MINISTRY OF EDUCATION

TEACHING SYLLABUS FOR GENERAL AGRICULTURE
(SENIOR HIGH SCHOOL 1-3)

Enquiries and comments on this syllabus should be addressed to:

The Director
Curriculum Research and Development Division (CRDD)
P. O. Box 2739
Accra, Ghana.

0302- 683668
0302-683651

September, 2010

TEACHING SYLLABUS FOR GENERAL AGRICULTURE

RATIONALE FOR TEACHING GENERAL AGRICULTURE

The importance of agriculture in the national economy is well recognised in terms of food production, income generation and employment opportunities. However, the potential of agriculture in Ghana is marginally utilised. Government policy is therefore to modernise the agricultural sector in such a way as to make Ghana an agro-industrialized country leading to the rural transformation of the country. The policy aims at improving the productivity of small-scale producers while actively promoting the emergence of medium and large-scale agricultural enterprises.

In line with government policy, the Ministry of Education has the responsibility to review agricultural education to ensure the development of well-trained agricultural work-force including managers and specialists of various kinds. There is the need for a broad-based training in agriculture to equip agricultural students with scientific, vocational and technological competencies to enable them fit into various sectors of agriculture. The agricultural training offered at the SHS level and particularly in the study of General Agriculture, lays the foundation for further work in agriculture at the tertiary level.

GENERAL AIMS

The General Agriculture syllabus is designed to help students to:

1. appreciate the importance of agriculture in the socio-economic development of Ghana,
2. acquire decision-making skills through the scientific principles of observation, data collection, analysis and interpretation,
3. develop skills and attitudes required for productive and profitable agriculture through practice and experiential learning,
4. recognise agriculture as a business and a viable livelihood option,
5. develop positive attitudes, interests, habits and good practices in agriculture,
6. be aware of the roles of extension service in the agricultural value chain,
7. recognise job opportunities in agriculture,
8. acquire techniques for efficient management of agribusinesses,
9. acquire requisite knowledge and skills needed for further training in agriculture.

SCOPE OF CONTENT

The content of this syllabus has been designed in a way that will offer knowledge and skills to students for whom Senior High School education is terminal. Knowledge and practices acquired in this subject will enable such students to work on their own, or seek employment in agricultural establishments. The syllabus also provides adequate foundation knowledge and skills for students who will want to pursue further education and training in agriculture after SHS.

The syllabus covers both theory and practicals in the following areas:

- Introduction to Agriculture and Agricultural Education

- Soil Uses and Management

- Farm Mechanisation

- Crop Production

- Animal Production

- Agricultural Economics, Agribusiness and Extension.

PRE-REQUISITE SKILLS AND ALLIED SUBJECTS

General Agriculture is studied by all candidates who select the Agriculture programme as their elective field of study in Senior High School. Students offering this subject must have had sound foundation in Integrated Science and Mathematics at the Junior High School level. In addition to General Agriculture, students are to select **one** subject from Group A and **two** subjects from Group B subjects as listed below:

Group A: Crop Husbandry and Horticulture, Animal Husbandry, Fisheries, and Forestry.

Group B: Chemistry, Physics and Mathematics.

ORGANISATION OF THE SYLLABUS

The syllabus has been structured to cover the three-year Senior High School Programme. In each year, there are a number of sections with each section comprising a number of units. The composition is as follows:

ORGANISATION AND STRUCTURE OF THE SYLLABUS

YEAR 1	YEAR 2	YEAR 3
SECTION 1: INTRODUCTION TO AGRICULTURE (p.1) UNIT 1 Importance of agriculture to the national economy UNIT 2 Meaning, types and importance of agricultural education UNIT 3 Measurements in agriculture	**SECTION 1 : INTRODUCTION TO AGRICULTURE (p. 22)** UNIT 1: Land and its uses UNIT 2: Development of agriculture UNIT 3 Invasive Alien Species (IAS) UNIT 4: Introduction to forestry UNIT 5: Forest products and their contribution to national development	**SECTION 1: INTRODUCTION TO AGRICULTURE (p. 46)** Unit 1: Sustainable Agriculture and Good Agricultural Practices (GAP)
SECTION 2: SOIL USES AND MANAGEMENT (p..4) UNIT 1 Origin and formation of soil UNIT 2 Nature, composition and properties of soil.	**SECTION 2: SOIL USES AND MANAGEMENT (p. 27)** UNIT 1: Effects of land preparation practices on the soil. UNIT 2: Plant nutrients and nutrient cycles. UNIT 3; Soil fertility and its maintenance	**SECTION 2: SOIL USES AND MANAGEMENT (p.47)** UNIT 1: Soil and water conservation
SECTION 3: FARM MECHANIZATION (p. 7) UNIT 1 Introduction to farm mechanisation. UNIT 2: Farm power UNIT 3: Farm Machinery and Implements	**SECTION 3: FARM MECHANIZATION (p.30)** UNIT 1: Harvest and post-harvest tools, equipment and machinery UNIT 2: Irrigation and Drainage	**SECTION 3: FARM MECHANIZATION (p.49)** UNIT 1: Surveying and Planning of farmsteads.

YEAR 1	YEAR 2	YEAR 3
SECTION 4: **CROP PRODUCTION (p. 10)**	**SECTION 4**: **CROP PRODUCTION (p. 33)**	**SECTION 4**: **CROP PRODUCTION (P. 51)**
UNIT 1: Importance and classification of crops	UNIT 1: General principles of plant protection	UNIT 1: Basic principles of ornamental plant production
UNIT 2: Principles of crop production	UNIT 2: Husbandry of some selected crops	
	UNIT 3: Principles of crop improvement	
SECTION 5: **ANIMAL PRODUCTION (p.14)**	**SECTION 5**: **ANIMAL PRODUCTION (p. 39)**	**SECTION 5: ANIMAL PRODUCTION (p. 53)**
UNIT 1: Importance, classification and distribution of breeds of farm animals in West Africa	UNIT 1: General management practices of farm animals	UNIT 1: Introduction to fisheries
UNIT 2: Animal nutrition	UNIT 2: Principles of animal health management	UNIT 2: Fish farming
UNIT 3: Reproduction in farm animals	UNIT 3 Husbandry of selected farm animals	
UNIT 4: Principles of animal health improvement		
SECTION 6: **AGRICULTURAL ECONOMICS AGRIBUSINESS AND EXTENSION (p. 18)**	**SECTION 6: AGRICULTURAL ECONOMICS AGRIBUSINESS AND EXTENSION (p. 43)**	**SECTION 6**: **AGRICULTURAL ECONOMICS AGRIBUSINESS AND EXTENSION (p. 56)**
UNIT 1: Agricultural economics: Importance and basic principles	UNIT 1: Establishment and management of agribusiness	UNIT 1: Marketing of agricultural produce.
UNIT 2: Factors of production	UNIT 2: Agricultural financing:	UNIT 2: Agricultural Extension
UNIT 3: Introduction to agribusiness management	UNIT 3: Farm records and accounts	UNIT 3: The value chain approach in food quality and safety assurance

TIME ALLOCATION

General Agriculture is allocated 6 periods of 40 minutes each, per week. Of the six periods, three should be devoted to practical work and three to theory. The practical aspect of the subject is essential and teachers should give adequate attention to it.

SUGGESTIONS FOR TEACHING THE SYLLABUS

Schools offering General Agriculture must keep a school farm. Where this is not possible, a well planned garden with small plots should be maintained for regular observation by the students. At least one species of farm animals from each of the following three groups must be kept on a small-scale basis:

- Pigs and Poultry
- Goats, Sheep and Cattle
- Rabbits, Grasscutter, Guinea pigs and Fish

It is also recommended that the study of General Agriculture at the Senior High Schools be supplemented with visits to well established government and private experimental and commercial farms, agricultural research institutes and other institutions related to agriculture. Teachers should also invite staff of MOFA and other related institutions to serve as resource persons where necessary.

Practical work should involve laboratory experiments, farm work, observations carried out on the farm or garden, field trips, collection of specimens and record keeping.

Each student must keep three practical notebooks for the following:

1. Farm diary

2. Specimen album

3. Laboratory experiments and project reports.

General Objectives

General Objectives have been listed at the beginning of each Section. The general objectives specify the skills and behaviours the student should acquire after learning the units of a section. Read the general objectives very carefully before you start teaching the section. After teaching all the units of a section, go back and read the general objectives again to be sure you have covered the objectives adequately in the course of your teaching.

Sections and Units: The syllabus has been planned on the basis of Sections and Units. Each year's work is divided into sections. A section consists of a fairly homogeneous body of knowledge within the subject. Within each section are units. A unit consists of a more related and homogeneous body of knowledge and skills.

The syllabus is structured in five columns: Units, Specific Objectives, Content, Teaching and Learning Activities and Evaluation. A description of the contents of each column is as follows:

Column 1 - Units: The units in Column 1 are divisions of the major topics of the section. You are expected to follow the unit topics according to the linear order in which they have been presented. However, if you find at some point that teaching and learning in your class will be more effective if you skipped to another unit before coming back to the unit in the sequence, you are encouraged to do so.

Column 2 - Specific Objectives: Column 2 shows the Specific Objectives for each unit. The specific objectives begin with numbers such as 1.3.5 or 2.2.1. These numbers are referred to as "Syllabus Reference Numbers (SRN)". The first digit in the syllabus reference number refers to the section; the second digit refers to the unit, while the third digit refers to the rank order of the specific objective. For instance, 1.3.5 means: Section 1, Unit 3 (of Section 1) and Specific Objective 5. In other words, 1.3.5 refers to Specific Objective 5 of Unit 3 of Section 1. Similarly, the syllabus reference number 2.2.1 simply means Specific Objective number 1 of Unit 2 of Section 2. Using syllabus reference numbers provides an easy way for communication among teachers and other educators. It further provides an easy way for selecting objectives for test construction. Let's say for instance, that Unit 2 of Section 2 has five specific objectives: 2.2.1 - 2.2.5. A teacher may want to base his/her test items/questions on objectives 2.2.3 and 2.2.4 and not use the other three objectives. In this way, a teacher would sample the objectives within units and within sections to be able to develop a test that accurately reflects the importance of the various skills taught in class.

You will note also that specific objectives have been stated in terms of the student i.e., *what the student will be able to do after instruction and learning in the unit*. Each specific objective hence starts with the following, "The student will be able to: ". This in effect, means that you have to address the learning problems of each individual student. It means individualizing your instruction as much as possible such that the majority of students will be able to master the objectives of each unit of the syllabus.

Column 3 - Content: The "content" in the third column of the syllabus presents a selected body of information that you will need to use in teaching the particular unit. In some cases, the content presented is quite exhaustive. In some other cases, you could add more information to the content presented. You must at any rate, use any practical experiences you have and other knowledge you have acquired from books and other sources in your teaching.

Column 4 -Teaching and Learning Activities (T/LA): T/LA that will ensure maximum student participation in the lessons is presented in Column 4. Avoid rote learning and drill-oriented methods and rather emphasize participatory teaching and learning, and also emphasize the cognitive, affective and psychomotor domains of knowledge in your instructional system wherever appropriate. You are encouraged to re-order the suggested teaching and learning activities and also add to them where necessary in order to achieve optimum student learning. The major purpose of teaching and learning is to make students capable of applying their knowledge in dealing with problems in and out of school. A suggestion that will help your students acquire the habit of analytical thinking and the capacity for applying their knowledge to problems is to begin each lesson with a practical problem. Select a practical problem for each lesson. The selection must be made such that students can use knowledge gained in the previous lesson and other types of information not specifically taught in class. At the beginning of a lesson, state the problem, or write the problem on the board. Let students analyse the problem, suggest solutions etc., criticize solutions offered, justify solutions and evaluate the worth of possible solutions. There may be a number of units where you need to re-order specific objectives to achieve such required effects. The emphasis is to assist your students to develop analytical thinking and practical problem solving techniques in agriculture.

Column 5 - Evaluation: Suggestions and exercises for evaluating the lessons of each unit are indicated in Column 5. Evaluation exercises can be in the form of oral questions, quizzes, class assignments, essays, structured questions, project work etc. Ask questions and set tasks and assignments that will challenge your students to apply their knowledge to issues and problems in General Agriculture and that will engage them in developing solutions, and developing positive attitudes as a result of having undergone instruction in this subject. The suggested evaluation tasks are not exhaustive. You are encouraged to develop other creative evaluation tasks to ensure that students have mastered the instruction and behaviours implied in the specific objectives of each unit. For evaluation during class lessons, determine the mastery level you want students to achieve in their answers and responses. If for instance, you take 80% as the mastery level, ensure that each student's answer to questions asked in class achieves this level of mastery.

Lastly, bear in mind that the syllabus cannot be taken as a substitute for lesson plans. It is therefore, necessary that you develop a scheme of work and lesson plans for teaching the units of this syllabus.

Profile Dimensions

Profile dimensions describe the underlying behaviours or abilities students are expected to acquire as a result of having gone through a period of instruction. Each of the specific objectives in this syllabus contains an action verb that specifies the type of learning or skill that the student should acquire by the end of the instructional period. A specific objective as follows: The student will be able to describe …etc. contains an action verb "describe" that indicates what the student will be able to do after teaching and learning have taken place. Being able to "describe" something after the instruction has been completed means that the student has acquired "knowledge". Being able to explain, summarize, give examples, etc. means that the student has understood the lesson taught. Similarly, being able to develop, plan, construct etc, means that the student has learnt to create, innovate or synthesize knowledge. Each of the action verbs in the specific objectives of the syllabus describes the behaviour the student will be able to demonstrate after the instruction. "Knowledge", "Application", etc. are dimensions that should be the prime focus of teaching, learning and assessment in schools.

As already implied, profile dimensions describe the underlying behaviours for teaching, learning and assessment. In General Agriculture, the three profile dimensions required for teaching, learning and testing are:

Knowledge and Understanding	40%
Application of Knowledge	30%
Practical Skills	30%

Each of the dimensions has been given a percentage weight that should be reflected in teaching, learning and testing. The weights show the relative emphasis that the teacher should give in the teaching, learning and testing processes. Combining the three dimensions in the teaching and learning process will ensure that General Agriculture will be taught and studied not only at the cognitive level, but will also lead to the acquisition of practical skills in the subject.

The explanation of the key words involved in each of the profile dimensions is as follows:

Knowledge and Understanding (KU)

Knowledge — The ability to:
remember, recall, identify, define, describe, list, name, match, state principles, facts and concepts. Knowledge is simply the ability to remember or recall material already learned and constitutes the lowest level of learning.

Understanding — The ability to:
explain, summarize, translate, rewrite, paraphrase, give examples, generalize, estimate or predict consequences based upon a trend. Understanding is generally the ability to grasp the meaning of some material that may be verbal, pictorial, or symbolic.

Application of Knowledge (AK)

The ability to use knowledge or apply knowledge, as implied in this syllabus, has a number of learning/behaviour levels. These levels include application, analysis, innovation or creativity, and evaluation. These may be considered and taught separately, paying attention to reflect each of them equally in your teaching. The dimension “Application of Knowledge” is a summary dimension for all four learning levels. Details of each of the four sub levels are as follows:

Application — The ability to:
apply rules, methods, principles, theories, etc. to concrete situations that are new and unfamiliar. It also involves the ability to produce, solve, operate, demonstrate, discover etc.

Analysis The ability to
break down a piece of material into its component parts; to differentiate, compare, distinguish, outline, separate, identify significant points etc., recognize unstated assumptions and logical fallacies, recognize inferences from facts etc.

Innovation/
Creativity - The ability to
synthesize or put parts together to form a new whole. It involves the ability to combine, compile, compose, devise, suggest a new idea or possible ways, plan, revise, design, organize, create, and generate new solutions. The ability to create or innovate is the highest form of learning. The world becomes more comfortable because some people, based on their learning, bring new ideas, design and create new things.

