Production and life cycles of RBC and WBC	
	4.4. Heart beat (cardiac cycles) and blood pressure	
	4.5. Pulmonary and systemic circulation	
	4.6. Maintenance of blood flow	
	4.7. Capillary exchange	
	4.8. Blood bio-assay (NFS) and detection of infections	
	5.0. Hygiene of the circulatory system	
Preventing respiratory infections and diseases	5.1. Accidents of the cardio-vascular system – haemorrhages (bleeding), haemolysis, stroke, congestive heart failure (cardiac arrest), and their prevention and management, etc;	3
	5.2. Diseases/disorders of the cardio-vascular system – hypertension, different types anaemia, arteriosclerosis, leukaemia, oedema, rectal varicose veins (pile or haemorrhoid) and their prevention and management	
	6.0. Gaseous exchange and respiration	4
	6.1. The lungs and the respiratory passage way – structure, adaptation and function	
	6.2. Mechanisms of breathing (inspiration and expiration) and respiratory volumes	
	6.3. Internal respiration – energy production (aerobic and anaerobic simply treated)	
Preventing infections and disorders of the excretory system	7.0. Hygiene of the respiratory system	4
	7.1. Accidents affecting the respiratory system	
	7.2. Some respiratory infections	
	7.2.1. Upper respiratory tract infections (sinusitis, tonsillitis, Laryngitis (loss of voice))	
	7.2.2. Lower respiratory tract disorders - (pneumonia, tuberculosis, bronchitis, asthma, emphysema, lung cancer, etc) – causes/causative agents, signs and symptoms, prevention/treatment and management	9
	7.2.3. Hygiene rules applicable to the respiratory system	
	8.0. The excretory system	
Preventing infections and disorders of the excretory system	8.1. Organs – structure, adaptations and functions;	9
	8.2. Urine formation (glomerular filtration, tubular reabsorption, tubular secretion;	
	8.3. Maintaining water-salt balance	
	8.4. Diseases of the urinary system (signs and symptoms of urinary tract infections – urethritis & cystitis; renal failure, kidney stones, etc.)	
	8.5. Prevention and treatment of urinary tract infections and renal failures	
	8.6. The skin – structure, adaptations and functions	
	8.6.1. Hygiene of the skin	
	8.6.2. Skin diseases (cancer of the skin, fungal diseases – ring and pinworms, scabies)	
	8.7. The liver – structure and function	
	8.7.1. Liver disorders – hepatitis, cirrhosis, jaundice.	
	8.8. Lungs (respiratory tract) infections	

Preventing skeletal system deformities, diseases and accidents	9. The skeletal and muscular systems	10
	9.1. Functions of the skeletal system	
	9.2. Structure and function of a typical bone	
	9.3. Bones of the skeleton	
	9.3.1. Classification	
	9.3.2. Structure and functions of types	
	9.3.3. Role of appropriate feeding in bone growth and articulation	
	9.4. Fractures and sprains	
	9.4.1. Classification and characteristics	
	9.4.2. First aid in fractures and sprains	
	9.5. Types of joints, structure, functions and different types of movements	
	9.6. Postures and deformities (scoliosis, kyphosis and lordosis)	
	9.7. Importance of exercise and sports on the skeletal system	
	10. Types and functions of muscles	4
10.1. Muscles, exercise, cramp and oxygen debt		
10.2. Muscle spasms and injury (strain, sprain and tendinitis)		
10.3. Muscle diseases (lockjaw or tetanus)		
TOTAL	54 PERIODS	

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
Invasion of the environment by pathogenic microorganisms	Infections by emerging diseases	Protection against emerging diseases	<ul style="list-style-type: none"> <li>Identify the causes and causative agents of emerging diseases</li> </ul>	<b>1.0. Emerging diseases</b> <b>1.1. HIV/AIDS virus (structure, reproduction, life cycle and latent period/incubation period, signs and symptoms, transmission)</b> <b>1.2. Ebola virus (structure, reproduction, life cycle and latent period/incubation period, signs and symptoms, transmission)</b>	Identification of the organisms, Identification of transmission pathways	<ul style="list-style-type: none"> <li>- Problem-solving</li> <li>- Curiosity</li> <li>- Critical thinking</li> <li>- Self-esteem</li> <li>- Interpersonal relationships</li> <li>- Respect of others opinions</li> <li>- Avoidance behaviour</li> </ul>	Health personnel (doctors, nurses, lab technicians, etc) Health establishment, biologists, Anthropologists, etc.



