

MINISTRY OF EDUCATION



TEACHING SYLLABUS FOR CROP HUSBANDRY AND HORTICULTURE (SENIOR HIGH SCHOOL 1- 3)

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RATIONALE FOR TEACHING CROP HUSBANDRY AND HORTICULTURE

Agriculture is considered important to the economic development of this nation and its teaching has thus been given prominence in the educational system. The development of a syllabus in Crop Husbandry and Horticulture as an elective at the pre-tertiary level seeks to increase the learner's interest in the subject at an early age and further equip them with basic knowledge in entrepreneurial skills in Crop Husbandry and Horticulture and related vocations.

The study of Crop Husbandry and Horticulture helps the student to combine general knowledge with practical-oriented skills and further lays the foundation for further training in the subject at the tertiary level.

GENERAL AIMS

This syllabus is designed to help students to:

1. recognize the factors that affect crop production
3. acquire knowledge of the botany of various arable and horticultural crops
3. apply knowledge of propagation, cultivation and use of various arable and horticultural crops.
4. improve agricultural productivity by effective management of arable and horticultural crop enterprises.
5. produce crops from the six food groups that contribute to good health.
6. work toward accomplishing national self-reliance in food production.
7. acquire knowledge and skills in processing, preservation, storage and transportation of crops.
8. develop strategies for dealing with the basic obstacles hindering sustained production of arable and horticultural crops
9. develop interest in home gardening.
10. appreciate the aesthetic values of ornamental plants in landscaping and interior decoration.
11. appreciate the contribution of arable and horticulture crops in the national economy.

SCOPE OF CONTENT

The content of this syllabus has been revised to enhance the professional practice of learners by incorporating an appreciable amount of occupational competencies that will enable learners to practise some aspects of occupations in Crop Husbandry and Horticulture at the end of Senior High School. The course also offers enough knowledge, skills and attitudes that will enable students, after some apprenticeship training, to work on their own or seek employment in the Crop and Horticulture industry. The course also gives enough foundation for those who will go on for further studies in Crop Husbandry and Horticulture and in related areas such as Biology, Botany, Plant Science, etc.

The subject covers the following essential areas of arable and horticultural crop production:

- i. botany of crops
- ii. environmental factors affecting production of crops
- iii. site selection and land preparation
- iv. establishment and maintenance of nurseries
- v. occupational skills in growing crop plants as well as skills for harvesting, processing, packaging, transportation and marketing of produce /products
- vi fundamentals of landscaping, designing, production and marketing of ornamental plants

Professional areas in Crop Husbandry and Horticulture covered by the syllabus may be categorised as follows:

A. CROP HUSBANDRY

- i. Crop Production Hands (labour)
- ii. Crop Production Services ((Sale of inputs)
- iii. Arable and Tree Crop Production (SMEs)
- iv. Arable and Tree Crop Processing (SMEs)
- v. Crop Storage (SMEs)
- vi. Packaging and Transportation (SMEs)

B. HORTICULTURE:

- i. Horticulture Hands (labour)
- ii. Horticultural Services (Sale of inputs)
- iii. House Plant Production
- iv. Landscape Design
- v. Managing Horticultural Enterprises (SMEs):
 - Arboretums
 - Fruit Crop Enterprises and Orchard
 - Vegetable Gardens

PRE-REQUISITE SKILLS AND ALLIED SUBJECTS

Students offering Crop Husbandry and Horticulture must have achieved at least average performance in Integrated Science and Mathematics at the Junior High School level. Interest in crops and horticulture is also vital for success in this course. Students offering this course should study General Agriculture and two other subjects from the options specified under the SHS Elective Agriculture Programme, that is Chemistry, Physics and Mathematics.