Evaluation The ability to:
appraise, compare features of different things and make comments or judgments, contrast, criticize, justify, support, discuss, conclude, make recommendations etc. Evaluation refers to the ability to judge the worth or value of some materials, ideas etc., based on some criteria. Evaluation is a constant decision making activity. We generally compare, appraise and select throughout the day. Every decision we make involves evaluation. Evaluation is a high level ability just as application, analysis and innovation or creativity since it goes beyond simple knowledge acquisition and understanding.

A number of examination questions at the high school level begin with the word “Discuss”. The word “discuss” asks for a variety of thinking skills and is obviously a high level thinking behaviour. Students consequently do poorly on examination questions that start with “Discuss”. For this reason, and also for the reason that discussion of issues, discussion of reports etc., are some of the major intellectual activities students will be engaged in, in work situations and at higher levels of learning, it will be very helpful if you would emphasize discussion questions etc. both in class and in the tests you set.

Practical Skills (PS)

Practical skills refer to the psychomotor domain. This involves the demonstration of manipulative skills using tools, machines and equipment to carry out practical operations and to solve practical problems. The teaching and assessment of practical skills should involve experiments, projects, case studies and field studies.

Skills required for effective practical work are the following:

1. Equipment Handling
2. Observation
3. Manipulation
4. Measuring
5. Recording
6. Reporting
7. Creativity
8. Communication

Equipment Handling: Students should be able to handle and use equipment properly for practical work. The teacher should ensure that students acquire a high level of proficiency in the use of tools, equipment and machinery in relevant areas of agriculture. It is essential for students to observe the necessary safety measures in handling equipment.

Observation: The student should be able to use his/her senses to make accurate observations. Where appropriate, students should be able to tell the colour, form, texture and the structure of specimens provided and be able to classify them.

Manipulation: Manipulation involves the skilful handling of scientific objects and tools for accomplishing specific tasks.

Measuring: Refers to the accurate use of measuring instruments and equipment. The teacher should guide students to make appropriate measurements of agricultural specimens, chemicals etc.

Recording: Recordings must aim at a high degree of accuracy.

Reporting: Students should be able to present pertinent and precise reports on projects they undertake. Reports, oral or written, should be concise, clear and accurate.

Creativity: Students should be encouraged to be creative and be able to use new methods in carrying out projects. You can help your students to be creative by encouraging any little creative efforts, techniques and products they may develop.

Communication: Students should be guided to develop effective oral and written communication skills necessary for group work, reports etc.

The action verbs provided under the various profile dimensions should help you to structure your teaching such as to achieve the effects needed. Select from the action verbs provided for your teaching, in evaluating learning before, during and after the instruction. Use the action verbs also in writing your test questions. This will ensure that you give your students the chance to develop good thinking skills, and the capacity for excellent performance in examinations and in practical agriculture and life situations. Check the weights of the profile dimensions to ensure that you have given the required emphasis to each of the dimensions in your teaching and assessment.

FORM OF ASSESSMENT

It must be emphasized again that it is important that both instruction and assessment be based on the profile dimensions of the subject. In developing assessment procedures, select specific objectives in such a way that you will be able to assess a representative sample of the syllabus objectives. Each specific objective in the syllabus is considered a criterion to be achieved by the student. When you develop a test that consists of items or questions that are based on a representative sample of the specific objectives taught, the test is referred to as a "Criterion-Referenced Test". In many cases, a teacher cannot test all the objectives taught in a term, in a year etc. The assessment procedure you use i.e. class tests, home work, projects etc. must be developed in such a way that it will consist of a sample of the important objectives taught over a period.

The example below shows an examination consisting of three papers, Paper 1, Paper 2, Paper 3 and School Based Assessment (SBA). Paper 1 will usually be an objective-type paper; Paper 2 will consist of structured questions or essay questions, essentially testing "Application of Knowledge", but also consisting of some questions on "Knowledge and Understanding". Paper 3 will be the practical test paper, and the SBA will be based on all three dimensions as indicated. The distribution of marks for the objective test items, essay type questions and the practical questions in the three papers and in the SBA should be in line with the weights of the profile dimensions already indicated and as shown in the last column of the table below.

The West African Examinations Council (WAEC) generally sets 50 or 60 objective test items at the WASSCE. Emulate this by developing an objective test paper (Paper 1) that consists of 60 items. Paper 2 could consist of some structured questions and essay questions. In general, let students answer five essay questions from a list of 7-10 questions. Paper 3 will consist of 5-7 practical questions.

In the examination structure presented below, Paper 1 is marked out of 60; Paper 2 is marked out of 90, Paper 3 marked out of 60, and SBA is marked out of 90, giving a total of 300 marks. The last row shows the weight of the marks allocated to each of the four test components. The three papers are weighted differently. Paper 2 is a more intellectually demanding paper and is therefore weighted more than Papers 1 and 3.

Distribution of Examination Paper Weights And Marks

Dimensions	Paper 1	Paper 2	Paper 3	School Based Assessment	Total Marks	% Weight of Dimension
Knowledge and Understanding	50	30	-	40	120	40
Application of Knowledge	10	60	-	20	90	30
Practical Skills	-	-	60	30	90	30
Total Marks	60	90	60	90	**300**	
% Contribution of Papers	20	30	20	30		**100**

You will note that Paper 1 has a contribution of 20% to the total marks; Paper 2 has a contribution of 30% to the total marks; Paper 3 has a contribution of 20%, and SBA has a contribution of 30% to the total marks. The numbers in the cells indicate the marks to be allocated to the items/questions that test each of the dimensions within the respective test papers.

The last but one column shows the total marks allocated to each of the dimensions. Note that the numbers in this column are additions of the numbers in the cells and they agree with the profile dimension weights indicated in the last column. Of the total marks of 300, 120 marks, equivalent to 40% of the total marks, are allocated to Knowledge and Understanding. 90 marks, equivalent to 30% of the total marks, are allocated to each of Application of Knowledge and Practical Skills. The weights of the three dimensions are indicated in the last column. The ratio of theory to practice in General Agriculture is hence 70:30.

WASSCE consists of two papers. Paper 1includes the objective test and essay test components. Paper 2, the practical test, is separate. In the example above, we recommend three separate papers to give your students extended practice for adequate examination preparation.

Item Bank: Obviously the structure of assessment recommended in this syllabus will need a lot of work on the part of the teacher. In preparation for setting examination papers, try to develop an item bank. The term “item bank” is a general term for a pool of objective items, a pool of essay questions or a pool of practical test questions. As you teach the subject, try to write objective test items, essay questions, structured essay questions and practical test questions to fit selected specific objectives which you consider important to be tested. If you proceed diligently, you will realize you have written more than 100 objective test items and more than 30 essay questions in a space of one year. Randomly select from the item bank to compose the test papers. Select with replacement. This means, as items/questions are selected for testing, new ones have to be written to replace those items/questions already used in examinations. Items and questions that have been used in examinations may also be modified and stored in the item bank.

Test wiseness

An important issue in the preparation for a major examination such as the WASSCE, is the issue of test “wiseness”. To be test wise means that the student knows the mechanics for taking a test. These mechanics include writing your index number and other particulars accurately and quickly on the answer paper; reading all

questions before selecting the one's best questions to answer; apportioning equal time to each question or spending more time on questions that carry more marks; making notes on each question attempted before writing the answer; leaving extra time to read over one's work; finally checking to see that the personal particulars supplied on the answer sheet are accurate. Some good students sometimes fail to do well in major examinations because of weakness in the mechanics of test taking; because they are not test wise. Take your students through these necessary mechanics so that their performance on major examinations may not be flawed by the slightest weakness in test taking.

GUIDELINES FOR SCHOOL-BASED ASSESSMENT (SBA)

A new School Based Assessment system (SBA) will be introduced into the school system in 2011. The new SBA system is designed to provide schools with an internal assessment system that will help schools to achieve the following purposes:

- Standardize the practice of internal school-based assessment in all Senior High Schools in the country
- Provide reduced assessment tasks for subjects studied at SHS
- Provide teachers with guidelines for constructing assessment items/questions and other assessment tasks
- Introduce standards of achievement in each subject and in each SHS class
- Provide guidance in marking and grading of test items/questions and other assessment tasks
- Introduce a system of moderation that will ensure accuracy and reliability of teachers' marks
- Provide teachers with advice on how to conduct remedial instruction on difficult areas of the syllabus to improve class performance.

SBA may be conducted in schools using the following: Mid-term test, Group Exercise, End-of-Term Test and Project

1. Project: This will consist of a selected topic to be carried out by groups of students for a year. Segments of the project will be carried out each term toward the final project completion at the end of the year,

   The projects may include the following:
   i) farm work
   ii) experiment
   iii) investigative study (including case study)

   A report must be written for each project undertaken.

2. Mid-Term Test: The mid-term test following a prescribed format will form part of the SBA

3. Group Exercise: This will consist of written assignments or practical work on a topic(s) considered important or complicated in the term's syllabus

4. End-of-Tem Test: The end –of-term test is a summative assessment system and should consist of the knowledge and skills students have acquired in the term. The end-of-term test for Term 3 for example, should be composed of items/questions based on the specific objectives studied over the three terms, using a different weighting system such as to reflect the importance of the work done in each term in appropriate proportions. For example, a teacher may build an End-of-Term 3 test in such a way that it would consist of the 20% of the objectives studied in Term 1, 20% of objectives studied in Term 2 and 60% of the objectives studied in Term 3.

GRADING PROCEDURE

To improve assessment and grading and also introduce uniformity in schools, it is recommended that schools adopt the following WASSCE grade structure for assigning grades on students' test results. The WASSCE structure is as follows:

Grade A1:	80 - 100%	-	Excellent
Grade B2:	70 - 79%	-	Very Good
Grade B3:	60 - 69%	-	Good
Grade C4:	55 - 59%	-	Credit
Grade C5:	50 - 54%	-	Credit
Grade C6:	45 - 49%	-	Credit
Grade D7:	40 - 44%	-	Pass
Grade D8:	35 - 39%	-	Pass
Grade F9:	34% and below	-	Fail

In assigning grades to students' test results, you are encouraged to apply the above grade boundaries and the descriptors which indicate the meaning of each grade. The grade boundaries i.e., 60-69%, 50-54% etc., are the grade cut-off scores. For instance, the grade cut-off score for B2 grade is 70-79% in the example. When you adopt a fixed cut-off score grading system as in this example, you are using the criterion-referenced grading system. By this system a student must make a specified score to be awarded the requisite grade. This system of grading challenges students to study harder to earn better grades. It is hence a very useful system for grading achievement tests.

Always remember to develop and use a marking scheme for marking your class examination scripts. A marking scheme consists of the points for the best answer you expect for each question, and the marks allocated for each point raised by the student as well as the total marks for the question. For instance, if a question carries 20 marks and you expect 6 points in the best answer, you could allocate 3 marks or part of it (depending upon the quality of the points raised by the student) to each point , hence totalling 18 marks, and then give the remaining 2 marks or part of it for organisation of answer. For objective test papers you may develop an answer key to speed up the marking.

SENIOR HIGH SCHOOL - YEAR 1

SECTION 1

INTRODUCTION TO AGRICULTURE

General Objectives: The student will:

1. be aware of the importance of agriculture to the national economy.
2. appraise the role of agricultural education in national development.
3. recognise various occupations in agriculture for the youth.
4. acquire basic measurement skills in agribusiness.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1	The student will be able to:			
IMPORTANCE OF AGRICULTURE TO THE NATIONAL ECONOMY	1.1.1 define agriculture and describe its branches.	Definition and branches of agriculture:- Branches of Agriculture: Crop Production, Animal Production, Horticulture, Farm Mechanisation, Soil Management, Fisheries, Forestry, Agricultural Economics and Extension	Assist students to explain the meaning of agriculture and discuss its various branches.	Students to list six branches of agriculture.
	1.1.2 outline the contribution of agriculture to the national Economy.	Role of agriculture in the National Economy:- Food, shelter, raw material for industries, employment, foreign exchange, income etc.	Assist students to discuss the benefits derived from agriculture.	Students to write an essay on the role of Agriculture in the Economic Development of Ghana.
	1.1.3 explain the inter-dependence of Agriculture and Industry.	Inter-dependence of Agriculture and Industry	Guide students to discuss the inter-dependence of Agriculture and industry in the economic development of a nation e.g., chemical industries provide fertilizers and drugs: mechanical industries supply agricultural machinery and implements: transport industry distributes agricultural inputs and products: agricultural produce used as raw materials for industries e.g., cocoa for chocolate factories.	Students to list five linkages between agriculture and industry and briefly discuss three of them.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 **MEANING, TYPES AND IMPORTANCE OF AGRICULTURAL EDUCATION**	The student will be able to: 2.1.1 explain the concept of agricultural education.	Meaning of agricultural education.	Students to do the following: i. brainstorm to bring out the meaning of agricultural education ii. find other meaning of agricultural education from the encyclopedia or internet and discuss in class.	Write an essay on the merits and demerits of vocational and general agriculture.
	2.1.2 describe the types of agricultural education.	Types of agricultural education. a) Formal e.g. general, pre-vocational and vocational . b) Non-Formal e.g. agricultural extension and agricultural youth clubs. c) Informal e.g. apprenticeship	Assist students to discuss the types of agricultural education	Outline the benefits that can be derived from agricultural education.
	2.1.3 outline the importance of agricultural education in national development.	Importance of agricultural education: manpower development, acquisition of leadership skills, inculcating the spirit of voluntarism in the youth, strengthening democracy and rural development, etc.	Students to brainstorm to come out with the benefits of agricultural education to national development. **Note:** Encourage students to form and run agricultural clubs.	
	2.1.4 describe occupations in agriculture.	Agricultural occupations: production of crops and animals, provision of services, agricultural mechanics, processing of agricultural products, landscaping, agricultural resource management, forestry, teaching and research, etc.	**Note**: Invite a resource person to give a talk on occupations in agriculture.	
	2.1.5 outline the job descriptions and entry qualifications for agricultural occupations .	Job descriptions and entry requirements for agricultural occupations	Students to match agricultural occupations with their job descriptions and qualifications for entry.	Students in groups to undertake a survey of agricultural occupations in their district and write a report .

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 3 **MEASUREMENTS IN AGRICULTURE**	The student will be able to: 3.1.1 calculate area, volume, percentage, plant density, yield per unit area, rate of application, seed rate and dressing percentage.	Calculated measurements: area, volume, percentage, plant density, yield per unit area, rate of application of fertilizers and pesticides, seed rate and dressing percentage of farm animals. Examples of Measurements in Agriculture : **Animal Husbandry:** - Stocking density, weight of live animals , feedstuff, carcass, drugs, vaccines, etc., - Feed conversion efficiency - Output in percentages, eg. Hen day-egg production, litres (milk yield); meat yield in kilograms. - Heart beat per second **Crops/Forestry:** - Area of land, weight , volume, population (density, seed rate , etc.), angles, distance (girth, diametre, thickness) **Fisheries:** - mesh sizes in cm - Ponds: length, breadth, depth, stocking rate, - Water Quality: Temperature, pH, Feed quantity in tonnage. **Agric. Mechanisation:** - Power, torque, etc.	Students to discuss the activities in which these measurements are made. Students to calculate the various measurements listed in content. e.g: area, volume, percentage, plant density, yield per unit area, rate of application of agro--chemicals, seed rate and dressing percentage of carcass etc.	Calculate the rate of application of fertilizer on a hectare of maize plot
	3.1.2 relate indigenous measurements with standardized units of measurement.	Indigenous units and instruments for measuring weight, volume and length of agricultural equipment and commodity in comparison with standardized measures e.g. pole etc.	Students make list of indigenous measuring materials used by farmers, sellers and processors of agricultural commodities and compare them with standardized measures. Students to discuss the advantages and disadvantages of using indigenous measurements.	<u>Project:</u> Students to produce a chart of equivalent values of indigenous measurement units and their corresponding standardized units of measurements.