<b>Invasion of the environment by pathogenic microorganisms</b>	Infection by pathogenic microorganisms	Preventing infection by pathogenic microorganisms	<ul style="list-style-type: none"> <li>– Reduce risk of infection</li> <li>– Educate and/or sensitise</li> <li>– Accept voluntary screening</li> <li>– Respect medical prescriptions and treatment</li> </ul>	<b>2.0. Prevention of infections</b> <b>2.1. Behavioural – avoid all contacts with the body fluids of infected or dead persons e.g. washing of corpses; seeking medical care in a formal health unit; etc</b> <b>2.2. Physical barrier/quarantine – quarantine infected persons in the case of Ebola, use condoms in the case of HIV/AIDs, etc.</b> <b>2.3. Chemical – use drugs prescribed by medical authorities, disinfect all utensils and equipment, corpses in the case of Ebola, etc</b> <b>2.4. Serum-therapy and vaccine-therapy (definitions and mechanisms)</b> <b>3.0. The immune responses</b> <b>3.1. Definition of terms</b> <b>3.2. Specific (cell mediated and mechanisms)</b> <b>3.3. Non-specific (skin, mucous, phagocytosis and mechanisms of functioning)</b>	Adopt preventive and curative behavior in the event of infection		
Improving the health of the circulatory (cardio-vascular) system.	Prevalence of circulatory system (Cardio-vascular system) accidents and diseases.	Prevention of cardio-vascular accidents and diseases.	<ul style="list-style-type: none"> <li>- Identification of signs and symptoms of cardio-vascular accidents and diseases;</li> <li>- Management of cardio-vascular accidents and diseases;</li> <li>- Consulting medical personnel in health establishment;</li> <li>- Adopting a healthy feeding habit;</li> <li>- Reading and correct interpretation of comprehensive blood bio-assay (NFS) results.</li> </ul>	<b>4.0. The circulatory system</b> <b>4.1. Structure and function of the heart and blood vessels (arteries, veins, capillaries)</b> <b>4.2. Structure and functions of blood cells (WBC, RBC, Platelets and Plasma)</b> <b>4.3. Production and life cycles of RBC and WBC</b> <b>4.4. Heart beat (cardiac cycles) and blood pressure</b> <b>4.5. Pulmonary and systemic circulation</b> <b>4.6. Maintenance of blood flow</b> <b>4.7. Capillary exchange</b> <b>4.8. Blood bio-assay (NFS) and detection of infections</b> <b>5.0. Hygiene of the circulatory system</b> <b>5.1. Accidents of the cardio-vascular system – haemorrhages (bleeding), haemolysis, stroke, congestive heart failure (cardiac arrest), and their prevention and management, etc;</b> <b>5.2. Diseases/disorders of the cardio-vascular system – hypertension, different types anaemia, arteriosclerosis, leukaemia, oedema, rectal varicose veins (pile or haemorrhoid) and their prevention and management</b>	<ul style="list-style-type: none"> <li>- Good mastery of the first aid applicable to bleeding, CVA (Cerebrovascular accidents or stroke), heart attack (Myocardial infarction (MI)), etc;</li> <li>- Doing sports and other exercises to keep circulatory system in proper functioning;</li> <li>- Choice of appropriate food types</li> <li>- Avoidance of alcohol, drug and tobacco consumption</li> </ul>	<ul style="list-style-type: none"> <li>- Problem-solving;</li> <li>- Taking the right decision;</li> <li>- Curiosity</li> <li>- Critical thinking</li> <li>- Self-esteem</li> <li>- Interpersonal relationships</li> <li>- Respect of others opinions</li> <li>- Avoidance behaviour</li> </ul>	Health personnel (doctors, nurses, lab technicians, etc) Health establishment, Dieticians, Hematologists, Biologists, Sports personnel, Youth and animation officials, etc.

Improving the health of the respiratory system	Prevalence of respirator system infections	Preventing respiratory infections and diseases	<ul style="list-style-type: none"> <li>- Identification of signs and symptoms of respiratory tract infections and disorders;</li> <li>- Management of respiratory tract infections and disorders;</li> <li>- Consulting medical personnel in health establishment;</li> <li>- Saying no to cigarette smoking and alcohol consumption</li> <li>- Observing hygiene rules of the respiratory system</li> </ul>	<b>6.0. Gaseous exchange and respiration</b> <b>6.1. The lungs and the respiratory passage way – structure, adaptation and function</b> <b>6.2. Mechanisms of breathing (inspiration and expiration) and respiratory volumes</b> <b>6.3. Internal respiration – energy production (aerobic and anaerobic simply treated)</b> <b>7.0. Hygiene of the respiratory system</b> <b>7.1. Accidents affecting the respiratory system</b> <b>7.2. Some respiratory infections</b> <b>7.2.1. Upper respiratory tract infections (sinusitis, tonsillitis, Laryngitis (loss of voice))</b> <b>7.2.2. Lower respiratory tract disorders - (pneumonia, tuberculosis, bronchitis, asthma, emphysema, lung cancer, etc) – causes/causative agents, signs and symptoms, prevention/treatment and management</b> <b>7.2.3. Hygiene rules applicable to the respiratory system</b>	<ul style="list-style-type: none"> <li>- Good mastery of the first aid applicable to acute pneumonia and chronic bronchitis,</li> <li>- Doing sports and other exercises to keep the respiratory system healthy</li> <li>- Avoidance of cigarette smoking and alcohol consumption</li> </ul>	<ul style="list-style-type: none"> <li>- Problem-solving;</li> <li>- Taking the right decision;</li> <li>- Curiosity</li> <li>- Critical thinking</li> <li>- Self-esteem</li> <li>- Interpersonal relationships</li> <li>- Respect of others opinions</li> <li>- Developing a strong will power</li> </ul>	Health personnel (doctors, nurses, lab technicians, etc) Health establishment, Dieticians, Hematologists, Biologists, Sports personnel, Youth and animation officials, etc.
Improving the health of the excretory system	Prevalence of excretory system infections and disorders (kidney, skin, liver, lungs)	Preventing infections and disorders of the excretory system	<ul style="list-style-type: none"> <li>- Identification of signs and symptoms of excretory organs infections and disorders;</li> <li>- Management of excretory organs infections and disorders (dialysis, etc);</li> <li>- Consulting medical personnel in health establishment;</li> <li>- Observing hygiene rules of the excretory organs</li> </ul>	<b>8.0. The excretory system</b> <b>8.1. Organs – structure, adaptations and functions;</b> <b>8.2. Urine formation (glomerular filtration, tubular reabsorption, tubular secretion;</b> <b>8.3. Maintaining water-salt balance</b> <b>8.4. Diseases of the urinary system (signs and symptoms of urinary tract infections – urethritis &amp; cystitis; renal failure, kidney stones, etc.)</b> <b>8.5. Prevention and treatment of urinary tract infections and renal failures</b> <b>8.6. The skin – structure, adaptations and functions</b> <b>8.6.1. Hygiene of the skin</b> <b>8.6.2. Skin diseases (cancer of the skin, fungal diseases – ring and pinworms, scabies)</b> <b>8.7. The liver – structure and function</b> <b>8.7.1. Liver disorders – hepatitis, cirrhosis, jaundice.</b> <b>8.8. Lungs (respiratory tract) infections</b>	<ul style="list-style-type: none"> <li>- Consulting health personnel;</li> <li>- Doing sports and other exercises to keep the respiratory system healthy</li> <li>- Care of the skin</li> <li>- Adopt healthy eating habits</li> </ul>	<ul style="list-style-type: none"> <li>- Problem-solving;</li> <li>- Taking the right decision;</li> <li>- Curiosity</li> <li>- Critical thinking</li> <li>- Self-esteem</li> <li>- Interpersonal relationships</li> <li>- Respect of others opinions</li> <li>- Avoidance behaviour</li> </ul>	Health personnel (doctors, nurses, lab technicians, etc) Health establishment, Dieticians, Hematologists, Biologists, Sports personnel, Youth and animation officials, etc.