ORGANISATION OF THE SYLLABUS

The syllabus has been structured to cover the three years of Senior High School education. Each year's work consists of a number of sections with each section comprising a number of units. The organisation and structure of the syllabus is as follows:

ORGANISATION AND STRUCTURE OF THE SYLLABUS

YEAR 1	YEAR 2	YEAR 3
<p>SECTION 1: VOCATIONS IN CROP HUSBANDRY AND HORTICULTURE(p.42)</p> <p>UNIT 1: Scope and importance of vocations in crop husbandry and horticulture</p> <p>SECTION 2: CULTIVATION OF FIELD CROPS I (p.1)</p> <p>UNIT 1: Factors affecting crop production</p> <p>UNIT 2: Characteristics and importance of field crops</p> <p>UNIT 3: Distribution of field crops in West Africa</p> <p>UNIT 4: Breeding of field crops</p> <p>UNIT 5: Production of Cereal crops</p> <p>UNIT 6: Production of Leguminous crops</p> <p>SECTION 3: CULTIVATION OF FRUIT CROPS I (p.8)</p> <p>UNIT 1: Fruit crops - characteristics, distribution and environmental requirements</p> <p>UNIT 2: Land preparation and Techniques for raising fruit crops</p> <p>UNIT 3: Fruit crops - harvesting, handling and marketing</p>	<p>SECTION 1: CULTIVATION OF FIELD CROPS II (p.16)</p> <p>UNIT 1: Production of Root and Tuber crops</p> <p>UNIT 2: Cotton Production</p> <p>UNIT 3: Cultivation of sugar cane</p> <p>SECTION 2: CULTIVATION OF FRUIT CROPS II (p.1)</p> <p>UNIT 1: Cultivation of specific Fruit Crops</p> <p>SECTION 3: PRODUCTION OF VEGETABLE CROPS (p.25)</p> <p>UNIT 1: Importance of vegetable crops</p> <p>UNIT 2: Types of vegetable crop production systems in West Africa</p> <p>UNIT 3: Environmental requirements</p> <p>UNIT 4: Site selection and land preparation</p> <p>UNIT 5: Nursery and cultural practices in vegetable crop production.</p>	<p>SECTION 1: CULTIVATION OF TREE CROPS (p. 33)</p> <p>UNIT 1: Characteristics of tree crops</p> <p>UNIT 2: Environmental requirements and Plant Adaptations</p> <p>UNIT 3: Land Preparation and Techniques for raising tree crops</p> <p>UNIT 4: Tree crops - harvesting and post-harvest handling</p> <p>UNIT 5: Production of specific tree crops</p> <p>SECTION 2: LANDSCAPING(p.40)</p> <p>UNIT 1: Scope and Importance of Landscaping</p> <p>UNIT 2: Fundamentals of Landscaping</p>

YEAR 1		YEAR 2		YEAR 3	
SECTION 3:	RAISING ORNAMENTAL PLANTS (p.11)	SECTION 3:	PRODUCTION OF VEGETABLE CROPS CONT'D (p.28)	SECTION 3:	ENTREPRENEURSHIP IN CROP HUSBANDRY AND HORTICULTURE
UNIT 1:	Characteristics of common Ornamental Plants	UNIT 6:	Cropping patterns in vegetable cultivation	UNIT 1:	Establishing enterprises in crop husbandry and horticulture
UNIT 2:	General functions of Ornamental Plants	UNIT 7:	Harvesting, seed production and post-harvest handling		
UNIT 3:	Propagation of Ornamental Plants	UNIT 8:	Cultivation of specific vegetable crops		
UNIT 4:	Types and management of House Plants				
UNIT 5:	Establishment and management of Lawns				
UNIT 6:	Establishment and management of Hedges				
UNIT 7:	Establishment and management of Beds and Borders				

TIME ALLOCATION

A minimum of six periods of teaching and practical work must be allocated for Husbandry and Horticulture per week, with each period lasting for 40 minutes. Of the six periods, three should be devoted to practical work and three to theory.

SUGGESTIONS FOR TEACHING THE SYLLABUS

Crop Husbandry and Horticulture is a subject in the Elective Agriculture programme for Senior High School. The syllabus has been revised and new issues integrated. This syllabus may therefore contain concepts that are new to the teacher and especially to students. It is important to read this section very carefully to be able to follow the sequence of steps and processes suggested for effective teaching and learning.

Teachers should identify resource persons who will assist them to teach some of the topics which they may find difficult to teach. Classroom activities should be supplemented with practical work, field trips and attachment to crop husbandry and horticulture related institutions and farms.