SENIOR HIGH SCHOOL - YEAR 1

SECTION 2

SOIL USES AND MANAGEMENT

General Objectives: The student will:

1. be aware of the origin and nature of soil.
2. recognize soil as a living entity obtained through the activities of living organisms.
3. demonstrate how the physical properties of the soil relate to its function as a rooting medium.
4. relate the physical and chemical properties of the soil to crop growth.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 **ORIGIN AND FORMATION OF SOIL**	The student will be able to: 2.1.1 describe the processes of soil formation.	Processes of soil formation:- a). Weathering of rocks i. Physical, ii. Chemical, iii. Biological b). Transportation of fragmented weathered materials c). Deposition of weathered material d) Role of organic matter	**NB:** Teacher to begin this unit by revising the types of rocks and their formation with students. Assist students to discuss the processes of soil formation.	Explain how the following contribute to weathering of rocks - hydrolysis - hydration - oxidation - temperature - living organisms
	2.1.2 outline the factors of soil formation.	Factors of soil Formation: Parent material, topography, living organisms, climate, and time	Guide students to discuss the factors which determine the rate of development, types and quality of soil formed in a particular area.	Students to write an essay on the factors that determine the type and quality of the soil formed at a place.
	2.1.3 draw, label and describe a typical soil profile.	Soil Profile: • Meaning • Description using texture, colour, structure, porosity, depth, organic matter content	Students to dig or visit dug-out pits to examine and identify horizons of soil profile. Assist students to describe each horizon using texture, colour, structure, porosity, depth, organic matter content.	a) What is a soil profile? b) Draw, label and describe the profile of a matured forest soil.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **ORIGIN AND FORMATION OF SOIL**	The student will be able to: 2.1.4 relate the knowledge about soil profile to crop production.	Knowledge of soil profile helps the farmer to select: - suitable crops for cultivation, - suitable methods of cultivation, - appropriate tools/implements, etc.	Assist students to discuss the importance of the knowledge of soil profile in crop production.	
UNIT 2 **NATURE, COMPOSITION AND PROPERTIES OF SOIL.**	2.2.1 list the components of soil and outline their importance.	Components of the soil: - mineral particles/matter - organic matter - air - water	Students to list and describe the components of the soil and discuss the role of each component in agriculture. **Note**: Discussion of mineral particles should be based on the properties of different soils (sand, silt and clay). - The role of organic matter should be stressed.	Students to list five functions of organic matter in the soil.
	2.2.2 identify soil living organisms and describe their role in the soil.	Role of living organisms in the soil	Guide students to discuss the importance of soil flora (bacteria, fungi, algae etc.) and soil fauna (nematodes, earthworms, arthropods, rodents etc.) to crop production. -Students to collect and identify soil living organisms.	Students to list six soil living organisms and indicate their importance in the soil.
	2.2.3 analyze the physical and chemical properties of the soil, their causes and effects on plant growth	Physical properties of soil: colour, texture and, structure, porosity, aeration, temperature, consistency, etc. Chemical properties of soil: soil reaction (pH)	Students to brainstorm and list the physical and chemical properties of the soil. **Note:** Textural classes and types of soil structure should be treated. Students to discuss causes of soil acidity, effects on plant growth, and how to correct it.	Students to 1. tabulate the three main soil textural classes and their distinguishing properties. 2. Classify soil samples into types of soil structure

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D) NATURE, COMPOSITION AND PROPERTIES OF SOIL	The student will be able to: 2.2.4 perform experiments to determine various physical and chemical properties of soil.	Experiments to demonstrate physical and chemical properties of soil	Guide students to perform the under-listed experiments: i. Separation of the soil into sand, silt and clay fractions ii. Determination of soil texture by 'feel' or "field" methods iii. Comparison of drainage/porosity and the water holding capacity of sandy, clayey and loamy soils iv. Determination of the presence of living micro-organisms v. Determination of the percentage soil water content vi. Comparison of the speed and height of capillary action in sandy, clayey and loamy soils vii. Determination of soil pH	Students to test for the physical and chemical properties of soils and determine their effect on plant growth in the field or in potted plants.
	2.2.5 relate the physical and chemical properties of soil to crop growth and development.	Importance of soil physical and chemical properties in crop growth and development e.g. -soil texture -soil structure -soil consistency -soil air, -soil water, -soil temperature, and -soil pH	Assist students to discuss the role of physical and chemical properties of soils in crop growth and development.	Students to explain the following properties of the soil and indicate their importance in the growth of crops: a. Soil texture, b. soil structure, c. soil consistency, d. soil temperature, e. soil water and f. soil reaction (pH).

SENIOR HIGH SCHOOL - YEAR 1

SECTION 3
FARM MECHANISATION

General Objectives: The student will:

1. recognize the need for farm power.
2. acquire basic skills in handling farm machines and implements.
3. appreciate the importance of machines in agriculture.
4. be aware of safety precautions in handling farm machines and implements.
5. develop maintenance culture for machines and implements.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **INTRODUCTION TO FARM MECHANISATION**.	3.1.1 explain farm mechanisation	Meaning of farm mechanisation	Students to brainstorm to bring out the meaning of farm mechanisation e.g. -use of tools and equipment operated by hand, animals or motorised power to perform farm operations.	What is farm mechanisation?
	3.1.2 outline the objectives of farm mechanisation.	Objectives of farm mechanisation	Guide students to list and explain the objectives of farm mechanisation. **Note**: Objectives should include: -remove drudgery from farm tasks -achieve timeliness of farm operations -perform farm tasks to meet quality standards.	State three objectives of farm mechanisation.
	3.1.3 state the benefits of farm mechanisation.	Importance of farm mechanisation -increased productivity per unit area of land and per worker - increase in food supply, income and raw materials supply etc.	Students to discuss the importance of farm mechanisation.	Discuss three (3) importance of farm mechanisation in the development of Agriculture.
	3.1.4 practise safety precautions to prevent accidents and other farm hazards.	Farm safety measures in the use of machinery, electricity, agro-chemicals, draught animals, sharp tools, ladders, fire and hot materials. Dressing code, and general precautions for safety. First aid and first aid box.	Teacher to use charts or films to illustrate the safety measures taken in farm workshops and in the field Arrange trips to farm machinery workshops for students to observe, discuss and practice workshop safety measures under supervision.	Project: Students to prepare a display board/chart and write six important safety precautions in the use of farm machinery.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 **FARM POWER**	The student will be able to: 3.2.1 list the sources of farm power	Sources of Farm Power: -human, -animal (horses, oxen, donkey), -Internal combustion engines -solar - electricity -wind and water	Guide students to discuss the sources of farm power. **Note**: The discussion should include factors which affect the efficiency of draught animals .e.g. - food intake - breed - diseases - previous training given, etc.	Discuss the factors that affect the performance of draught animals.
	3.2.2 describe the uses of farm power.	Uses of farm power	Teacher to lead students to discuss the uses of farm power. Students to be taken to see draught animals at work or a film on it.	Students to discuss the merits and demerits of solar and wind power.
	3.2.3 discuss the merits and demerits of each farm power.	Merits and demerits of each source of farm power	Students to brainstorm and bring out the merits and demerits of the various sources of farm power.	In a tabular form give the names of two draught animals, and indicate the merits and demerits in the use of each animal.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 3 **FARM MACHINERY AND IMPLEMENTS**	The student will be able to: 3.3.1 differentiate between farm machines and implements	Differences between farm machines and implements	Students to brainstorm and bring out the similarities and differences between farm machines and implements.	
	3.3.2 identify the principal parts of the internal combustion engine and their functions	Principal parts of the internal combustion engine and their functions	Arrange for a visit to a mechanisation centre or a fitting workshop for an explanation on the functioning of the internal combustion engine Students to identify major parts of the internal combustion engine and discuss their functions using charts or an old tractor engine.	List four parts of an internal combustion engine and state their functions. Describe the operation of the internal combustion engine.
	3.3.3 state the uses of the tractor and its implements	Uses of the tractor and its implements	**Note**: The discussion should include the operation of the engine, i.e. the induction, compression, power and exhaust strokes) Assist students to discuss the use of the tractor and its implements: plough, harrow, ridger, trailer, planters etc.	
	3.3.4 identify the principal parts of farm implements and state their functions	Principal parts of farm implements and their functions	Organize a visit to a well-established farm in the locality for students to observe the tractor and its various implements in operation. **Note**: Use pictures or diagrams, to discuss the principal parts of the plough, harrow and planters.	Draw and label the principal parts of the following: a) disc plough b) disc harrow c) knapsack sprayer
	3.3.5 operate simple farm machines	Operation of simple farm machines: Mist blower, power tiller, lawn mower and knapsack sprayer	**Note**: Arrange a demonstration lesson on the operation of simple farm machines as listed in content. Students to be given opportunities to operate the machines.	What are the functions of the following implements: 1. disc plough 2. mould board plough 3. disc harrow 4. planter 5. ridger
	3.3.6 care for and maintain a farm tractor and implements	Care and maintenance of tractor and implements	Students to practise routine maintenance procedures e.g. cleaning the machine and their parts, changing oil, changing battery, lubricating movable parts etc. **Note**: Proper storage of the machines and implements should be stressed.	Students to prepare maintenance schedule for the farm tractor and implements.

SENIOR HIGH SCHOOL - YEAR 1

SECTION 4

CROP PRODUCTION

General Objectives: The student will:

1. appreciate the importance of crop plants.
2. become aware of the general principles underlying crop production.
3. acquire basic skills in crop production.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 **IMPORTANCE AND CLASSIFICATION OF CROP PLANTS**	The student will be able to: 4.1.1 outline the benefits derived from crop plants.	Benefits derived from crop plants:	Students to brainstorm to bring out the benefits derived from crop plants. E g. -- food for humans, feed for farm animals -industrial raw materials -employment -income -foreign exchange,	List five benefits derived from crop plants.
	4.1.2 classify crop plants.	Classification of crop plants based on the under-listed criteria: Growth cycle/life span (annuals, biennials and perennials) -Botany (Family, Genus, Species,) -Uses (ornamentals, vegetables, fruits, beverages, spices and drugs, fibre and oil). Classification by method of cultivation (arable crops, plantation crops and field crops)	Assist students to classify crop plants based on categories shown in content.	Make a list of crop plants grown in the locality and classify them under: Growth cycle, botany, method of cultivation and uses.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 **PRINCIPLES OF CROP PRODUCTION**	The student will be able to: 4.2.1 select a site for crop production	Factors that influence the choice of a garden/farm site: - Topography - Vegetation. - Soil - Source of water - Market - Accessibility of site, etc.	Students to brainstorm to list and discuss the factors that affect the selection of site for a garden or crop farm.	List and discuss five factors that should be considered in selecting a site for a named crop.
	4.2.2 describe indigenous and mechanized methods of land preparation and their effects on the soil.	Different methods of land preparation and their effects on the soil .	Guide students to discuss the steps involved in following land preparation methods and their effects on the soil. a. Manual methods, using simple tools such as cutlass, hoe, axe to clear weeds, fell trees, etc. b. Use of animal-drawn tillers c. Mechanised methods using tractors to plough, harrow, etc. d. Use of herbicides. e. Burning. **NB:** Plan a trip to farms where these methods are practised for students to observe. -Stress the adverse effects of using burning on the environment	Describe the activities involved in preparing one hectare of forest land for crop production. Discuss the effects of burning and ploughing on the soil.
	4.2.3 define tillage and describe the types of tillage.	Meaning and Types of Tillage: Tillage is the preparation of the soil for crop propagation and growth Tillage practices: ploughing, harrowing, ridging, mounding, etc. - <u>Types of tillage</u>: Minimum tillage, primary tillage, and secondary tillage, zero tillage	Guide students to define tillage and discuss the types of tillage. -Guide students to mix and apply appropriate herbicide to a small plot of land to demonstrate zero tillage. **Note**: Discuss zero tillage as a land clearing method and not as a soil preparation method.	Define tillage and describe three examples of tillage operations.
	4.2.4 explain the objectives of tillage. .	Objectives of tillage. 1. Control weeds 2. Incorporate organic matter 3. Improve soil structure 4. Improve aeration and drainage 5. Achieve leveling of the ground, 6. improve nutrient status of the soil etc	Assist students to discuss the objectives of tillage practices.	State four objectives of tillage

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D) **PRINCIPLES OF CROP PRODUCTION**	The student will be able to: 4.2.5 differentiate between primary and secondary tillage	Primary and secondary tillage	Students to brainstorm to bring out the differences between primary and secondary tillage.	Students to: Distinguish between primary and secondary tillage.
	4.2.6 describe methods used in plant propagation	Methods of plant propagation: - seed propagation - vegetative propagation	Guide students to discuss seed and vegetative propagation, their merits and demerits.	Discuss three merits and demerits of seed and vegetative propagation.
	4.2.7 describe the activities involved in seed propagation	Activities in Seed Propagation: - Seed selection and testing - Seed treatment. - Seed planting methods (broad casting, drilling, etc.) Planting at stake(direct planting): - Lining and pegging - Time of planting - Planting depth - Plant population and spacing(seed rate) - Rate differences in rate of fertiliser application between primary and secondary tillage	Assist students to discuss guidelines for selection and testing for seed quality, and the methods for seed treatment. -Students use guidelines to select good quality seeds for planting. **NB**: Seed dormancy and treatment to overcome dormancy should be treated. Assist students to discuss and practise activities involved in seed planting under i. planting at stake ii. raising seedlings using two crops.	Describe the activities involved in: a) seed selection b) seed testing Each student to use appropriate methods to break the seed dormancy of three different crops.
	4.2.8 produce seedlings for Transplanting	Nursery Practices - selection of nursery site - preparation of seed box, nursery bed bed/box - seed sowing - watering - shading - pricking out - stirring of soil - weed control - fertilizer application - pest and disease control - hardening-off - transplanting -watering after planting	Students to prepare seed boxes/beds and nursery beds and raise vegetable such as tomato, or onion to transplanting stage using the practices in content. Guide students to prick out and transplant the seedlings.	**Project:** Students to apply the principles learnt to cultivate up to transplanting stage, any of the crops selected by the school for this course.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D) **PRINCIPLES OF CROP PRODUCTION**	The student will be able to: 4.2.9 carry out vegetative propagation methods .	Methods of vegetative propagation: a). <u>Natural</u> - Corms - Rhizomes - Suckers - Slips - Crowns - Runners - Bulb, - Stem tubers, b). <u>Artificial</u> - Cuttings - Budding - Grafting - Layering	Assist students to discuss methods of vegetative propagation as listed in content. Students to practise activities involved in vegetative propagation using natural methods and cuttings. Assist students to discuss methods that use artificial manipulations of the plant (e.g. budding, grafting, layering, cuttings.)	Students use stem cuttings to plant cassava or sweet potatoes they observe and record changes at the various stages growth.
	4.2.10 perform cultural practices associated with crop production.	Cultural practices: - thinning, filling-in (supplying), watering, pruning, staking, mulching, fertilizer application, topping and desuckering, stirring the soil, training, weed control, earthing-up, pest and disease control etc.	Assist students to discuss the cultural practices in crop production and the reasons for performing them.	Give one reason for undertaking each of the following cultural practices in crop production: 1. thinning 2. filling-in 3. pruning 4. staking 4. mulching