Improving human health	Prevalence of skeletal system deformities and accidents	Preventing skeletal system deformities, diseases and accidents	<ul style="list-style-type: none"> <li>- Applying first aid in case of strain, sprain fracture and injury from sharp metal objects;</li> <li>- Practicing massage;</li> <li>- Adopting good seating postures;</li> <li>- Choosing foods appropriate to the proper growth and functioning of bones and joints</li> <li>- Practising sports and physical exercises;</li> <li>- Adopting recommended seating and standing positions</li> <li>- Adopting appropriate positions in weight lifting</li> </ul>	<b>9. The skeletal and muscular systems</b> <b>9.1. Functions of the skeletal system</b> <b>9.2. Structure and function of a typical bone</b> <b>9.3. Bones of the skeleton</b> <b>9.3.1. Classification</b> <b>9.3.2. Structure and functions of types</b> <b>9.3.3. Role of appropriate feeding in bone growth and articulation</b> <b>9.4. Fractures and sprains</b> <b>9.4.1. Classification and characteristics</b> <b>9.4.2. First aid in fractures and sprains</b> <b>9.5. Types of joints, structure, functions and different types of movements</b> <b>9.6. Postures and deformities (scoliosis, kyphosis and lordosis)</b> <b>9.7. Importance of exercise and sports on the skeletal system</b> <b>10. Types and functions of muscles</b> <b>10.1. Muscles, exercise, cramp and oxygen debt</b> <b>10.2. Muscle spasms and injury (strain, sprain and tendinitis)</b> <b>10.3. Muscle diseases (lockjaw or tetanus)</b>	<ul style="list-style-type: none"> <li>- Choice and use of materials necessary for first aid in the case of sprains, and fractures</li> <li>- Choice of appropriate food for the growth and functioning of bones and joints</li> <li>- Mastery of the techniques of massage</li> <li>- Practicing an outdoor or indoor sports and physical exercises;</li> </ul>	<ul style="list-style-type: none"> <li>- Empathy</li> <li>- Respect of oneself</li> <li>- Self-discipline</li> <li>- Interpersonal relationships</li> <li>- Problem-solving</li> <li>- Curiosity and critical thinking skills</li> <li>- Taking the right decision</li> </ul>	Health personnel (doctors, nurses, lab technicians, etc) Health establishment, Dieticians, Hematologists, Biologists, Sports personnel, Youth and animation officials, Tradi-practitioners
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## MODULE THREE: ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT

**TIME ALLOCATION: 10H (12 PERIODS)**

### INTRODUCTION TO THE MODULE

This module treats:

- Saprotrophic and
- Parasitic nutrition as feeding relations in ecosystem functioning.

It capitalises on the concept of social interactions between organisms as well as the substratum on which all depend evoked earlier in form 3. Considering the importance of these relationships to the maintenance of life, it is therefore necessary to help learners develop and appropriate knowledge of the role of major life processes such as decomposition of organic matter and parasitism as feeding relationships in the life sustaining process.

### CONTRIBUTION TO THE CURRICULUM

- The skills the learner will acquire in this module will better equip him/her for the sustainable management of his/her environment.
- This module would also invoke the love for careers in conservation, environmental engineering, agronomy, teaching and environmental education, etc.

### CONTRIBUTION TO SOCIETAL LIFE

This module will develop in the learner psychosocial skills

# SYNOPSIS OF CATEGORIES OF ACTION, CORE KNOWLEDGE AND ESTIMATED DURATION IN PERIODS

Category of action	Core knowledge	Estimated duration in periods
Maintaining a clean environment and the natural equilibrium through the recycling	7. Saprotrophic nutrition and definition <ul style="list-style-type: none"> <li>a. Role of saprotrophs in the ecosystem (as decomposers in cleaning the environment, recycling of matter, soil formation and food spoilage)</li> <li>b. Structure, feeding and life cycle of the bread mould,</li> <li>c. Nitrogen fixation,</li> <li>d. Decomposition of sewage and household refuse – urban wastes</li> <li>e. Example of a saprotrophic food chain</li> </ul>	4
Eradicating plant and animal parasites	8. Parasitism <ul style="list-style-type: none"> <li>a. Definition and types</li> <li>b. Life cycle of a locally specific plant (e.g. <i>Phytophthora</i>) and animal (e.g. tapeworm or <i>Plasmodium</i>) parasite and adaptation to their parasitic modes of life</li> <li>c. Example of a parasitic food chain</li> </ul>	4
Maintaining natural relationships and ecosystem interactions	9. Predation <ul style="list-style-type: none"> <li>a. Definition</li> <li>b. Example of predatory food chain in a typical ecosystem</li> <li>c. Food web and ecological equilibrium</li> <li>d. Pyramids of numbers and energy</li> <li>e. Biological control of pests and diseases vectors.</li> </ul>	4
<b>TOTAL</b>	<b>12 PERIODS</b>	