Schools are encouraged to have farms for practical activities in crop husbandry and horticulture. Some teaching-learning materials on crop husbandry and horticulture such as crop specimens, horticultural plants, agricultural machinery, irrigation tools and equipment may be available on farms, university faculties of

Agriculture, Department of Parks and Gardens, agricultural research stations, Ghana Irrigation Development Authority (GIDA), and Plant Genetic Resource Centre at Bonsu. Teachers need to organise field trips to these facilities, undertake projects specified in the syllabus for students to have experiential learning. The projects must be supervised, evaluated and graded. Students are also encouraged to attach themselves to farms and crop husbandry and horticulture institutions for experiential learning during holidays. Students should write and present reports on field trips and attachment. Teachers should evaluate and grade the reports as part of School-Based Assessment (SBA).

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 the section, go back and read the general objectives again to be sure you have covered the objectives adequately in the course of your teaching.

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.

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". 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. In a few cases the content space has been left blank. You should, as much as possible, add to the information provided by reading from books and other sources, and contributing your own experiences to the instructional process.

Column 4 -Teaching and Learning Activities (T/L): T/L activities that will ensure maximum student participation in the lessons are 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 able to apply their knowledge in dealing with issues both 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. You are encouraged to use teaching aids, visits and resource persons for effective delivery of lessons.

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 Crop Husbandry and Horticulture 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

A central aspect of this syllabus is the concept of profile dimensions that should be the basis for instruction and assessment. More than one dimension constitute a profile of dimensions. A 'dimension' is a *psychological construct* for describing a particular learning behaviour. Profile dimensions describe the underlying behaviours or abilities students are expected to acquire as a result of having gone through a period of instruction.

Profile dimensions are derived from the cognitive, affective and psychomotor domains of educational objectives. From the cognitive domain, two profile dimensions are developed; namely Knowledge and Understanding (KU) and Application of Knowledge (AK). The affective domain covers beliefs, attitudes and values. The psychomotor domain covers physical and combined skills normally referred to as process skills or practical skills. Specific objectives used in developing syllabuses or training programmes describe behaviours to be exhibited by learners after going through a learning process. A specific objective represents attributes of learning from one or more of the domains of educational objectives.

For example, the statement of a specific objective is 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" from the cognitive domain. Being able to explain, summarise, 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 specific objectives in this syllabus contains an "action verb" that 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 and learning in schools. Read each objective carefully to know the profile dimension toward which you have to teach.

DEFINITION OF PROFILE DIMENSIONS

As already stated, profile dimensions describe the underlying behaviours for teaching, learning and assessment. In crop husbandry and horticulture, the three profile dimensions that have been specified for teaching, learning and testing are:

Knowledge and Understanding	20%
Application of Knowledge	30%
Attitudes and Practical Skills	50%

Each of the dimensions has been given a percentage weight that should be reflected in teaching, learning and testing. The weights, indicated on the right of the dimensions, 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 Crop Husbandry and Horticulture is 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

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 parts etc., recognize unstated assumptions and logical fallacies, recognize inferences from facts etc.

Innovation/
Creativity - The ability:
synthesize or put different 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 Senior High School level begin with the word “Discuss”. Discuss belongs to the evaluation thinking skill and implies the ability to analyze, compare, contrast, make a judgement etc. The word “discuss” asks for a variety of thinking skills and is obviously a higher 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 after they have left secondary school, it will be very helpful if you would emphasize discussion questions etc. both in class and in the tests you set.

Competency Based Learning

Competency Based learning is a combination of knowledge, skills, and the ability to use tools and equipment for accomplishing work to acceptable standards in the industry. Competency includes cognitive and practical skills as well as attitudinal and other personality characteristics. These characteristics include principles of social orientation that is the core values of honesty, fairness, reliability, trustworthiness, cooperation and support as well as the ability to relate well with people. Competency Based Learning has been adopted for teaching and learning practical subjects.

Competency Based Learning requires students to perform tasks by using relevant knowledge, skills, and tools to achieve specified targets within specified times. The case study approach in teaching and learning is particularly suitable in providing students with situations which they could emulate to reach high levels of professional practice.