SENIOR HIGH SCHOOL - YEAR 1

SECTION 5

ANIMAL PRODUCTION

General Objectives: The student will

1. recognize the importance and distribution of farm animals in West Africa
2. make use of the basic principles of nutrition in farm animal production
3. recognize the principal species and breeds of tropical farm animals.
4. appreciate the basic principles and role of animal improvement in agriculture

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 **IMPORTANCE, CLASSIFICATION AND DISTRIBUTION OF BREEDS OF FARM ANIMALS IN WEST AFRICA**	The student will be able to: 5.1.1 describe the benefits derived from farm animals.	Importance of farm animals	Discuss the benefits derived from farm animals under the following headings: Food, power, traction and transport; supply of fertiliser; fuel, feed; religious purposes; research, medicine; sports and pleasure etc.	Discuss the importance of farm animals to man.
	5.1.2 classify farm animals.	Classification of farm animals	Assist students to discuss the classification of farm animals: - Ruminants e.g. sheep, goats, cattle. - Non-ruminants omnivores e.g. Pigs, Poultry - Non-ruminant herbivores e.g. rabbit, grass-cutter, horses.	
	5.1.3 identify the major breeds of farm animals, their characteristics and distribution in West Africa.	Breeds of farm animals, their characteristics and distribution.	Guide students to discuss the major breeds of farm animals, their characteristics and distribution in West Africa.	Describe two (2) major breeds of sheep and goats in Ghana.
	5.1.4 outline the factors that influence the distribution of farm animals in West Africa.	Factors affecting distribution of farm animals: Climate, vegetation ,availability of feed, prevalence of pests and diseases etc.	Guide students to discuss the factors that influence the distribution of farm animals in West Africa.	Describe the distribution of cattle in West Africa and outline the factors associated with their distribution

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **IMPORTANCE, CLASSIFICATION AND DISTRIBUTION OF BREEDS OF FARM ANIMALS IN WEST AFRICA**	The student will be able to: 5.1.5 illustrate with a map the distribution of farm animals in West Africa	Map of West Africa showing the distribution of farm animals.	Using a map of West Africa, assist students to learn the distribution of farm animals in West Africa. **Note**: Arrange field trip to farms where different breeds of farm animals can be found. Films, pictures or charts could be used to guide students observe the breeds and note their characteristics for further class discussion. Students to draw a map of West Africa showing the distribution of various breeds of farm animals.	Draw a map of Ghana showing the distribution of the major breeds of farm animals.
UNIT 2 **ANIMAL NUTRITION**	5.2.1 outline the importance of the six main food nutrients in the production of animals 5.2.2 classify animal feedstuffs according to the major nutrient groups supplied	Importance of food nutrients in the production of animals: carbohydrates, fats, proteins, minerals, water and vitamins Classification of animal feedstuffs by the nutrient groups; Importance of roughage in feedstuff.	Assist students to discuss the importance of each of the six main nutrients in animal production. **Note**: Begin this unit with a revision of the parts and functions of the digestive system of ruminant and non-ruminant farm animals (SHS Integrated Science Syllabus Yr.1, SRN 3.5.4). -Assist students to classify animal feeds according the six nutrient groups. (Discuss the role of roughage in digestion of food in farm animals)	Classify the following feed stuffs by the nutrient groups: i. cassava leaves ii. groundnut cake iii. fish meal iv. maize mash v. hay vi. wheat bran vii. soya bean cake viii. cassava peels ix. blood meal x. bone meal
	5.2.3 prepare animal feed accurately	Feed preparation	**Note**: The forms of animal feed and their preparation should be briefly discussed; e.g. concentrates, silage, hay, fresh herbage, etc.	
	5.2.4 outline types of animal ration	Types of animal ration: starter, maintenance, production, grower, fattening, etc.	Guide students to discuss animal rations including maintenance and production rations. **Note**: Ration formulation should be briefly treated. -Students to weigh, mix feed accurately and prepare formulated feeds.	Distinguish between maintenance and production rations.
	5.2.5 describe the effects of malnutrition on animal production.	Malnutrition in farm animals	**Note**: Effects of malnutrition on animal production should be discussed. Importance of balanced rations should also be treated.	Describe the effects of malnutrition in animal production .

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (Cont'd) **ANIMAL NUTRITION**	The student will be able to: 5.2.6 state the meaning and types of forage and pasture crops	Meaning of: i. forage crop ii. pasture crop Types of forage and pasture crops: (i.e. shrubs, grasses, trees, creepers)	Assist students to discuss the meaning of forage and pasture crops. Show students a collection of pasture and forage crops for them to identify by their types and common names.	
	5.2.7 outline the importance of forage and pasture crops in livestock nutrition	Importance of pasture and forage crops in animal nutrition	Guide students to discuss the importance of forage and pasture crops.	Outline four benefits of pasture and forage crops in Ghana.
UNIT 3 **REPRODUCTION IN FARM ANIMALS**	5.3.1 detect signs of heat.	Signs of heat.	**Note**: The discussion should include the signs and importance of heat.	Outline three benefits of being able to detect the signs of heat in your farm animals.
	5.3.2 outline the relevance of signs of heat for breeding.	Relevance of signs of heat in animal breeding.		
	5.3.3 describe the reproduction process in farm animals.	The process of reproduction in farm animals: - mating - fertilization - gestation - parturition -Functions of hormones	**Note**: Revise the structure of the male and female reproductive organs (refer to SHS integrated Science Syllabus, YR 2. SRN 3.2.1) with respect to farm animals. Using charts, diagrams, pictures, etc. guide students to discuss the process of reproduction in farm animals (Cover the points raised in content)	Students to make a table to compare the gestation periods of the following farm animals: Goat, sheep, cow, pig and rabbit.
	5.3.4 analyse the causes and effects of inbreeding and ways for preventing inbreeding among farm animals	Causes and effects of inbreeding; Prevention of inbreeding among farm animals.	Guide students to discuss the causes and effects of inbreeding and ways for preventing inbreeding in farm animals.	Outline four strategies you would use to prevent inbreeding among your farm animals.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 4 **PRINCIPLES OF ANIMAL IMPROVEMENT**	The student will be able to: 5.4.1 explain the aims of animal improvement.	Aims of animal improvement.	Students to brainstorm to bring out the meaning and aims of animal improvement.	What is animal improvement? State five objectives of animal improvement.
	5.4.2 describe the methods of animal improvement.	Methods of animal improvement: 1. Introduction 2. Selection 3. Breeding	Guide students to discuss the methods of animal improvement e.g. introduction, selection and breeding.	Distinguish between the following methods of animal improvement: 1. Introduction 2. Selection 3. Breeding
	5.4.3 outline the advantages and disadvantages of methods used to improve farm animals	Advantages and Disadvantages of Animal Improvement Methods.	**Note**: Advantages and disadvantages of each method should be treated. The lesson should include differences and similarities between breeds e.g. local, exotic and cross-breeds and their performance.	Describe the Improvement method which can be used to create resistance to diseases.
	5.4.4 describe Artificial Insemination	Artificial Insemination: - Meaning - Benefits - Procedure	Guide students to: i. discuss the meaning and benefits of Artificial Insemination. ii. describe the procedure for artificial insemination	Students to do the following: i. State six benefits of artificial insemination. ii. Outline three problems associated with artificial insemination

SENIOR HIGH SCHOOL - YEAR 1

SECTION 6

AGRICULTURAL ECONOMICS, AGRIBUSINESS AND EXTENSION

General Objectives: The student will:

1. appreciate the farm as an economic unit
2. become aware of the factors of production in agribusiness
3. use basic economic principles in agribusiness.
4. appreciate the need for business methods in farming.
5. acquire basic management skills in agribusiness

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **AGRICULTURAL ECONOMICS: IMPORTANCE AND BASIC PRINCIPLES**	6.1.1 explain agricultural economics and basic economic principles.	Meaning and scope of agricultural economics Scope of agricultural economics: Basic economic principles, factors of production, keeping records and accounts, agricultural financing and marketing of agricultural produce.	Assist students to discuss the meaning and scope of agricultural economics and relevant economic principles in agribusiness.	What is agricultural economics? Outline the importance of agricultural economics in Agribusiness.
	6.1.2 describe the farm as an economic unit	The farm as an economic unit. Economic properties of the farm: Inputs – outputs, property, market orientation, income, employment generation properties, being governed by all the basic economic principles, etc.	Guide students to identify the economic attributes of the farm (See content)	Discuss four reasons why the farm is considered as an economic unit
	6.1.3 apply agricultural economics and farm management in agribusiness.	Application of agricultural economics and farm management in agribusiness	Assist students to do the following: i. discuss the application of agricultural economics in agribusiness and in the formulation of agricultural policies. ii. discuss how to apply principles of management in agribusiness.	
	6.1.4 define demand and supply .	Principles of demand and supply	Assist students to discuss the concept of demand and supply, and their effects on pricing of farm produce	Explain the relationship between demand, supply and price of a farm produce Teacher to supply a hypothetical demand schedule for students to translate into a demand curve.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D)	The student will be able to:			
AGRICULTURAL ECONOMICS: IMPORTANCE AND BASIC PRINCIPLES	6.1.5 explain the factors that influence demand.	Factors influencing demand of a commodity: - The price of the commodity - Consumers income - Prices of related commodities - Consumer's taste and preferences.	Students to discuss the factors that influence the demand for a commodity **Note:** The discussion should include the differences between change in demand and change in quantity demanded.	Explain five factors which may affect a) demand b) supply of agricultural commodity
	6.1.6 explain the factors that affect supply.	Factors influencing supply of agricultural commodity	Brainstorm to bring out the factors that affect the supply of a commodity.	Students to collect and compare data on prices of agricultural commodities in the peak and lean seasons.
	6.1.7 explain how demand and supply interact to establish the price for a commodity.	Determinants of price for a commodity	Guide students to discuss how demand and supply interact to establish the price of a commodity. **Note**: Effects of shifts in the demand and supply curves on equilibrium price should be discussed.	How will the price of an essential agricultural commodity respond to its scarcity?
UNIT 2 **FACTORS OF PRODUCTION**	6.2.1 explain the factors of agricultural production.	Factors of agricultural production: -land -labour -capital -management/entrepreneurship	Define and discuss land, labour, capital and management in relation to agricultural production.	State the two market forces and graphically illustrate how they determine the price of a commodity.
	6.2.2 describe the characteristics of land for agricultural use.	Characteristics of land	Students to brainstorm to bring out the characteristics of land for agricultural use.	Write an essay on how the four factors of production can influence your choice of a farming enterprise.
	6.2.3 explain the factors that determine supply of land for agricultural use.	Factors determining the supply of agricultural land	Assist students to discuss the factors that determine the supply of land.	List the factors that determine the supply of agricultural land.
	6.2.4 outline the sources of agricultural labour.	Sources of agricultural labour	Guide students to discuss the sources of agricultural labour and factors that determine the supply and efficiency of labour.	Explain five factors that determine the supply of agricultural labour.
	6.2.5 outline the types of capital for Agricultural production.	Types of capital for agricultural production	Discuss the types of agricultural capital and the role of capital as a factor of production.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 2 (CONT'D)	6.2.6 state the importance of capital in agribusiness.	Importance of capital in agri-business	Guide students to discuss the importance of capital in agribusiness.	Explain why capital is important in agribusiness.
FACTORS OF PRODUCTION	6.2.7 outline the role of farm management in agricultural production.	The role of farm management in agricultural production	Discuss the role of management in agricultural production. **Note**: The functions of a farm manager should be discussed.	outline eight functions of a farm manager.
	6.2.8 draw a production curve to show the relationship between fixed input and variable inputs in agricultural production.	Production function	Guide students to draw a production function curve with given data.	Distinguish between fixed input and variable input.
	6.2.9 apply the concept of diminishing marginal returns.	Concept of diminishing marginal returns	Use the production curve to explain the concept of diminishing marginal returns. **NB:** Total product, average product and marginal product should be stressed.	State and explain the law of diminishing returns using suitable examples
UNIT 3				
INTRODUCTION TO AGRIBUSINESS MANAGEMENT	6.3.1 explain the concept of agribusiness.	Meaning of agribusiness Examples of agribusiness: crops and animal production, fisheries, agroforestry, agroprocessing and specialized services in agriculture	Students to brainstorm and bring out the meaning of agribusiness. Guide students to identify a wide range of agribusinesses covering production, services, input supply, processing, packaging, marketing, research etc.	
	6.3.2 identify various agribusinesses and possible agriculture-related occupations/ professions.	Possible professions in agriculture <u>On-farm</u>: Tractor Operator, Cattle Ranch Manager, Bee Keeper, Landscape Designer, Florist, Dairy Farmer, Seed Grower, Vegetable Seedling Producer, Veterinary Doctor, Pineapple Grower. <u>Off -Farm</u>: Agricultural Extensionist, Quarantine Officer, Pineapple Exporter, Agricultural Economist, Butcher, Agricultural marketing agent, Animal Feed Miller, Agricultural engineer, Plant Medium Producer, Breeder Description of tasks involved in practicing and managing agribusiness	Students to list and discuss the various agribusinesses practised in their district (both on-farm and off-farm businesses). The discussion to include businesses dealing with: -production of agricultural products and inputs e.g. maize, compost. - processing of agricultural produce. -provision of agricultural services e.g. farm hand, tractor operator, extension agent. - trading in agricultural products and inputs, e g: selling of yam, agro- chemicals, etc - manufacture or repair of agricultural tools and machines. - construction of agricultural structures, e g: farm structures, pens.	Discuss ten on-farm and off-farm businesses practised in your district.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 3 (CONT'D) **INTRODUCTION TO AGRIBUSINESS MANAGEMENT**	The student will be able to: 6.3.3 describe tasks/activities performed in agribusiness management.	Tasks/activities performed in agribusiness management: Planning, organizing, budgeting, record keeping, supervising, coordinating	Organize students into groups to visit some of the agribusinesses in the district to interview the practitioners and identify the profile and practising the businesses using the following guidelines: 1. Name of business 2. Educational background of the entrepreneur. 3. Sex of practitioner 4. Age of practitioner 5. Source of working capital 6. Source of supply of materials/inputs/resources 7. Range of products 8. How business started 9. Tasks performed in practising the business 10. Other relevant question(s) as related to the enterprise e.g. bank statement. Groups to present their reports for class discussion.	What is agribusiness? Write out in a stepwise Order the activities performed in two named small production agribusinesses. <u>PROJECT</u> In groups, students to conduct a survey of agricultural businesses in their locality using the guidelines under teaching/learning activities and write reports.