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
Managing nutritional relationships in ecosystems	Prevalence of wastes and refuse in the environment	Maintaining a clean environment and the natural equilibrium through the recycling	<ul style="list-style-type: none"> <li>Building compost and producing compost manure</li> <li>Improving soil fertility</li> <li>Avoiding slash and burn in agriculture</li> <li>Education and sensitisation</li> <li>Sorting and disposal of refuse and urban wastes</li> </ul>	<b>10. Saprotrophic nutrition and definition</b> <b>a. Role of saprotrophs in the ecosystem (as decomposers in cleaning the environment, recycling of matter, soil formation and food spoilage)</b> <b>b. Structure, feeding and life cycle of the bread mould,</b> <b>c. Nitrogen fixation,</b> <b>d. Decomposition of sewage and household refuse – urban wastes</b> <b>e. Example of a saprotrophic food chain</b>	<ul style="list-style-type: none"> <li>Recognise decomposition as having advantages</li> </ul>	<ul style="list-style-type: none"> <li>Problem-solving</li> <li>Curiosity</li> <li>Taking informed decision</li> <li>Conserving the soil and soil microorganisms</li> </ul>	Ecologists; Sewage and waste treatment specialists; NGOs
	Prevalence of Parasites in nature	Eradicating plant and animal parasites	<ul style="list-style-type: none"> <li>Identifying different types of plant and animal parasites</li> <li>Killing parasites using physical and biological means</li> </ul>	<b>11. Parasitism</b> <b>a. Definition and types</b> <b>b. Life cycle of a locally specific plant (e.g. <i>Phytophthora</i>) and animal (e.g. tapeworm or <i>Plasmodium</i>) parasite and adaptation to their parasitic modes of life</b> <b>c. Example of a parasitic food chain</b>	<ul style="list-style-type: none"> <li>Demonstrate the use of the life cycle to eliminate parasites</li> </ul>	<ul style="list-style-type: none"> <li>Problem-solving</li> <li>Curiosity</li> <li>Taking informed decision</li> </ul>	Agriculturalists; Animal breeders; Cattle ranches
	Prevalence of preys in natural systems	Maintaining natural relationships and ecosystem interactions	<ul style="list-style-type: none"> <li>Identifying prey – predator relationships</li> <li>Using prey-predator relationship in biological control of pests and disease vectors</li> </ul>	<b>12. Predation</b> <b>a. Definition</b> <b>b. Example of predation food chain in a typical ecosystem</b> <b>c. Food web and ecological equilibrium</b> <b>d. Biological control of pests and diseases vectors.</b>	<ul style="list-style-type: none"> <li>Demonstrate the use of prey-predator relationship to eliminate pests and disease vectors</li> </ul>	<ul style="list-style-type: none"> <li>Problem-solving</li> <li>Curiosity</li> <li>Taking informed decision</li> </ul>	Ecologists; Agricultural specialists; NGOs

# **FORM FIVE (5) SYLLABUS**

# **SYLLABUS OUTLINE FORM 5**

## **BRIEF PRESENTATION OF THE MODULES**

### **MODULE ONE: *THE LIVING WORLD***

**TIME ALLOCATION: 35H (42 PERIODS)**

#### **INTRODUCTION TO THE MODULE**

This module treats:

- Reproduction in flowering plants;
- Food production through animal rearing;
- Classical biotechnology and the transformation of plant and animal food products; paternity and crime issues;
- Coordination in plants;
- Genetic variations and anomalies in the population with particular emphasis on humans.

It involves simple participatory construction of these concepts using concrete examples of life situations to buttress the way in which living system function.

From this point of view the teacher ought to facilitate the construction and appropriation by the learner of knowledge and competencies linked to:

- knowledge of specific scientific facts, terminologies, concepts, conventions, trends and sequences and life cycles, etc
- observation and measurement of scientific facts, phenomena and events
- identification of problems and seeking ways of solving them and
- the application of such knowledge and methods to seek solutions to daily life situations.

#### **CONTRIBUTION TO THE GOALS OF THE CURRICULUM**

This module could provide future career in the fields of food sciences, agronomy, genetic engineering and teaching, etc.

#### **CONTRIBUTION TO SOCIETAL LIFE**

- This module enables learners to develop psychosocial skills necessary for living in an ever changing environment.

## SYNOPSIS OF CATEGORIES OF ACTION, CORE KNOWLEDGE AND ESTIMATED DURATION IN PERIODS

Category of actions	Core knowledge	Estimated duration/periods
Improving food production by appropriating knowledge of the mechanisms of functioning of living organisms	1. Reproduction In Plants	6
	1.1. Definitions and types	
	1.2. Structure of the reproductive organ (the flower) and functions of parts	
	1.3. Mechanism of fertilisation (Pollination , types, characteristics and agents)	
	1.4. Seed and fruit formation, seed and fruit dispersal	
	1.5. Germination and growth in plants	
	2. Food production through rearing of animals (poultry farming, piggery and cattle rearing)	6
	3. Classical biotechnology and transformation of food	7
	3.1. Transformation of agricultural produce (cassava by fermentation into miondo/bobolo/garri/starch/flour; maize, soya bean, palm kernel and mineral elements into feed; maize into beer, corn fufu, corn beer and sha'a drinks, millet into bilibili; Potato, cassava, maize into flour; tomato fruits into pastes; sugar cane into sugar/wine/gin; fruits into fruit juices, etc.	
	3.2. Transformation of animal products (milk into butter/cheese/yoghout; meat into sausage/jambon; hide into tanned leather)	6
	4. Coordination In Plants	
	4.1. Definition and types of tropism (e.g. phototropism, geotropism ,nastic movement , tactic movement etc)	
	4.2. Importance of these plants movements	
	4.3. Experiments to demonstrate phototropism and geotropism	
Eradicating prejudices surrounding genetic and chromosome anomalies	4.4. Effects of Auxins and other plant growth hormones on the shoots and roots of plants	
	4.5. Horticulture and its importance	
	5. Definition of basic terminologies used in genetics	4
	6. Chromosomes and genes	
	6.1. Notion of DNA and storage of genetic information	
	6.2. The human caryotype	
	6.3. Relationship between genes and chromosomes	4
	7. Transmission of genetic information	
	7.1. Mitosis and meiosis and variation of chromosome number during both processes	
	7.2. Crossing over during meiosis as one of the mechanisms at the origin of differences between children	
	7.3. Cancer as a disorder of cell division	2
	7.4. Sex determination in humans (Roles of X and Y chromosomes)	
	7.5. The mixing of the male and female chromosomes during fertilisation as another factor for differences between children	4
	7.6. Mendelian genetics and monohybrid inheritance	
	7.6.1. Resemblances and differences (variation) within the human race	
	7.6.2. Differences (variation) between individuals (genotypic and phenotypic characteristics)	2
	7.7. Test cross/back cross	
	8. Genetic anomalies and the modification of the characteristics of an individual: case of the sickle cell anaemia	
	9. Genes and diversities in humans: case of the ABO blood group and albinism	2
	9.1. Notion of alleles (dominance and co-dominance)	
	9.2. Notion of diversity in characteristics and the expression of allelic characters.	2
	10. Modern biotechnology: Paternity determination by comparison of DNA fingerprints; Forensic science and crime detection/tracing lineage and relationships	
<b>TOTAL</b>	<b>42 PERIODS</b>	



CONTEXTUAL FRAMEWORK		Competencies		Resources			
Family of situations	Examples of situations	Category of actions	Examples of actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other Resources
<b>SUPPLY OF MAN'S NEEDS IN ANIMAL AND PLANT RESOURCES</b>	Insufficient consumable resources	Improving food production by appropriating knowledge of the mechanisms of functioning of living organisms	<ul style="list-style-type: none"> <li>Practice animal husbandry and crop cultivation</li> <li>Transformation of food</li> </ul>	<b>I. Reproduction In Plants</b> <b>1.1. Definitions and types</b> <b>1.2. Structure of the reproductive organ (the flower) and functions of parts</b> <b>1.3. Mechanism of fertilisation (Pollination , types, characteristics and agents)</b> <b>1.4. Seed and fruit formation, seed and fruit dispersal</b> <b>1.5. Germination and growth in plants</b> <b>2. Food production through rearing of animals (poultry farming, piggy and cattle rearing)</b> <b>3. Classical biotechnology and transformation of food</b> <b>3.1. Transformation of agricultural produce (cassava by fermentation into miondo/bobolo/garri/starch/flour; maize, soya bean, palm kernel and mineral elements into feed; maize into beer, corn fufu, corn beer and sha'a drinks, millet into bilibili; Potato, cassava, maize into flour; tomato fruits into pastes; sugar cane into sugar/wine/gin; fruits into fruit juices, etc.</b> <b>3.2. Transformation of animal products (milk into butter/cheese/yoghout; meat into sausage/jambon; hide into tanned leather)</b>	<b>I. Recognise the importance of flowers to man and the society</b> <b>II. Recognise the importance of insects in nature</b>	-Curiosity and sense of observation -Interest in scientific investigations -Patience -Love for nature -Team spirit and cooperation -Decision making -Creative thinking -Logical reasoning -Methodological action -Problem solving -Management and respect for the environment	-Didactic materials – charts, models, -biology related fields,  Agricultural professionals Agro-industrial companies

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Examples of Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
<b>SUPPLY OF MAN'S NEEDS IN ANIMAL AND PLANT RESOURCES</b>	Insufficient consumable resources	Improving food production by appropriating knowledge of the mechanisms of functioning of living organisms	<ul style="list-style-type: none"> <li>Identify plant needs in nutrients (H<sub>2</sub>O, mineral elements, CO<sub>2</sub>, sunlight energy and soil)</li> <li>Prevent plant nutrient deficiency and diseases.</li> <li>Practice experimental growth of plants in different directions of environmental factors like sunlight.</li> <li>Avoid the planting of crops in areas that lack light</li> <li>Practising the storage and ripening of fruits</li> <li>Practising the growing of flowers (horticulture)</li> <li>Pruning of plants to improve yield</li> </ul>	<b>4. Coordination In Plants</b> <b>4.1.</b> Definition and types of tropism e.g (phototropism, geotropism ,nastic movement , tactic movement etc) <b>4.2.</b> Importance of these plants movements <b>4.3.</b> Experiments to demonstrate phototropism and geotropism <b>4.4.</b> Effects of Auxins and other plant growth hormones on the shoots and roots of plants <b>4.5.</b> Horticulture and its importance	- Experimental demonstration of: <ul style="list-style-type: none"> <li>Phototropism and geotropism</li> <li>plant growth in the presence or absence of sunlight</li> <li>Improve social life</li> </ul>	-Curiosity and sense of observation -Interest in scientific investigations -Patience -Love for nature -Team spirit and cooperation -Decision making and critical spirit -Creative thinking -Logical reasoning -Methodological action -Problem solving -Management and respect for the environment	-Didactic materials – charts, models, -biology related fields,  Agricultural professionals

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
Recurrence of genetic anomalies and new character traits in the population	Genetic and chromosomal anomalies	Eradicating prejudices surrounding genetic and chromosome anomalies	<ul style="list-style-type: none"> <li>– Explain the occurrence of certain characteristics and resemblances in some families</li> <li>– Educate the community on the scientific basis for certain (misconceptions) superstitious beliefs relating to genetic abnormalities in certain families</li> <li>– Educate community members on genetic and chromosome anomalies and misconceptions</li> <li>– Willingly subscribe to electrophoresis tests and blood group tests to diagnose anomalies</li> <li>– Educate and sensitise on the scientific basis of paternity and identification of corpses buried in mass graves</li> </ul>	<p><b>5. Definition of basic terminologies used in genetics</b></p> <p><b>6. Chromosomes and genes</b></p> <p><b>6.1. Notion of DNA and storage of genetic information</b></p> <p><b>6.2. The human karyotype</b></p> <p><b>6.3. Relationship between genes and chromosomes</b></p> <p><b>7. Transmission of genetic information</b></p> <p><b>7.1. Mitosis and meiosis and variation of chromosome number during both processes</b></p> <p><b>7.2. Crossing over during meiosis as one of the mechanisms at the origin of differences between children</b></p> <p><b>7.3. Cancer as a disorder of cell division</b></p> <p><b>7.4. Sex determination in humans (Roles of X and Y chromosomes)</b></p> <p><b>7.5. The mixing of the male and female chromosomes during fertilisation as another factor for differences between children</b></p> <p><b>7.6. Mendelian genetics and monohybrid inheritance</b></p> <p><b>7.6.1. Resemblances and differences (variation) within the human race</b></p> <p><b>7.6.2. Differences (variation) between individuals (genotypic and phenotypic characteristics)</b></p> <p><b>7.7. Test cross/back cross</b></p> <p><b>8. Genetic anomalies and the modification of the characteristics of an individual: case of the sickle cell anaemia</b></p> <p><b>9. Genes and diversities in humans: case of the ABO blood group and albinism</b></p> <p><b>9.1. Notion of alleles (dominance and co-dominance)</b></p> <p><b>9.2. Notion of diversity in characteristics and the expression of allelic characters.</b></p> <p><b>10. Modern biotechnology: Paternity determination by comparison of DNA fingerprints; Forensic science and crime detection/tracing lineage and relationships</b></p>	<ul style="list-style-type: none"> <li>- Identify anomalies from manifestation and karyotype maps</li> <li>- Sensitise community on blood group and other tests before marriage</li> <li>- Voluntarily request for blood group and other tests</li> <li>- Master the scientific basis of paternity,</li> <li>- Education and awareness campaign project to dispel an identified and locally specific misconception in the community (e.g. albinism, sickle cell anaemia, blood group incompatibility and rhesus factor)</li> </ul>	<ul style="list-style-type: none"> <li>- Respect of other's opinion</li> <li>- Empathy</li> <li>- Accept others as they are</li> <li>- Problem-solving within families</li> <li>- Critical thinking and innovative spirit</li> <li>- Creativity</li> <li>- Taking informed decisions</li> </ul>	<ul style="list-style-type: none"> <li>- Medical professionals</li> <li>- Biologists</li> <li>- Laboratory technicians</li> <li>- The family</li> <li>- Scientists</li> <li>- NGOs</li> <li>- Human rights organisations</li> </ul>