SENIOR HIGH SCHOOL - YEAR 2

SECTION 1

INTRODUCTION TO AGRICULTURE

General Objectives: The student will:

1. become aware of land tenure systems and how they influence agricultural production.
2. appreciate the importance of the agricultural systems in West Africa.
3. recognize factors that influence the development of agriculture in West Africa
4. describe the features of forestry and the importance of forest products in national development

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1	The student will be able to:			
LAND AND ITS USES	1.1.1 describe the uses of land.	Responsible use of land for agriculture, forestry, game and wildlife, fisheries	Assist students to discuss the agricultural and non-agricultural uses of land.	
	1.1.2 describe the land tenure systems in West Africa.	Land Tenure systems in West Africa	Discuss the various land tenure systems in West Africa. e.g. Communal land ownership, Free-hold title, Lease-hold title, Tenancy etc. -Students to find out land tenure systems in other parts of West Africa from the internet.	i. Explain the term 'Land Tenure System'. ii. Discuss how communal land ownership affects agricultural production in West Africa.
	1.1.3 explain how land tenure system affect agricultural production in West Africa.	Effects of land-tenure systems on agricultural production	Assist students to discuss the problems associated with land tenure systems and how they affect agricultural production in West Africa.	
UNIT 2 DEVELOPMENT OF AGRICULTURE	1.2.1 explain the meaning of agricultural development.	Meaning of agricultural development	Students in groups to explain the concept of agricultural development.	Explain what is meant by agricultural development.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D)	The student will be able to:			
DEVELOPMENT OF AGRICULTURE	1.2.2 outline the objectives of agricultural development in West Africa	Objectives of agricultural development in West Africa. - self sufficiency in food production - improve traditional cash crop production for export. - production of industrial raw materials. - improving the living conditions of farmers and the general rural environment. - production of non traditional crops and animals for export(diversification) - practice of sustainable agriculture. - development of indigenous crops and animals	Assist students to discuss the objectives of agricultural development in West Africa.	Students to outline and explain five objectives of agricultural development in West Africa.
	1.2.3 identify the problems associated with agricultural development in West Africa and suggest solutions	Problems of agricultural development in West Africa and their solutions: -land tenure system -inadequate social amenities such as water, electricity, -inadequate credit, poor transportation, storage and processing facilities, - limited knowledge of improved technology due to low level of education and - low access to extension services - ageing farming population - presence of devastating diseases such as HIV/AIDS, CSM, Burulli ulcer, guinea worm, malaria, - inadequate health care delivery, - poor agricultural policies, etc.	Guide students to bring out the problems that hinder agricultural development in West Africa and suggest possible solutions.	Students to outline ten problems that impede agricultural development in West Africa and suggest possible solutions.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D) **DEVELOPMENT OF AGRICULTURE**	The student will be able to: 1.2.4 outline the role of government and other agencies in the development of agriculture in West Africa.	Role of government and other agencies in agricultural development -policy formulation -establishment and funding of institutions for agricultural extension education -provision of agricultural credit -provision of agricultural tools, equipment and machinery -financing research programmes and activities -produce marketing and -protection of the environment.	Assist students to discuss the contributions of some governmental and non-governmental agencies involved in the development of agriculture in West African countries. **Note**: Invite some executives of NGOs and state owned enterprises (SOE) for a panel discussion on the contributions of their organisations to agricultural development.	Students to write an essay on the contributions of five (5) agencies to the development of agriculture in their countries.
UNIT 3 **INVASIVE ALIEN SPECIES (IAS)**	1.3.1 define invasive alien species	**Invasive alien species**: plant or animal transported beyond the ecosystem where it occurs naturally, may multiply out of control, endangering native species in the invaded ecosystem, undermining agriculture, threatening public health or creating other unwanted and often irreversible disruptions.	Brainstorm to explain the term IAS and give examples Use digital (internet, CD Rom, films etc) content and explain the term IAS.	Define and explain IAS and give examples
	1.3.2 identify and describe common features of invasive alien species in their locality	**Terrestrial(land)** **a. Plants species** such as Chromolaena odorata (Acheampong weed), Lantana camara (Spanish Flag or Lantana), Leucaena sp., Mimosa pigra (mimosa), Azadirachta indica (neem), Striga sp. (witch weed), Teak **b. Animal species** include Spodoptera exempta (army worm), locust, Zonocerus variegatus (grasshopper), Achatina fulica (land snail Achatina). Larger Grain Borer, Solenopsis invicta Red Fire Ant/ RIFA / "Efo Red" / "Charles Taylor", cassava white fly and mango mealy bug **Aquatic plants**: Water hyacinth (Eichhornia crassipes), Water lettuce (Pistia stratiotes), Kariba weed (Salvinia molesta).	Organize field trips to different ecosystems where they can identify and classify common examples of invasive species	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 3 (CONT'D) **INVASIVE ALIEN SPECIES (IAS)**	The student will be able to: 1.3.3 mention effects of IAS on Agriculture 1.3.4 suggest ways to prevent and control IAS	**Effects of IAS** - Some block waterways eg. Water Hyacinth - Take over farm and forest lands - Decrease crop production - Compete with crops for soil nutrient, water, light - Increase cost of agriculture Production - Cause harm to humans and other animals etc. **Preventive and Control measures** - Awareness creation through education - Screening of plant and animals at entry point to our country - Monitoring of IAS in Ghana	Organise a group discussion on effects of IAS on Agricuture and present reports	Explain two advantages and disadvantages of IAS
UNIT 4 **INTRODUCTION TO FORESTRY**	1.4.1 define forest and forestry.	Definition of forest and forestry. Differences between forestry and agriculture	Students to brainstorm to bring out the meaning of forest and forestry Students to compare forestry to agriculture to bring out their essential differences.	Differentiate between forest and forestry.
	1.4.2. describe the salient features of forestry.	Salient features of forestry: long term activity, occupies large land area for a long period of time; developed over several years, poses lots of risks, provides business opportunities.	Invite a resource person from the Forestry Department to give a talk on the importance and functions of forests and forest products, e.g. conservation of water, soil, and plant and animal species	Outline three salient features of the forest. Describe how the forest helps to conserve plant and animal species.
UNIT 5 **FOREST PRODUCTS AND THEIR CONTRIBUTION TO NATIONAL DEVELOPMENT**	1.5.1 give examples of some plants and animals in the forest.	-Types of plants in the forest: trees, shrubs, herbs, climbers, special plants [e.g. Avicennia sp. (white mangrove), Rhizophera sp.(red mangrove), bamboo etc], fungi -Types of animals: birds, insects, mammals, reptiles, amphibians, snails etc.	Guide students to discuss the characteristics of types of plants and animals as in content. -Students to group different kinds of forest plants and animals according to the types in content.	List the various groups of forest plants and animals.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 5 (CONT'D) **FOREST PRODUCTS AND THEIR CONTRIBUTION TO NATIONAL DEVELOPMENT**	The student will be able to: 1.5.2 outline the contributions of forest and forest products to national development.	Functions of the forest to development: Conservation of climate; conservation of water, soil, plants and animal species; sustenance of agricultural production; provision of wood for industry, construction and fuel Uses of timber and non-timber forest products: -Timber products for buildings, furniture, railway, paper, boats and canoes, carving, utensils, toys, educational equipment, etc. -Non-timber forest products such as games and wildlife for tourism, skins and hides, plant medicine, foods and spices, ropes, roofing materials, sponge, etc.; Contribution of forest and forest products to employment, income generation (both local and foreign), social and educational activities, health, etc.	Students to discuss the various uses of timber and non-timber forest products and relate them to the provision of vast employment opportunities, avenues for foreign exchange generation, social ceremonies, education and good health.	State three important contributions of each of the following to national development: 1. Forest 2. Plant medicine 3. Timber 4. Game and wildlife .
	1.5.3 explain deforestation and its effects on the environment and the national economy	Meaning and causes of deforestation Effects of deforestation on the environment and the economy.	Students to discuss the meaning and causes of deforestation and effects of deforestation on the environment and the economy of Ghana.	Explain five reasons why deforestation should be controlled in a country.
	1.5.4 describe methods of forest management.	Forest management practices: selective exploitation of forest resources, forest regeneration and afforestation,	Assist students to discuss the methods of forest management.	
	1.5.5. explain the need for conserving game and wildlife.	Game and Wildlife conservation and its socio-economic contributions	Students to debate on why game and wildlife should be conserved instead of being used for immediate needs of individuals and the nation.	Students to produce a summary of major points raised by both sides in the debate for evaluation.

SECTION 2
SOIL USES AND MANAGEMENT

General Objectives: The student will:

1. become aware of the effect of methods of land preparation practices on the environment.
2. recognise how soils are managed to maintain and improve soil fertility.
3. acquire basic skills and habit in the maintenance of soil fertility

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 **EFFECTS OF LAND PREPARATION PRACTICES ON THE SOIL**	The student will be able to: 2.1.1 explain the effects of indigenous and mechanized methods of land preparation on the soil.	Effects of different land preparation methods on the soil	Assist students to discuss the effects of the following land preparation methods on the soil: a. Manual methods, using simple tools such as cutlass, hoe, axe to clear weeds, fell trees, etc. b. Use of animal-drawn tillers c. Mechanised methods using tractors to plough, harrow, etc. d. Use of herbicides. e. Burning.	Discuss the effects of burning and ploughing on the soil.
UNIT 2 **PLANT NUTRIENTS AND NUTRIENT CYCLES**	2.2.1 classify plant nutrients into macro and micro nutrients.	Classification of plant nutrients: Major (macro) nutrients e.g. Nitrogen (N), Potassium (K) Phosphorus (P), Calcium (Ca) Magnesium (Mg),Sulphur (S) Hydrogen (H), Oxygen (O) Carbon(C), Minor (micro) nutrients e.g. Boron (Bo), Molybdenum (Mo) Manganese (Mn), Chlorine (Cl) Zinc (Zn), Copper (Cu), Iron (Fe)	Assist students to discuss macro and micro nutrients and group soil nutrients into the two classes.	Distinguish between major and minor nutrients and give five examples of each.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **PLANT NUTRIENTS AND NUTRIENT CYCLES**	The student will be able to: 2.2.2 state the sources of plant nutrients.	Sources of plant nutrients: <u>Nutrient</u> <u>Source</u> N Nitrogenous fertilizers e.g. urea, organic manure P Phosphatic fertilizers, e.g. super phosphate, organic manure K Potassic fertilizers, e.g. Muriate of potash, wood ash, organic manure Zn Zinc sulphate Fe Iron sulphate Mn Manganese sulphate	Assist students to discuss the sources of the following nutrients: nitrogen, phosphorus, potassium, zinc, iron and manganese.	
	2.2.3 state the functions of nutrients in plant growth.	Functions of nutrients e.g., Nitrogen, Phosphorus and Potassium, Zinc, Iron in plant growth	Students to discuss the role of N, P, K in plant growth and development	State two functions each of N, P. K, Zn, Fe and identify one source of each.
	2.2.4 describe the deficiency symptoms associated with Nitrogen, Phosphorus, Potassium, Zinc and Iron in plant growth. .	Deficiency symptoms of N, P, K, Zn and Fe	Show to students plants having the deficiency symptoms of nitrogen, phosphorus and potassium. Students to go round the school farm to identify plants having deficiency symptoms of nitrogen, phosphorus, potassium, zinc and iron and record their findings.	Students to describe deficiency symptoms on two crops growing on the field/school farm.
	2.2.5 describe how nitrogen and carbon are cycled in nature.	Carbon and Nitrogen cycles	Assist students to discuss nitrogen and carbon cycles using appropriate diagrams. **NB**: The importance of carbon and nitrogen cycles should be stressed.	Students to describe the Nitrogen and carbon cycles and indicate their importance

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 3 **SOIL FERTILITY AND ITS MAINTENANCE**	The student will be able to: 2.3.1 explain the concept of soil fertility and productivity.	Meaning of soil fertility and soil productivity	Students brainstorm and bring out the meaning of soil fertility and productivity.	Distinguish between soil fertility and soil productivity.
	2.3.2 describe the characteristics of a fertile soil.	Characteristic of a fertile soil: adequate nutrients, good water holding capacity, well-aerated, presence of organic matter, suitable pH, absence of toxic substances	Students examine both fertile and infertile soils to bring out their characteristics.	Describe four characteristics of fertile soil.
	2.3.3 describe methods of maintaining and improving soil fertility.	Maintenance of soil fertility: crop rotation, application of fertilizers, cover cropping, liming, mulching, fallowing, etc.	Guide students to discuss methods of improving soil fertility.	Write short notes on four methods used to improve soil fertility.
	2.3.4 classify fertilizers.	Classification of fertilizers into organic fertilizers and inorganic fertilisers	Guide students to identify and classify fertilizers into organic and inorganic. **Note**: Inorganic (chemical fertilizers) should be further classified into compound, straight or single fertilizers.	Differentiate between organic and inorganic fertilizers and give two examples of each.
	2.3.5 prepare compost.	Preparation of Compost: Stack/heap method and pit method	Assist students to discuss methods of preparing compost. -Guide students in groups to prepare compost. **NB:** Take students through the stock/heap and the pit method.	Give a stepwise procedure involved in the preparation of compost using the heap method.
	2.3.6 demonstrate the methods of fertilizer application.	Methods of fertilizer application: broadcasting, row placement or side dressing, band placement, foliar application and placement.	Students to discuss and practice the methods of fertilizer application on the school farm. **Note** Split application of fertilizers involving top dressing should be explained	Students to demonstrate the following methods of fertilizer application: 1. Foliar application 2. Band placement
	2.3.7 outline the factors that affect fertilizer use.	Factors affecting fertilizer use: Discussion should include: crop factors; soil factors; climatic factors; social factors; economic factors and management.	Students to identify and analyze the factors that affect fertilizer use.	Explain how climatic and economic factors influence the application of fertilizers in your country.

SENIOR HIGH SCHOOL - YEAR 2

SECTION 3

FARM MECHANISATION

General Objectives: The student will:

1. appreciate the uses of machines and equipment in harvesting and post harvesting operations.
2. be aware of the role irrigation and drainage systems play in crop production.
3. recognise the type of irrigation and drainage systems to use in crop production.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 **HARVEST AND POST-HARVEST TOOLS, EQUIPMENT AND MACHINERY**	The student will be able to: 3.1.1 classify tools, machinery and equipment used in harvesting, processing and storage of crops.	Classification of tools, machinery and equipment for harvesting, processing and storage: - Harvesting tools (sickle, cutlass, go-to-hell, hoe, chisel, etc. -Harvesting machinery: (combine harvester, cotton picker, and groundnut lifter) - Processing machinery and equipment (cassava grater, corn milling machines, dehusker, sheller, groundnut decorticator, solar dryers, palm fruit digester and press) -Storage equipment,(silos, barns, cribs, refrigerators and deep freezers)	Help students to discuss harvesting tools, machinery and equipment using pictures, diagrams, films and real objects e.g. cutlass, sickle, go-to-hell, groundnut lifters, combine harvesters, etc. Students to look for different kinds of tools, machinery and implements for harvesting, processing and storage on the internet and copy pictures of them.	Students to name three tools each for the following: 1. Harvesting 2. Weeding 3. Watering 4. Tilling the soil
	3.1.2 state the specific uses of each tool, machinery and equipment.	Uses of tools, equipment and machinery	**Note**: Arrange for students to visit a nearby farm to observe the uses of the various harvesting, processing and storage tools, machinery and equipment (as listed in 3.1.1) Seek permission from the farm owners to allow students to practice how to operate some of the tools and machinery. Follow the visit with class discussion on the tools, equipment and machinery seen and their uses	Students to classify and state the functions of: a) maize sheller, b) groundnut decorticator and c) cassava grater.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D)	The student will be able to:			
HARVEST AND POST-HARVEST TOOLS, EQUIPMENT AND MACHINERY	3.1.3 operate simple harvesting, processing and storage equipment.	Operation of harvesting, processing and storage equipment	Students to operate some of the harvesting, processing and storage equipment listed in content (if these are available) and discuss their observations.	
UNIT 2				
IRRIGATION AND DRAINAGE	3.2.1 differentiate between irrigation and drainage.	Irrigation and drainage	Guide students to discuss the purposes and features of irrigation and drainage systems, pointing out their similarities and differences.	State the differences between irrigation and drainage.
	3.2.2 outline the benefits of irrigation and drainage	Benefits of irrigation and drainage	Students to brainstorm to list and discuss the benefits derived from irrigation and drainage e.g. - raising productivity of lands: - improving yield and quality of produce; -improving sanitation and health conditions of the farm environment - allowing fertilizer to be added to irrigation water (i.e. fertigation) for full use by the plant.	Discuss five benefits derived from irrigation and drainage
	3.2.3 outline the problems of irrigation and drainage in agriculture.	Problems of irrigation and drainage	Assist students to discuss the problems associated with irrigation and drainage systems e.g. - maintenance - water availability - pests and diseases - salinity ingress	Outline the problems associated with irrigation and drainage systems used in agriculture.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D)	The student will be able to:			
IRRIGATION AND DRAINAGE	3.2.4 classify methods of irrigation and drainage systems.	Classification of irrigation and drainage systems 1. Irrigation: - Surface (furrow, flooding and drip/trickle) - Overhead (Sprinkler, Watering can) 2. Drainage: - Open or Surface drainage - Subsurface drainage	Assist students to discuss and practice the various methods of irrigation and observe drainage systems in the school farm. Discuss the process of adding fertilizer to irrigation water for full use of crops as in 'fertigation'. **Note:** Arrange a trip to farms where some of the irrigation and drainage systems in operation can be observed and discussed.	Describe three methods of irrigation and state the advantages and disadvantages of each. Write a report on the visit to farm(s) which use irrigation/drainage systems.
	3.2.5 identify equipment used in irrigation and drainage.	Irrigation and drainage equipment	Students to download pictures of irrigation and drainage equipment from the internet and discuss their uses. Equipment should include watering cans, pipes, sprinklers, tiles etc.	
	3.2.6 state the advantages and disadvantages of various irrigation and drainage systems.	Advantages and disadvantages of various irrigation and drainage systems	Teacher to guide students to compare the merits and demerits of using different irrigation and drainage systems.	Write down five advantages and five disadvantages each of irrigation and drainage in Ghana.