## MODULE TWO: HEALTH EDUCATION

**TIME ALLOCATION: 30H (36 PERIODS)**

### INTRODUCTION TO THE MODULE

This module treats:

- Reproductive health in humans;
- Psychosocial changes accompanying anatomical and physiological changes at puberty and their management;
- Poverty and misery imposed by poor family planning and deficient knowledge in birth control methods;
- STIs and HIV/AIDS infection and affections, their transmission, prevention treatment
- Hormonal imbalances and the control of the menstrual cycle, and
- Modern biotechnology and the management of terminal diseases

### CONTRIBUTION TO THE CURRICULUM

The competences acquired would enable the learner to improve the management of his/her health and that of others.

### CONTRIBUTION TO SOCIETAL LIFE

- This module will develop in the learner psychosocial skills for a fulfilled life.
- At the same time it provides important resources for a more efficient and global solving of daily life problems.
- It offers career options in medicine, pharmacology, stress management and teaching

### SYNOPSIS OF CATEGORIES OF ACTION, CORE KNOWLEDGE AND ESTIMATED DURATION IN PERIODS

Category of actions	Core knowledge	Estimated duration/Periods
Preventing infection through the reproductive organs	1. Reproduction in humans	6
	1.1. Importance	
	1.2. Structure and function of reproductive organs (male and female)	
	1.3. Gametogenesis	
	1.4. Copulation, fertilisation, pregnancy, birth	
	1.5. Growth and development of the child	
	1.6. Puberty – external and internal changes accompanying puberty	
Eradicating poverty and misery	2. Family planning	5
	2.1. Definition	
	2.2. Birth control and different methods	
	2.3. Advantages and disadvantages of each method	
	2.4. Early pregnancies – definition, causes and consequence (including abortion)	
	2.5. Prevention of early pregnancies	

Eradicating STIs and HIV/AIDS	3. STIs:	6
	3.1. Gonorrhoea, Syphilis, herpes, candidiasis, trichomoniasis, Chlamydia	
	3.2. Causes and consequences	
	3.3. Prevention and treatment	
	4. HIV/AIDS	
	4.1. Definition, causes, signs and symptoms,	
	4.2. Modes of transmission	
Preventing hormonal disorders	4.3. Prevention and treatment	5
	5. The endocrine system	
	5.1. Endocrine glands, and their secretions	
	5.2. Role of hormones in the individual	
	5.3. Hormonal imbalance, disorders and consequences	
Preventing terminal diseases	5.4. Hormonal control of the menstrual cycle (adolescence, adulthood and menopause)	6
	6. Modern biotechnology	
	6.1. DNA and gene technology	
	6.2. Techniques used in modern biotechnology (transduction, down-streaming and up-streaming, DNA finger printing)	
	6.3. Applications of modern biotechnology in health	
	6.3.1. Production of insulin	
Preventing nervous system and sense organs disorders and accidents	6.3.2. Cancer therapy and monoclonal antibodies	8
	6.0. The nervous system	
	6.1. General organisation – brain, spinal cord; sympathetic and parasympathetic	
	6.2. Structure and functions – reflex arc, reflex action, conditioned reflex, nervous transmission	
	6.3. Nervous fatigue (causes, effects and prevention)	
	6.4. Resting and its advantages on the nervous system	
	6.5. Toxicity and prevention	
	6.6. The effects of drugs, alcohol and cigarette on the nervous system	
	6.7. Sense organs (eye and ear)	
	6.7.1. Structure and function of parts	
	6.7.2. Defects of the eye and ear	
	6.7.3. Correcting eye and ear defects	
	6.7.4. Hygiene of the eye and ear	
<b>TOTAL</b>	<b>36 PERIODS</b>	

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
Improving human reproductive health	Prevalence of reproductive health diseases	Preventing infection through the reproductive organs	<ul style="list-style-type: none"> <li>- Practising hygiene rules of reproductive health</li> <li>- Overcoming stress and the psychological changes that characterise puberty</li> </ul>	<b>1. Reproduction in humans</b> <b>1.1. Importance</b> <b>1.2. Structure and function of reproductive organs (male and female)</b> <b>1.3. Gametogenesis</b> <b>1.4. Copulation, fertilisation, pregnancy, birth</b> <b>1.5. Growth and development of the child</b> <b>1.6. Puberty – external and internal changes accompanying puberty</b>	<ul style="list-style-type: none"> <li>- Identify differences between sexual organs</li> <li>- Care for sexual organs</li> <li>- Appreciate the importance of body hygiene Identify adolescent characteristics</li> <li>- Master the psychological changes accompanying puberty</li> </ul>	<ul style="list-style-type: none"> <li>- Psychosocial skills</li> <li>- Empathy</li> <li>- Self confidence</li> <li>- Problem solving</li> <li>- Creativity</li> <li>- Critical thinking</li> <li>- Taking decisions</li> </ul>	<ul style="list-style-type: none"> <li>- Health personnel</li> <li>- Biologist</li> <li>- Parents</li> <li>- The community</li> <li>- peers</li> </ul>
	Prevalence of poverty, and misery	Eradicating poverty and misery	<ul style="list-style-type: none"> <li>- Avoiding irresponsible sexual behaviour;</li> <li>- Avoiding unwanted pregnancies;</li> <li>- Awareness and sensitisation;</li> </ul>	<b>2. Family planning</b> <b>2.1. Definition</b> <b>2.2. Birth control and different methods</b> <b>2.3. Advantages and disadvantages of each method</b> <b>2.4. Early pregnancies – definition, causes and consequence (including abortion)</b> <b>2.5. Prevention of early pregnancies</b>	<ul style="list-style-type: none"> <li>- Adopting responsible sexual behaviour</li> <li>- Identify periods of safe and risky sexual intercourse</li> <li>- Mastering the working of each birth control method</li> <li>- Appreciating the effectiveness of different birth control methods</li> </ul>	<ul style="list-style-type: none"> <li>- Taking informed decisions</li> <li>- Problem solving</li> <li>- Making choices</li> <li>- Empathy</li> <li>- Critical thinking</li> </ul>	<ul style="list-style-type: none"> <li>- Health personnel</li> <li>- Biologist</li> <li>- Parents</li> <li>- The community</li> <li>- peers</li> </ul>