SECTION 4

CROP PRODUCTION

General Objectives: The student will:

1. recognize pests and diseases and their effects on crop plants.
2. recognize common weeds and their effects on crops
2. apply good husbandry practices to control weeds, pests and diseases in crop production
3. appreciate the importance of safety precautions in handling chemicals
4. apply required husbandry practices involved in the cultivation of field, vegetables, fruits and tree crops.
5. appreciate the basic principles and methods of crop improvement

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **GENERAL PRINCIPLES OF PLANT PROTECTION**	4.1.1 differentiate between healthy and diseased plants.	Healthy and diseased crop plants	Organize a visit to a crop farm for students to observe and compare healthy and diseased crop plants.	State two differences between a diseased and healthy crop plant.
	4.1.2 identify diseases of crop plants.	Identification of the common diseases of crop plants: Maize streak, leaf curl, leaf spot, blossom-end rot of tomato, gummosis of citrus, cabbage rot, bacterial soft rot of carrot, Cape St. Paul wilt of coconut, sikatoga of plantain/banana, black pod of cocoa, root knot nematode, damping-off disease, cassava mosaic and leaf rosette of groundnut	Students to identify common diseases of crop plants as listed in content and describe the symptoms.	Explain the term **disease** and state two effects of diseases on a named crop plant.
	4.1.3 classify crop diseases according to their causes.	Classification of crop diseases: a). Non pathogenic diseases (caused by excess or low nutrient, temperature, sunlight and water) b). Pathogenic diseases (caused by fungi, bacteria, viruses and nematodes)	Assist students to discuss two diseases from each group outlined in content. **NB**: The discussion of pathogenic diseases should be under the following headings: - Causal agent - Mode of transmission - Affected crop/s - Symptoms - Prevention and control measures	Give three causes of non-pathogenic diseases in plants.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **GENERAL PRINCIPLES OF PLANT PROTECTION**	The student will be able to: 4.1.4 describe the nature, preventive and control measures of selected diseases of crop plants.	<u>Fungal diseases:</u> - Damping off - Leaf spot of maize - Gummosis of citrus - Sikatoga of plantain/banana - Black Pod of Cocoa <u>Bacterial diseases:</u> - Bacterial soft rot of carrots - Cabbage rot - Black soft rot of onion <u>Viral diseases:</u> - Cassava leaf mosaic, - Leaf curl - Groundnut leaf rosette - Maize streak - Cape St. Paul wilt - Swollen shoot <u>Nematodes/Worms:</u> - Root knot nematode (of tomato and okro). Non pathogenic disease - Blossom-end rot of tomato	Students to visit farms to observe and identify the various diseases. They should collect specimen for preservation. Assist students to discuss control measures for crop plant diseases e.g. Physical, Chemical, Cultural, Prohibition/Quarantine, use of resistant varieties, Integrated approach, etc.	List and describe five common plant diseases identified in the school farm or a nearby farm. Describe the diseases gummosis and Cape St. Paul Wilt under the following headings: - Causal agent - Mode of transmission - Affected crops and effects - Symptoms - Prevention and control
	4.1.5 outline the effects of plant diseases on crop production.	Effects of plant diseases in crop production	Guide students to discuss the effects of diseases on crop production, e.g. - Reduction in yield - Reduction in quality of produce - Reduction in market value - Increase in cost of production - Low income to farmer	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 (CONT'D) **GENERAL PRINCIPLES OF PLANT PROTECTION**	4.1.6 classify pests of crops.	Classification of Pests of crop plants: a). Rodents: grasscutter, rats and squirrels b). Birds: weaver birds, quelea quelea c). Nematodes (Eelworm) d). Insects	Students to do the following: i. classify crop pests as rodents, birds, nematodes and insects. Ii. view some of the named pests from pictures /slides.	outline three classes of insect pests and give two examples in each case.
	4.1.7 group crop pests into field and storage pests.	<u>Field pests</u>: rodents, birds and insects <u>Storage pests</u>: rodents, insects such as [<u>Callosobruchus maculatus (c</u>owpea weevil) and <u>Sitophilus zea</u> (maize weevil)]	Students to group pests into field pests and storage pests.	
	4.1.8 classify insect pests according to their feeding habits.	Classification of insect pests based on feeding habits i. Biting and Chewing insects (beetles, grasshopper, cricket, termites, leaf miners) ii. Piercing and sucking insects (scale insects, aphids, moths and cotton stainer) iii. Boring insects (weevils, stem borers, fruit fly)	Students to classify insect pests according to their feeding habits..	Classify the following pests: i. maize weevil ii. aphids iii. grasshopper iv. cotton stainer
	4.1.9 apply control methods against pests and diseases of crops.	Methods of pest and disease control: 1. Physical (hand picking, burning, trapping, and scare crows) 2. Chemical (pesticides, fungicides, fumigants and nematicides) 3. Cultural (use of clean planting materials, regular weeding, crop rotation, good farm hygiene and pruning) 4. Biological - use of one living organism to control the numbers of others (e.g. cats against mice/rats, Lady bird beetle against Aphids, Marigold against Nematodes Parasitoids against mealybugs and aphids; phytoseiids against mites, etc. 5. Prohibition/Quarantine (restriction on the movement of crops/ plant materials from one place to another 6. Use of resistant varieties 7. Integrated Pest Management (combining physical, biological and cultural methods with minimum use of chemicals to control pests)	Assist students to discuss methods of prevention and control of pests in crop production as in content. **Note**: Arrange a trip to farms and research stations for students to observe the pest control methods. You can also invite resource persons to give demonstrations of the methods. <u>Project</u> Students develop a plan for controlling crop pests and apply the plan to control crop pests on the school farm.	Describe the following methods of controlling pests on crops: i. Cultural ii. Biological iii. Prohibition

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **GENERAL PRINCIPLES OF PLANT PROTECTION**	The student will be able to: 4.1.10 classify common weeds.	Classification of weeds: -Annuals -Biennials and -Perennials	Students to make a collection of weed species for identification and classification and prepare a weed album.	<u>Project</u>: Students to prepare weed album.
	4.1.11 outline the importance of weeds in agriculture.	Importance of weeds	Students to list and discuss the positive and negative effects of weeds in agriculture.	
	4.1.12 describe the methods of dispersal of weeds.	Dispersal of weeds (by man, water, wind, animals and explosive mechanisms)	Students brainstorm to list and discuss methods of weed dispersal as listed in content. **Note**: Advantages and disadvantages of each method should be discussed.	Write an essay on effects of weeds on agriculture in Ghana. State and explain four modes of dispersal of weeds.
	4.1.13 apply control methods against weeds.	Methods of weeds control: - Mechanical, - Chemical, - Biological and - Cultural methods	Students brainstorm to list and discuss methods of weed control. Students to design appropriate weed control strategies in their crop projects, apply them and evaluate their effectiveness.	
	4.1.14 use spray equipment.	Procedure for spraying with a knapsack sprayer	Assist students to calibrate a knapsack sprayer and use it to spray weeds on the school farm.	
UNIT 2 **HUSBANDRY OF SELECTED CROPS** **A. FIELD CROPS** **B. VEGETABLE CROPS** **C. FRUIT CROPS** **D. TREE CROPS**	4.2.1 classify crops into field, vegetable, fruit and tree crops	Classification of crops: -Field crops: (cereals, roots and tubers, fibre crops, tobacco and sugar-cane). -Vegetable crops:(leafy, bulbs, legume, fruit, and root) -Fruit crops: (plantain and bananas, citrus, mango, pawpaw, pineapple, avocado pear) -Tree crops: (cashew, cocoa, coffee, oil palm, coconut and rubber).	Guide students to classify crops into groups e.g.: field crops, vegetable crops, fruit crops and tree crops.	Students to classify the following crops into field, vegetable, fruit and tree crops: -plantain -lettuce -cocoa -sugar cane -sorghum

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 **HUSBANDRY OF SELECTED CROPS** **A. FIELD CROPS** **B. VEGETABLE CROPS** **C. FRUIT CROPS** **D. TREE CROPS**	The student will be able to: 4.2.2 outline the climate and soil requirements of selected crops 4.2.3 prepare land for planting selected field and vegetable crops. 4.2.4 Apply the correct seed rate, spacing, time of planting and method of planting in producing selected crops. 4.2.5 harvest and store selected Crops 4.2.6 outline the methods used and precautions taken during harvesting, post-harvest handling and storage. 4.2.7 outline the cultural practices for planting selected fruit and tree crops.	A study and cultivation of one field crop and vegetable crop the groups below: - Field crops: maize, sorghum, cassava, yam, cowpea, ground nut. - Vegetable crop: tomato, okro, onion, shallots. Good practices in harvesting and storage of selected field and vegetable crops. Harvesting, post-harvest handling and storage: - determination of period of harvesting - signs of maturity - harvesting procedure - precautions taken during harvesting - care and treatment of harvested products - methods of storage Good agricultural practices in fruit and tree crop cultivation. A study and cultivation of one fruit /tree crop **from the groups** below: - Fruit and tree crops: plantain, banana, pineapple, mango, citrus, Cocoa, oil palm, cashew.	Students to discuss the climate and soil requirement of selected crops Students to study and practice the production of selected crops observing good practices in the following: land preparation, seed rate, methods of planting, fertilizer application, weed control, pest and disease control, harvesting and storage Students to make a table indicating the seed rate/spacing and time of planting of the selected crops. Students to harvest each crop and store it. Assist students to discuss methods used and precautions taken at harvesting and post-harvest handling and storage Students to study the production of selected fruit and tree crops observing good practices in the following: land preparation, seed rate, methods of planting, fertilizer application, weed control, pest and disease control **Note**: Arrange visits to nearby farms to observe planting methods for the selected crops. Students to observe land preparation procedures of selected crops and practise.	PROJECT: Student to cultivate one field crop and vegetable crop using good agricultural practices for land preparation, seed rate, methods of planting, fertilizer application, weed control, pest and disease control, harvesting and storage and keep activity and financial records. Students to write a report after the field visit highlighting the following: Location of farm, size of farm, type of crop, cultural practices harvesting and marketing.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D) **HUSBANDRY OF SELECTED CROPS** **A. FIELD CROPS** **B. VEGETABLE CROPS** **C. FRUIT CROPS** **D. TREE CROPS**	The student will be able to: 4.2.8 measure yields of harvested Crops.	Measurement of crop yields	Guide students to measure yields of harvested crops in terms of weight, (kilogram, tonnes), crates, bags per unit area of land, etc.	a. Measure crops' yields in terms of weight, and numbers b. Calculate yield per hectare c. Prepare profit and loss account for the projects.
UNIT 3 **PRINCIPLES OF CROP IMPROVEMENT**	4.3.1 give the meaning of crop improvement	Meaning of Crop Improvement.	Students to brainstorm to bring out the meaning of crop improvement.	Describe in detail one method which can be used to change the genetic quality of a named vegetatively propagated crop.
	4.3.2 outline the aims of crop improvement	Aims of crop improvement:	Students to discuss the aims of crop improvement e.g. - to produce disease/pest resistant varieties, - to increase yield, - to improve quality of produce, - to reduce period of maturity.	
	4.3.3 describe the methods of crop improvement	Methods of crop improvement: Introduction, selection and cross-breeding	Assist students to discuss the methods of crop improvement	Describe three (3) methods of crop improvement.

SENIOR HIGH SCHOOL - YEAR 2

SECTION 5

ANIMAL PRODUCTION

General Objectives: The student will:

1. adopt appropriate husbandry practices in profitable animal production.
2. use basic skills in caring for and managing the health of farm animals.
3. apply required husbandry practices involved in the production of some farm animals
4. apply basic principles and methods of animal improvement

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **GENERAL MANAGEMENT PRACTICES OF FARM ANIMALS**.	5.1.1 explain the meaning and objectives of management of farm animals.	Meaning and objectives of management of farm animals	Students to brainstorm and bring out the meaning and objectives of management of farm animals.	Explain what farm management is. State three objectives of management in farm animals.
	5.1.2 select breeding stock.	Selection of breeding stock Factors to consider in selecting good breeding stock(performance records, appearance and state of the animal).	Guide students to discuss the factors to consider in selecting good breeding stock.	
	5.1.3 outline the various systems of keeping farm animals.	Management systems for keeping farm animals: - Ruminants:-Cattle, sheep or goats - Non-ruminant omnivores:- Poultry or Pigs - Non-ruminant herbivores:- Rabbit or Grasscutter or Guinea-Pigs	Students to discuss the extensive, semi-intensive and intensive systems of keeping farm animals. (The advantages and disadvantages of each system should be discussed)	Distinguish between the extensive and the intensive systems of keeping poultry. State two advantages and two disadvantages of each system.
	5.1.4 describe suitable environment for keeping and managing farm animals	Suitable environment for managing farm animals. Environmental factors: ventilation, space, weather conditions, etc. should be considered.	Assist students to discuss suitable environment for keeping and managing farm animals.	

UNIT	SPECIFIC OBJECTIVES	CONTENTS	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D)	The student will be able to:			
GENERAL MANAGEMENT PRACTICES OF FARM ANIMALS	5.1.5 select suitable materials for the construction of housing units	Suitable housing materials.	Students to brainstorm to come out with suitable materials for construction of animal housing.	
	5.1.6 select feedstuffs for feeding farm animals	Selection of appropriate feeds and good feeding practices	Guide students to select appropriate feeds for selected farm animals. Students to practice good feeding practices	Identify common feedstuffs in the community (Grass, legume, root and tuber and other species Hay, silage, salt lick, rice bran, wheat bran)
	5.1.7 demonstrate skills of caring for young animals.	Care of young animals	Assist students to discuss the following management practices: Creep feeding, weaning, debeaking, dehorning, disbudding, castration, marking/identification, trimming of hoofs, fostering, etc. **Note:** Arrange a demonstration class on the above management practices for students to observe and practise	Give stepwise description of the following practices and the reasons for their adoption in animal production: -Castration -Dehorning -Identification -Creep feeding
	5.1.8 outline good practices in processing and marketing farm animals.	Food safety and quality practices in processing and marketing of farm animals	Arrange a demonstration on slaughtering, evisceration and dressing of carcass **Note:** Food safety and quality practices in marketing of whole animals or cut-up parts of the carcass should be discussed.	Describe the processes involved in slaughtering and dressing of a chicken to meet food safety and quality standards
UNIT 2 **PRINCIPLES OF ANIMAL HEALTH MANAGEMENT**	5.2.1 define disease and their causes in farm animals	Diseases in farm animals and their causes	Assist students to discuss the meaning, and causes of diseases in farm animals. **Note:** General causes of diseases in farm animals should be discussed including bacteria, viruses, fungi, protozoa, mechanical injuries, thermal injuries, poisons, hereditary conditions, nutritional deficiencies etc.	Explain what a disease is and state the causes of diseases in farm animals.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D) **PRINCIPLES OF ANIMAL HEALTH MANAGEMENT**	The student will be able to: 5.2.2 describe the mode of transmission of animal diseases	Transmission of animal diseases	Assist students to discuss the mode of transmission of animal diseases e.g. through feed and water, by contact, through a vector, by air (airborne), etc.	Name four diseases of farm animals and describe their modes of transmission.
	5.2.3 define pests, vectors and parasites of farm animals	Pests, vectors and parasites of farm animals	Students to define pest, vectors and parasites and give examples of each.	
	5.2.4 select general control methods for pests, parasites and diseases	Prevention and control of pests, parasites and diseases of farm animals Sanitary practices, isolation, prohibition, quarantine, routine vaccination, good nutrition, use of drugs and chemicals	Guide students to discuss various preventive/control methods of pests, parasites and diseases. **Note**: Arrange a visit to an animal farm to observe pests and diseases control methods e.g. spraying, dipping, drenching, injection etc.	Differentiate between pest, vectors, and parasites and give two examples of each. State eight effects of parasites on their host.
	5.2.5 describe the nature, preventive and control methods of selected diseases and parasites of farm animals.	<u>Farm animal diseases:</u> - Viral: foot and mouth, rinderpest, Newcastle disease, fowl pox - Bacterial: anthrax, brucellosis, tuberculosis - Fungal: aspergillosis, ringworm - Protozoa: trypanosomiasis, coccidiosis, redwater <u>Farm animal parasites</u>: - Endoparasites: tapeworm, liver fluke and roundworm. - Ectoparasites: ticks, lice , fleas and mites	Students to mention all the diseases listed and discuss **one** from each group. The discussion should be done under the following headings: -causal agent, -mode of transmission, -affected animals, -symptoms, -effects on animal, -prevention and control measures Discuss two parasites from each group. **NB**: The discussion of parasites should be under the following headings: - Structure - Effects on the host - Prevention and control measures	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 2 (CONT'D) **PRINCIPLES OF ANIMAL HEALTH MANAGEMENT**	5.2.6 outline the economic importance of pests, parasites and diseases	Economic importance of pests, parasites and diseases	Teacher to guide students to find the meaning and determination of economic importance of pests, parasites and diseases in farm animals.	Construct a table on the economic importance of pests, parasites and diseases on studied farm animals
UNIT 3 **HUSBANDRY OF SELECTED ANIMALS:** **A) RUMINANTS** B) NON-RUMINANTS OMNIVORES **C) NON-RUMINANT HERBIVORES**	5.3.1 select the housing system suitable for the selected animals.	Husbandry of selected animals: - Ruminants:- Cattle, sheep or goats - Non-ruminant omnivores:- Poultry or Pigs - Non-ruminant herbivores:- Rabbit or Grasscutter or Guinea-Pigs	Students to study one animal each from the groups listed in the content. Husbandry of the selected animals should be studied under the following headings: a) selection of breeding/foundation stock b) planning the breeding programme c) housing d) feeding/ feeding programme e) routine management practices	**PROJECT**: Students to carry out a production project on one of the following animals: rabbits, poultry, sheep and goats. The following factors should be considered: Planning the project, costing and budgeting for inputs. Procurement of inputs. Implementation of programme.
	5.3.2 plan a breeding programme.	Breeding programme.	Guide students to select breeding stock and plan routine breeding programme for the selected farm animal (Arrange visits to animal farms for students to observe the various management practices)	
	5.3.3 keep records.	Types of Animal Production Records - Production record - Health record - Sales record	Guide students to discuss record keeping in animal production.	Draw an outline for the following records: Health record, Production record and Sales record.

SECTION 6

AGRICULTURAL ECONOMICS, AGRIBUSINESS AND EXTENSION

General Objectives: The student will:

1. become aware of the steps and entrepreneurial skills involved in establishing agribusinesses
2. be aware of sources of finance for operating agribusiness
3. be aware of the steps and conditions for obtaining credit for use in agribusiness.
4. acquire knowledge in estimating costs of all inputs in agricultural production.
5. appreciate the importance of keeping records in agribusiness.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 ESTABLISHMENT AND MANAGEMENT OF AGRIBUSINESS	The student will be able to: 6.1.1 identify the factors to consider in setting up an agribusiness.	Factors to consider in setting up an agribusiness. -knowledge about the business -capital - availability of tools/equipment - availability of materials/inputs - space/land/room for enterprise - labour - registration of business - availability of market - level of profit to be made	Students in groups, to identify and discuss the factors to be considered in setting up an agribusiness.	Students study an agribusiness enterprise and present group reports on factors they would consider in setting up their own agribusiness enterprise.
	6.1.2 outline steps in establishing agribusiness.	Steps in establishing agribusiness	Organize students into groups to visit some of the agribusinesses in the district to interview the practitioners and identify the steps in establishing agribusiness.	
	6.1.3 identify entrepreneurial skills and operate an agribusiness.	Skills to manage agribusinesses - decision making - planning - organising - directing - controlling - book keeping and accounts - budgeting - marketing	Invite successful agribusiness persons for a panel discussion on skills for managing agribusinesses. Assist students to discuss the skills of planning and budgeting for an agribusiness. Students to discuss ways of improving agribusinesses.	Discuss the importance of five entrepreneurial skills that are essential in the operation of an agribusiness.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 **AGRICULTURAL FINANCING**	The student will be able to: 6.2.1 state the sources and types of farm financing 6.2.2 outline the conditions for obtaining credit. 6.2.3 prepare a simple business plan. 6.2.4 explain the merits and demerits of various sources of credit.	Sources of farm financing: Banks, co-operative societies, money lenders, government and non-governmental agencies, marketing boards, thrift and loan societies ('Susu'). Conditions for obtaining credit: Collateral, surety, ability to repay, personal reputation, personal investment, business plan. Preparation of business plan Merits and demerits of credit sources	Assist students to discuss the sources of farm financing. **NB**: Financing covers credits and subsidies. -Short, medium and long term loans to be discussed. Assist students to discuss the conditions that have to be fulfilled to secure credit Guide students to prepare a simple business plan for securing credit. Invite personnel from a local bank to talk to students on the various transactions that are carried out in granting loans for farming. Guide students to discuss the advantages and problems associated with each credit source.	Distinguish between credit and subsidy. List five common sources of credit List and explain conditions that might be fulfilled in order to obtain credit from banks. Students to produce a simple business plan. Discuss the problems associated with obtaining credit from the following sources: a) Banks b) Money lenders c) Co-operative societies Discuss the merits and demerits of three sources of agricultural credit.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 3 **FARM RECORDS AND ACCOUNTS**	The student will be able to: 6.3.1 describe the types of records kept on the farm.	Types of farm records: - physical records (map, weather chart), - inventory - financial records - production record - labour record	Assist students to discuss types of farm records.	State three farm records kept on the farm.
	6.3.2 state the importance of keeping farm records and accounts.	Importance of farm records and accounts	Assist students to discuss the importance of farm records to the farmer.	State four benefits derived from farm accounts
	6.3.3 differentiate between farm records and accounts	Differences between farm records and accounts	Guide students to discuss the differences between farm records and accounts.	Distinguish between farm records and accounts.
	6.3.4 explain the various types of farm accounts.	Types of farm accounts	Discuss the various types of farm Accounts such as: - assets and liability, - income / receipts and expenditure accounts, - capital and credit accounts	
	6.2.5 prepare income and expenditure account; profit and loss account and balance sheet.	Preparation of farm accounts - Income and expenditure accounts - Profit and loss account - Balance Sheet	Guide students to prepare the accounts listed. **Note**: You may invite a resource person to come and help teach this lesson	Students to prepare the following: a) income and expenditure account b) profit and loss account c) balance sheet

SENIOR HIGH SCHOOL - YEAR 3

SECTION 1

INTRODUCTION TO AGRICULTURE

General Objectives: The student will:

1. appreciate sustainable and good agricultural practices
2. appreciate the relationship between responsible use of agricultural resources and sustainable agriculture.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **SUSTAINABLE AGRICULTURE AND GOOD AGRICULTURAL PRACTICES (GAP)**	1.1.1 explain the concept of sustainable agriculture and relate it to good agricultural practices.	Sustainable agriculture – agricultural practice that ensures **continued agricultural productivity**, while posing little or no threat to life, biodiversity, the physical, biological and social environment, and without adverse effects on the agricultural needs of future generations. Good agricultural practices (GAP): comprise a number of approved and enforced agricultural practices that ensure the attainment of **acceptable food safety and quality standards**	Students brainstorm to bring out the meaning of sustainable agriculture. **Note:** Ensure the lesson covers the issues raised in content and any others. -Students to brainstorm to bring out the meaning of GAP and relate it to the concept of sustainable agriculture.	Explain the concept of sustainable agriculture and good agricultural practices (GAP).
	1.1.2 give examples of sustainable agricultural practices and good agricultural practices (GAP) in West Africa.	Sustainable agricultural practices in West Africa: safe use of organic and inorganic fertilizers to improve soil fertility, alley farming, mixed farming, integrated pest management, cover cropping, crop rotation, etc. Examples of GAP: organic farming, observance of good farm environment, sanitation, observance of quality and safety standards, use of approved labour etc.	Students to brainstorm and list sustainable agricultural practices that address persisting problems about soil fertility; pest control; availability of animal feeds and environmental degradation, food safety and quality assurance.	Students give examples of sustainable agricultural practices and Good agricultural practices in West Africa.
	1.1.3 identify factors that influence sustainable agricultural production, and good agricultural practices in West Africa.	Factors influencing sustainable agricultural production and good agricultural practices in West Africa: 1. Social factors e.g. culture, human resource, etc 2. Economic environment, e.g. standard of living, inputs, market conditions, prices, etc. 3. Political e.g. government policies 4. Physical e.g. climate change, vegetation 5. Technology 6. Food quality and safety standards	Students to brainstorm to bring out the factors that influence sustainable agricultural production, and good agricultural practices.	Write an essay on how the production of one agricultural crop e.g. Cocoa, can be sustained. Write an essay on how good agricultural practices (GAP) could be promoted among farmers in West Africa.

SENIOR HIGH SCHOOL - YEAR 3

SECTION 2

SOIL USES AND MANAGEMENT

General Objectives: The student will:

1. recognize the need for soil and water conservation as ways for ensuring sustainable agriculture.
2. be aware of how human activities affect soil and water conservation.
3. adopt appropriate measures for ensuring soil and water conservation.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1	The student will be able to:			
SOIL AND WATER CONSERVATION.	2.1.1 explain the concept of soil and water conservation.	Soil and water conservation	Guide students to discuss the concept of soil and water conservation.	What is soil and water conservation?
	2.1.2 describe types of soil water and their importance.	Types of soil water and their importance: gravitational water, capillary water, hygroscopic water, wilting point, permanent wilting point, available water, non-available and superfluous water	Assist students to discuss the types of soil water and their importance.	Explain the following types of soil water and indicate the significance of each in crop production: a) gravitational water b) hygroscopic water c) capillary water
	2.1.3 explain soil erosion.	Soil erosion: Gradual wearing away of the topsoil	Take students out to observe eroded areas of the school compound or street. Students discuss their observations to come out with an explanation of soil erosion.	
	2.1.4 state the agents of soil erosion.	Agents of erosion: water, wind, ice, animals	Students to discuss the agents of soil erosion.	List four (4) agents of soil erosion.
	2.1.5 describe the types of water and wind erosion.	-Forms of erosion caused by water: splash, rill, sheet, gully -Forms of erosion caused by wind: suspension erosion, soil creep and saltation -Economic importance of soil erosion	Students to describe the types of erosion found on the school compound and discuss their causal agents.	Describe three types of soil erosion caused by water. State four (4) economic importance of soil erosion in crop production.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **SOIL AND WATER CONSERVATION**	The student will be able to: 2.1.6 explain the factors that influence soil erosion.	Factors influencing soil erosion: wind speed, rainfall, topography, vegetative cover, soil type, human and animal activity	Assist students to discuss the factors that influence soil erosion.	Explain how each of the following factors influences soil erosion i. Rainfall ii. Topography iii. Vegetative cover iv. Soil type v. Human activity
	2.1.7 outline the effects of soil erosion.	Effects of soil erosion: - loss of top soil - loss of soil fertility resulting in reduction in crop yield - lateritization, hardpan formation and deterioration in water seepage - siltation of river beds and dams - reduction of water holding capacity of soil - reduction of vegetation cover leading to savannization and finally desertification, etc.	Guide students to analyze the effects of soil erosion on agriculture. Students to practice various methods of controlling erosion on the field.	Write an essay on the effects of soil erosion on crop production.
	2.1.8 outline and carry out measures to prevent and control soil and water loss.	Soil and water conservation methods: - agronomic practices: cover-cropping, mulching, zero or minimum tillage - soil conditioning e.g. addition of manures and lime - tillage practices e.g. terracing, contour ploughing, etc.	Guide students to discuss erosion control methods as soil and water conservation techniques.	Describe how mulching/cover cropping/ can be used to control soil erosion. Name two tillage practices and describe how they could be used to control soil erosion.

SECTION 3

FARM MECHANISATION

General Objectives: The student will:

1. be aware of the application and importance of simple survey practices in agriculture.
2. recognise the need for planning a farmstead.
3. appreciate the problems and prospects of farm mechanisation.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **SURVEYING AND PLANNING OF FARMSTEAD**	3.1.1 explain the importance of surveying in construction, and measurement in farming operations	Purpose of surveying and measurement	Assist students to discuss the objectives of surveying. (Discussion to include: uses of surveying in the construction of roads; agricultural ventures; mining industry; town planning etc.)	State three (3) objectives of surveying.
	3.1.2 identify and state the uses of surveying instruments.	Surveying instruments and their uses	Bring and display in class survey instruments such as: - ranging poles, - Gunter's chain - measuring tape - prismatic compass - theodolite - dumpy level - abney level - tripod stand – Global Placement System (GPS) – Total Station (TS), etc. Assist students to identify the survey instruments and learn their uses. **Note:** You can invite a resource person to demonstrate the uses of the instruments.	1. List any six (6) survey equipment and describe their uses. 2. Students should be made to identify surveying instruments on display
	3.1.3 care for and maintain surveying Instruments	Care and maintenance of surveying instruments	Guide students to discuss and practice the care and maintenance of surveying instruments.	Describe four (4) ways of taking care of and maintaining surveying instruments.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **SURVEYING AND PLANNING OF FARMSTEAD**	The student will be able to: 3.1.4 outline the procedures for conducting a survey	Procedure for conducting a survey	Students to discuss the procedure for conducting a survey. (Discussion should include reconnaissance and preliminary surveys)	Describe the procedure for conducting a survey.
	3.1.5 make linear, angular and other measurements in the field and record data accurately	Measurements in surveying	Guide students to make linear and angular measurements, record data for map preparation.	
	3.1.6 prepare a map using field data.	Map preparation procedure: -Scale selection -Baseline determination -Transferring field measurements onto map, etc.	Assist students to discuss procedure for map preparation and practice map preparation with field data	Students to prepare the map of the school farm/garden.
	3.1.7 explain the meaning of a farmstead and state the importance of planning it	Meaning and importance of farmstead planning	Assist students to discuss the meaning and importance of planning a farmstead.	State the importance of planning a farmstead.
	3.1.8 outline the principles involved in planning a farmstead outlay	Principles of farmstead outlay	Guide students to discuss the factors to consider in the location of different farm structures, such as buildings, orchards, vegetable garden, etc. (The discussion to include: Topography; location of water source; type of soil; direction of wind; sunshine, etc.) Arrange a visit to a well established farm for students to observe and discuss farm outlay.	Discuss four (4) factors to consider in the location of farm buildings, structures and fields for production. Students to write a report on the locations of the various structures on the farmstead and reasons for their location.