Improving human reproductive health	Prevalence of STIs and HIV/AIDS	Eradicating STIs and HIV/AIDS	<ul style="list-style-type: none"> <li>- Preventing STI and HIV/AIDS transmission and infection</li> <li>- Caring for HIV/AIDS patients</li> </ul>	<b>3. STIs:</b> <b>3.1. Gonorrhoea, Syphilis, herpes, candidiasis, trichomoniasis, Chlamydia</b> <b>3.2. Causes and consequences</b> <b>3.3. Prevention and treatment</b> <b>4. HIV/AIDS</b> <b>4.1. Definition, causes, signs and symptoms,</b> <b>4.2. Modes of transmission</b> <b>4.3. Prevention and treatment</b>	<ul style="list-style-type: none"> <li>- Practising hygiene rules</li> <li>- Voluntary testing</li> <li>- Strict respect of medical prescriptions and advise in case of infection or affection</li> <li>- Avoiding sexual promiscuity</li> </ul>	<ul style="list-style-type: none"> <li>- Empathy</li> <li>- Taking informed decisions</li> <li>- Problem solving</li> <li>- Making choices</li> <li>- Critical thinking</li> <li>- creativity</li> </ul>	<ul style="list-style-type: none"> <li>- Health personnel</li> <li>- Biologist</li> <li>- Parents</li> <li>- The community</li> <li>- peers</li> </ul>
Improving human health	Prevalence of hormonal disorders	Preventing hormonal disorders	<ul style="list-style-type: none"> <li>- Identify hormonal disorders</li> <li>- Manage hormonal changes in reproductive sex</li> </ul>	<b>5. The endocrine system</b> <b>5.1. Endocrine glands, and their secretions</b> <b>5.2. Role of hormones in the individual</b> <b>5.3. Hormonal imbalance and disorders</b> <b>5.4. Hormonal control of the menstrual cycle (adolescence, adulthood and menopause)</b>	<ul style="list-style-type: none"> <li>- Master psychological changes accompanying hormonal changes</li> <li>- Explain the menstrual cycle and periods of safe and risky sexual intercourse</li> </ul>	<ul style="list-style-type: none"> <li>- Empathy</li> <li>- Taking informed decisions</li> <li>- Problem solving</li> <li>- Making choices</li> <li>- Critical thinking</li> <li>- creativity</li> </ul>	<ul style="list-style-type: none"> <li>- Health personnel</li> <li>- Biologist</li> <li>- Parents</li> <li>- The community</li> <li>- peers</li> <li>-</li> </ul>
	Prevalence of terminal disease	Preventing terminal diseases	<ul style="list-style-type: none"> <li>- Managing terminal diseases</li> </ul>	<b>6. Modern biotechnology</b> <b>6.1. DNA and gene technology</b> <b>6.2. Techniques used in modern biotechnology (transduction, down-streaming and up-streaming, DNA finger printing)</b> <b>6.3. Applications of modern biotechnology in health</b> <b>6.3.1. Production of insulin</b> <b>6.3.2. Cancer therapy and monoclonal antibodies</b>	<ul style="list-style-type: none"> <li>- Managing terminal diseases</li> <li>- Adopting a preventive nutritional life style</li> </ul>	<ul style="list-style-type: none"> <li>- Empathy</li> <li>- Taking informed decisions</li> <li>- Problem solving</li> <li>- Making choices</li> <li>- Critical thinking</li> <li>- creativity</li> </ul>	<ul style="list-style-type: none"> <li>- Health personnel</li> <li>- Biologist</li> <li>- Parents</li> <li>- The community</li> <li>- peers</li> </ul>

Improving human health	Prevalence of nervous system and sense organ diseases and accidents	Preventing nervous system and sense organs disorders and accidents	<ul style="list-style-type: none"> <li>- Avoiding nervous fatigue</li> <li>- Avoiding the consumption of drugs and toxic substances</li> <li>- Eating the right food</li> <li>- Respecting medical prescriptions</li> <li>- Doing sports</li> <li>- Organising work, resting and leisure time</li> <li>- Sensitising and raising awareness</li> <li>- educating</li> <li>- Hygiene of the sense organs (eye, ear)</li> <li>- Identifying symptoms and signs of different eye and ear defects</li> </ul>	<b>7.0. The nervous system</b> <b>7.1. General organisation – brain, spinal cord; sympathetic and parasympathetic</b> <b>7.2. Structure and functions – reflex arc, reflex action, conditioned reflex, nervous transmission</b> <b>7.3. Nervous fatigue (causes, effects and prevention)</b> <b>7.4. Resting and its advantages on the nervous system</b> <b>7.5. Toxicity and prevention</b> <b>7.6. The effects of drugs, alcohol and cigarette on the nervous system</b> <b>7.7. Sense organs (eye and ear)</b> <b>7.7.1. Structure and function of parts</b> <b>7.7.2. Defects of the eye and ear</b> <b>7.7.3. Correcting eye and ear defects</b> <b>7.7.4. Hygiene of the eye and ear</b>	<ul style="list-style-type: none"> <li>- Work, leisure and rest organisation and programming</li> <li>- Practising sports</li> <li>- Identification of drugs and other toxic substances to the nervous system.</li> <li>- Identification of eye and ear defects</li> <li>- Proper correction of eye defects</li> </ul>	<ul style="list-style-type: none"> <li>- Problem-solving</li> <li>- Curiosity and critical thinking skills</li> <li>- Taking the right decision</li> </ul>	Health personnel (doctors, nurses, lab technicians, etc) Health establishment, Dieticians, Neurologists Sports personnel, Youth and animation officials, Tradi- practitioners Eye and ear specialists Physicists
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## MODULE THREE: ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT

**TIME ALLOCATION: 10H (12 PERIODS)**

### INTRODUCTION TO THE MODULE

This module treats:

- Ecology, the concept of the ecosystem and natural equilibria
- Ecological factors;
- Man's impact on the ecosystem, and
- Conservation and management.