SENIOR HIGH SCHOOL - YEAR 3

SECTION 4

CROP PRODUCTION

General Objectives: The student will:

1. appreciate the importance of ornamental plant production as an agribusiness.
2. appreciate the aesthetic value of ornamental plants.
3 identify some ornamental plants.
4. apply the basic principles of ornamental plant production.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 **BASIC PRINCIPLES OF ORNAMENTAL PLANT PRODUCTION**	The student will be able to: 4.1.1 identify and classify ornamental plants	Identification and classification of ornamental plants Classes of ornamental plants i. Bedding plants e.g. bachelors button African marigold ii. Hedging plants e.g. - milk bush, ice plant iii. Borders e.g. - Alternantera species iv. Trees (shade, windbreak, shelter, etc.) e.g. Indian almond Flamboyant Whistling pine v. Shrubs e.g. rose hibiscus croton vi. Climbing plants e.g. - bougainvillea vii. Lawn plants e.g. love grass carpet grass Zoysia sp.(Japanese lawn Grass)	Take students round the school compound and assist them to identify ornamental plants and classify them.	Students to classify a list of ornamental plants.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **BASIC PRINCIPLES OF ORNAMENTAL PLANT PRODUCTION**	The student will be able to: 4.1.2. outline the importance of ornamental plants.	Importance of ornamental plants - beautification - shade - noise absorption - shelter belt - wind break - pleasure - direct walkway - avenue etc.	Assist students to discuss the importance of ornamental plants.	Discuss three contributions of ornamental plants to the well-being of people.
	4.1.3 differentiate between a bed and a border.	Differences between a bed and a border	Students to discuss the differences between a bed and border. Take students round the school compound to observe beds and borders.	State three differences between a bed and a border.
	4.1.4 outline the principles to be observed when planting on beds and borders.	Principles for planting on beds and borders	Discuss with students the principles to consider when planting on beds and borders.	State the principles to be observed when planting flowers in beds and borders.
	4.1.5 prepare beds and borders.	Preparation of beds and borders	Guide students to design and prepare beds and borders.	<u>Project:</u> Students to design and prepare a bed or a border under supervision of the teacher.

SENIOR HIGH SCHOOL - YEAR 3

SECTION 5

ANIMAL PRODUCTION

General objectives: The student will

1. be aware of various aspects of fisheries
2. recognise the importance of the fishing industry in the National Economy.
3. acquire skills for undertaking small scale fish farming

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **INTRODUCTION TO FISHERIES**	5.1.1 explain the term fisheries	Meaning of fisheries	Students to brainstorm to bring out the meaning of fisheries.	What is the meaning of fisheries?
	5.1.2 describe the different types of fisheries.	Types of fisheries: Culture fisheries (aquaculture/fish farming) Capture fisheries (fishing) • Subsistence fisheries • Commercial fisheries • Artisanal fisheries • Industrial fisheries	Students to describe and compare the various types of fisheries listed under content.	Compare subsistence and industrial fisheries.
UNIT 2 **FISH FARMING**	5.2.1 explain the meaning of aquaculture and fish farming.	Meaning of aquaculture: culture of organisms in water, e.g. fish, oyster, shrimp, sea weed, etc.	Students to do the following: i. brainstorm to bring out the meaning of aquaculture. ii. search for more information on other types of organisms that could be cultured in water using the internet	What is aquaculture? Mention three types of organisms that could be cultured in water.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 2 (CONT'D) **FISH FARMING**	5.2.2 outline the benefits and problems associated with fish farming.	Benefits and problems associated with fish farming and their possible solutions. Some invasive alien species in fishery habitat - Eichhornia crassipes (water hyacinth) - Pistia stratiotes (water lettuce) - Enteromorpha flezura (filamentous algae) - Ceratophyllum sp. (hornwort) - Cyperus papyrus (Papyrus reed)	Assist students to discuss the benefits derived from fish farming. (Discussion should include problems associated with fish farming and their possible solutions. Problems of invasive alien species in a fishery habitat should also be discussed	Discuss five benefits derived from fish farming.
	5.2.3 describe facilities for growing fish	Facilities for growing fish: • Earth ponds • Cages • Concrete tanks • Raceways • fish pens	Use films/pictures of different facilities for growing fish to facilitate class discussion	Describe three facilities for growing fish
	5.2.4 explain the factors that influence site selection for a fish pond	Factors influencing site selection for a fish pond	Guide students to discuss the main factors affecting site selection for a fish pond. **Note:** Arrange a visit to a fish farm for students to observe the following: site, soil type, structure of earth pond, stocking of pond, feeding, harvesting.	Outline four factors which influence site selection for a fish pond. Students to write reports on the visit covering the things observed: site, soil type, structure of earth pond, stocking of pond, feeding, harvesting.
	5.2.5 choose a suitable fish species to stock a pond.	Culturabale fish species for stocking a fish pond	Guide students to identify and discuss suitable fish species for pond rearing, e.g. Tilapia and clarias. Students discuss the steps used in stocking ponds with fish	What are the reasons why Tilapia and Clarias are widely considered ideal for pond farming?

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 (CONT'D) **FISH FARMING**	The student will be able to: 5.2.6 describe how to manage a fish pond to obtain a good harvest.	Managing a fish pond: Feeding, water quality, pond maintenance and production control	Students to hold class discussion on the management of a fish pond. (The discussion to include: feeds and feeding regimes: simple test for water quality including colour and pH; routine and periodic care for ponds and ways of controlling production in fish farming)	Discuss how an earth pond should be maintained to give a good yield. Write an essay on the activities involved in managing a fish pond.
	5.2.7 outline the procedure for harvesting mature fish from a pond	Harvesting of fish: - characteristics of a matured fish - time to harvest - methods used in harvesting	-Students identify the characteristics of matured fish. -Guide students to discuss methods used in harvesting fish from ponds. (Discussion should include merits of each method)	Describe two of the methods used for harvesting fish from a pond.
	5.2.8 describe methods of processing and preserving fish.	Methods of processing fish: washing, scaling, gutting, filleting, etc Methods of preservation: smoking, cooking, salting, drying, frying, freezing, canning	Assist students to discuss steps used in processing fish after harvest. (Methods of fish preservation should also be discussed)	

SENIOR HIGH SCHOOL - YEAR 3

SECTION 6

AGRICULTURAL ECONOMICS, AGRIBUSINESS AND EXTENSION

General Objectives: The student will:

1. recognize the importance of marketing as an economic activity in agribusiness.
2. Identify the functions and agents of marketing in agribusiness
3. be aware of the concept, objectives and importance of extension in agriculture.
4. recognize the principles and application of the value chain approach in agribusiness for ensuring food safety and quality

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **MARKETING OF AGRICULTURAL PRODUCE**	6.1.1 explain marketing	Meaning and importance of marketing.	Guide students to discuss the meaning and importance of marketing.	Distinguish between 'market' and 'marketing'. State the importance of marketing in an agricultural enterprise.
	6.1.2 describe the functions of marketing.	Marketing functions	Students to discuss functions of marketing such as assembling, processing, grading, sorting, packaging, storage, transportation, advertising and distribution. **NB**: The importance of marketing functions should be stressed.	What are the functions of the following marketing agents? The producer, retailer, wholesaler, co-operatives.
	6.1.3 identify the agents involved in marketing and describe their roles.	Marketing Agents: - producers - middlemen - consumers - co-operatives - marketing Boards - wholesalers - retailers	Students to discuss the role of the listed agencies in marketing agricultural produce. (The merits and demerits of the various agents to be discussed)	Give two advantages and two disadvantages of the operations of middlemen in the marketing of tomato in your country.
	6.1.4 describe the channels for distributing agricultural produce.	Marketing channels of agricultural produce	Students discuss marketing channels for agricultural produce.	Use a flow chart to illustrate the marketing channel of maize in your country.
	6.1.5 outline the problems associated with marketing of agricultural produce in their country.	Problems associated with marketing of agricultural produce.	Guide students to discuss problems associated with marketing of agricultural produce.	Discuss three (3) problems associated with the marketing of maize in your country.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 2 **AGRICULTURAL EXTENSION**	The student will be able to: 6.2.1 explain the meaning of agricultural extension.	Meaning of agricultural extension	Students brainstorm to bring out the meaning of agricultural extension.	
	6.2.2 outline the importance and objectives of extension in agriculture.	Objectives and importance of agricultural extension	Guide students to discuss the objectives and importance of agricultural extension.	What is agricultural extension? State three objectives of Agricultural Extension.
	6.2.3 outline the roles of various agencies in extension education.	Roles of various agencies in Extension Education: Universities, Research Institutions, Ministry of Food and Agriculture, Non-Governmental Organisations in Extension Education	Assist students to discuss the role of various agencies listed in content in extension education	Give five reasons why agricultural extension is important in agricultural production.
	6.2.4 state the characteristics of an effective extension system.	Characteristics of effective extension system	Discuss the characteristics of an effective extension system.	List the characteristics of an effective extension officer.
	6.2.5 identify the current problems and issues in extension education	Problems and issues in Extension Education.	Discuss current problems and issues in extension education.	Discuss any six problems of Agricultural Extension in Ghana.
	6.2.6 classify methods used in extension teaching.	Extension teaching methods: - individual methods - group methods - mass methods	Guide students to classify and discuss methods used in extension teaching.	What are the individual methods of extension teaching?
	6.2.7 outline the advantages and disadvantages of the methods used in agricultural extension teaching.	Advantages and disadvantages of the various extension teaching methods	Students to discuss the advantages and disadvantages of each extension method. <u>Role play:</u> Students to simulate some of the extension teaching methods in class. **Note**: Invite the local agricultural extension agent to plan and implement an extension activity with students.	Discuss any three extension methods giving their advantages and limitations. Write a report on the extension activity carried out with the agricultural extension agent and farmers in your community.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING/LEARNING ACTIVITIES	EVALUATION
UNIT 3 **THE VALUE CHAIN APPROACH IN FOOD QUALITY AND SAFETY ASSURANCE**	The student will be able to: 6.3.1 define and identify the characteristics of value chain.	Definitions and characteristics of value chain	Guide students to define and discuss the characteristics of value chain.	Explain value chain and describe its characteristics.
	6.3.2 outline the benefits of value chain development .	Benefits of value chain development in agricultural production and marketing	Students to discuss the benefits of value chain in agricultural production and marketing.	Select a value chain and identify the main actors in the chain.
	6.3.3 analyse the principles on which the success and competitiveness of a value chain depends.	Principles of value chain approach and how they influence the competitiveness and success of the value chain selected.	Students to discuss one example of a value chain and how various actors at the various stages can enhance or collapse its success.	Discuss three principles that will guide you to select a particular a value chain
	6.3.4 explain food safety and food quality.	Explanation of food quality and food safety	Guide students to discuss contemporary issues on food quality and food safety	
	6.3.5 explain the importance of standards in food quality and safety assurance in the domestic, regional and international markets	Importance of standards that assure food quality and food safety in the domestic, regional and international markets.	Guide students to discuss why food quality and food safety standards are important and necessary in the domestic, regional and international markets.	Discuss four reasons why school authorities should be concerned with the safety and quality of food served in the school dining hall
	6.3.6 identify some local and international bodies responsible for food quality and safety assurance.	Key players in food quality and safety assurance in Ghana. Example, Food and Drugs Board (Private sector and the public sector key players should be mentioned)	Assist students to identify and discuss major bodies responsible for ensuring food quality and safety in Ghana and in the global market.	
	6.3.7 describe practices for ensuring food quality and safety along the value chain	Food safety practices by national standards and international or standards along the value chain.	Organizes students for a study trip to a nearby food processing factory to observe food safety practices.	
		Local and international bodies responsible for food quality and safety assurance, e.g. Ghana Standards Board (GSB), Plant Protection Regulation Services Division (PPRSD), EPA, Codex Alimentarius Commission (CAC), World Trade Organisation (WTO), International Organization for Standardization (ISO). Examples of some international standards operating in Ghana e.g. Global GAP, British Retail Consortium (BRC).	Students find examples of global food safety and quality standards from the internet and discuss the role and operations.	Students write a report on food safety practices observed at the processing factory visited. List three local and three international bodies responsible for monitoring food standard in the country

FACILITIES / MATERIALS FOR GENERAL AGRICULTURE

GENERAL

1. At least a 2 – hectare plot of farm land
2. A laboratory
3. Approved textbooks
4. First aid box
5. 2 farm assistants (one for crops and one for animals)

Animal Production

a. Video demonstration of castration, dehorning, identification, creep feeding etc.
b. Sheep /goat pen with at least ten (10) animals.
c. Video and pictures of diseased animals and animal diseases, pests/parasites, pathogens
d. A six – unit piggery or a poultry farm (with at least 60 birds}
e. Rabbits / guinea pigs/ grasscutter farm (with at least 20 animals}
f. Video and pictures of different systems of keeping animal

FORESTRY

a. Pictures and CDs of useful plant species and some wild forest animals,
b. Video of forest scenes, video and pictures on uses of timber and non-timber species.
c. videos on processes of deforestation.

CROP PRODUCTION

a. A store for seeds, Fertilizers
b. CDs and pictures of vegetables, field crops, tree and plantation crops, animal feeds (grasses and legumes etc)
c. A crop museum or herbarium
d. Pictures and video clips of crops, good husbandry practices, biological processes in crops, crop diseases and pests
e. Colour pictures and video clips of invasive alien species.

6. Soil
a. rocks samples,
b. Soil augur,
c. Soil pH kit
d. pictures of soil profiles, landscapes, different soil structures, soil texture, eroded soils, types of erosion, mulching and cover cropping
e. a video showing soil composting

7. Economics and Extension
a. Pictures and video clips of agricultural extension agents in action

8. Surveying
a. Pictures of ranging poles, Gunter's chain, measuring tape, prismatic compass, theodolite, dumpy level, abney level, tripod stand, Global Placement System (GPS), Total Station (TS), etc.
b. Video clips on how to use the various instruments , maps and charts

9. Measuring Equipment: Weighing scales (mechanical and electronic), micrometer screw gauges, vernier calipers, garden line, volumetric measures (measuring cylinders, pipettes, burettes, bowls).

AGRICULTURE LABORATORY

Laboratory chemicals, supplies, pesticides e.g. Herbicides, fungicides, fumigants and nematicides

Mechanization

a. Land tilling machines and implements: tractor / power tiller, plough, harrow, slasher, ridger, hoes, cutlasses, pickaxes, mattocks, rakes, hand forks, hand trowels, garden/foot forks, shovels,
b. Storage facilities: refrigerators, Electricity, Tools and equipment store, seed store and agrochemical store, storage barn
c. Maintenance equipment: spanners, screw drivers, pliers, hacksaw and blades, files,
d. Pictures and CDs of all equipment
e. Harvesting equipment e.g.: shears, secateurs, sickle, go-to-hell (cocoa sickle), Malaysian sickle, push trucks, wheel barrows,
f. Other equipment: knapsack sprayer, axes
g. Drainage/ irrigation equipment: Sprinkler, Watering can, pumping machine, P.V.C. pipes