### CONTRIBUTION TO THE CURRICULUM

- The skills the learner will acquire in this module will better equip him/her for the sustainable management of his/her environment and the resources.
- This module would also invoke the love for careers in conservation, environmental engineering, agronomy, teaching and environmental education, etc.

### CONTRIBUTION TO SOCIETAL LIFE

This module will develop in the learner psychosocial skills necessary for living in a clean and conducive environment.

### SYNOPSIS OF CATEGORIES OF ACTION, CORE KNOWLEDGE AND ESTIMATED DURATION IN PERIODS

Category of actions	Core knowledge	Estimated duration/periods
Conserving the natural environment and the recycling of matter in nature	I. ECOLOGY	4
	I.1. Definition of some ecological concepts (ecosystem, environment, habitat, community, population, ecological niche etc )	
	I.2. Ecological Factors:	
	I.2.1. Biotic Factors and effects	
	I.2.2. Abiotic Factors and effects	
	I.3. Role of the components of the ecosystem and their interdependence	3
	I.4. Energy flow and the cycling of matter in the ecosystem (biogeochemical cycles – carbon, nitrogen, water and feeding relationships – food chains, food webs, predation, symbiosis, mutualism)	
	I.5. Human impacts on the ecosystems	5
	I.5.1. Pollution	
	I.5.2. Definition and types	
	I.5.3. Control and management of urban wastes (Solid, liquid and gaseous wastes)	
	I.5.4. Legislation and pollution	
I.6. Conservation: Definition, importance, examples – flower gardens, game reserve, national parks, zoos, botanical gardens etc		
TOTAL	12 PERIODS	

CONTEXTUAL FRAMEWORK		COMPETENCIES		RESOURCES			
Family of situations	Examples of situations	Category of actions	Actions	Essential Knowledge	Abilities (Aptitudes)	Life Skills (Practice)	Other resources
Managing relationship between organisms in ecosystems	Disruption of natural equilibria	Conserving the natural environment and the recycling of matter in nature	<ul style="list-style-type: none"> <li>- Identifying environmental factors and their effects on the organisms and environment</li> <li>- Adopting protective behaviour towards the natural environment</li> <li>- Educating and sensitising on the consequences of polluting the land , water, and air</li> <li>- Educating and sensitising on the importance of recycling, protecting reserve areas and species</li> <li>- Identifying different stages, wastes produced and energy consumed along a locally specific product life cycle (from raw material to disposal)</li> </ul>	<b>I. ECOLOGY</b> <b>I.1. Definition of some ecological concepts (ecosystem, environment, habitat, community, population, ecological niche etc )</b> <b>I.2. Role of the components of the ecosystem and their interdependence</b> <b>I.3. Energy flow and the cycling of matter in the ecosystem (biogeochemical cycles – carbon, nitrogen, water and feeding relationships – food chains, food webs, predation, symbiosis, mutualism)</b> <b>I.4. Ecological Factors:</b> <b>I.4.1. Biotic Factors and effects</b> <b>I.4.2. Abiotic Factors and effects</b> <b>I.5. Human impacts on the ecosystems</b> <b>I.5.1. Pollution</b> <b>I.5.2. Definition and types</b> <b>I.5.3. Control and management of urban wastes (Solid, liquid and gaseous wastes)</b> <b>I.5.4. Legislation and pollution</b> <b>I.6. Conservation: Definition, importance, examples – flower gardens, game reserve, national parks, zoos, botanical gardens etc</b>	<ul style="list-style-type: none"> <li>– Recognise the role of different components of the ecosystem on conservation</li> <li>– Recognise the negative impact of man's activities on the ecosystem and to the survival of the human species</li> <li>– Develop and implement a project to solve a locally specific identified ecological problem.</li> <li>– Community Project: Managing a locally specific waste in your community</li> </ul>	<ul style="list-style-type: none"> <li>- Problem-solving</li> <li>- Curiosity</li> <li>- Taking informed decision</li> </ul>	<ul style="list-style-type: none"> <li>- Agricultural experts</li> <li>- Ecologists, Sewage and waste treatment specialists</li> <li>-NGOs</li> </ul>

**Article 2:** The syllabus presented in article one here above shall be implemented as from the beginning of the 2016-2017 school year;

**Article 3:** All previous provisions repugnant hereto are hereby repealed;

**Article 4:** Inspectors Coordinator General, the Director of General Secondary Education, the Director of Examinations and Certification, Regional Delegates of Secondary Education, Divisional Delegates of Secondary Education, Education Secretaries of various Private Educations Agencies, Principals of public and private schools, each in their own sphere shall be charged with the strict implementation of this order which shall be inserted and published in the Official Gazette in English and French.

Yaoundé, - 9 DEC 2014

THE MINISTER OF SECONDARY EDUCATION

The image shows a circular official stamp of the Ministry of Secondary Education of Cameroon. The stamp contains the text 'REPUBLIQUE DU CAMEROUN', 'Ministère de l'Éducation', 'Le Ministre', 'Secondary Education', and 'ENSEIGNEMENTS SECONDAIRES'. In the center is a coat of arms. Overlaid on the stamp is a handwritten signature in black ink, which appears to be 'Louis Baptes Baptes'. Below the signature, the name 'Louis Baptes Baptes' is written in red ink.

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- RDSE/DDSE
- Education Secretaries
- School Heads
- Files/Archives