Competence involves *application of knowledge* in a significant range of work activities, performed in a variety of contexts/activities which may be complex or not routine and there is some individual responsibility or autonomy. Collaboration with others perhaps through membership of a work group or team may often be a requirement. Personal accountability for analysis, diagnosis, design, planning, execution and evaluation of task may also be required.

Attitudes and Practical Skills (APS)

Attitudes and Practical skills form the third profile dimension in practical or vocational subjects. They are competencies or abilities required for performing satisfactorily in a job. Performance is a reflection of skills. Four types of skills are identified in job performance:

1. Intellectual skills
2. Psychomotor skills
3. Social skills
4. Attitudes

Intellectual skills

Intellectual skills in job performance are also referred to as perceptual skills. They enable a person to conceptualise performance. Conceptualisation is a mental skill which depends largely on one’s cognitive abilities. One needs to conceptualise and visualise an action before it is performed. For example, one needs to know the names of all rice varieties in a given country, describe the characteristics of the rice varieties before being able to identify an abnormality in a particular rice plant.

Psychomotor skills

Psychomotor skills refer to motor activities which are performed with an intention. It needs coordinated movement of hand, body and muscles, mental abilities and intention to guide movement. They involve demonstration of manipulative skills in using tools, machines and equipment to carry out practical operations and to solve practical problems. The element of thinking is much needed in movement in order to perform a given task better.

Examples of activities involving psychomotor skills include:

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 in Crop Husbandry and Horticulture. The teacher should ensure that students acquire a high level of proficiency in the use of tools and equipment relevant to the field of Crop Husbandry and Horticulture.

Observation: The student should be able to use his/her senses to make accurate observations. He/she should, for instance, 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 accurate measurements of 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 teaching and assessment of psychomotor skills should involve practical experiences at work sites, field work, experiments, projects, case studies and field studies.

Social skills

Social skills refer to activities which are performed in a given social context. For example, interviewing people for information involve social skills. The effectiveness of interviewing people for information, does not only depend on the verbal fluency of an interviewer, but largely on how well the interviewer approaches the

interviewee, how accurate the interviewer was in selecting an interviewee. It is not the content of the interview but how one conducts the interview. Examples of social skills include effective communication with farmers, good relation to the farmer when conducting an interview, understanding farmers indirect expressions, etc.

Attitudes

Attitudes are feelings one develops towards something. The feelings can be positive or negative. An individual who has positive attitude to work can derive happiness from his or her work. S/he enjoys the job and is willing to do more, makes clients feel more attached, values the individual and services rendered.

A person with negative attitudes to work does a job only as a means of livelihood. S/he achieves no job satisfaction, has poor results and has clients who are unhappy with him or her. Attitudes influence job performance, education and training in agriculture should be geared to cultivating positive attitudes to agricultural work.

Assessment of Attitudes and Practical Skills

Process Assessment: The processes or steps (sub-skills) involved in performing a task are observed and rated with marks or letter grades. In awarding marks or grading, the performance of the learner is judged by comparing with the indicator of acceptable performance. In judging, depending on the type of sub-skill, if learner performance matches with the indicator of acceptable performance a grade A is given, grade B is awarded if performance is acceptable but below the indicator standard. Grade C is given if achieved performance is below the indicator and is unacceptable. The three-level grading system is adopted if the sub-skills are not crucial for successful performance of the whole task. If the sub-skills are crucial for achieving successful task performance, then a two level grading type is used. In such cases, an A is awarded for successful performance and a B is given for unsuccessful performance.

Product Assessment: The quality of a finished product is assessed using the criteria describing the quality standards of the product. Marks or grades are awarded depending on the level of match between the criteria for assessment of the product.

Proficiency Assessment: In this, the quality of a product or task and the speed used in performing the task are crucial. The two level grading system is normally used. For example, after students have learned and acquired the skills in castrating pigs, a number of piglets are given them to castrate within a specified time frame. Students who complete the assignment successfully within the time period obtain grade A, while those who fail to castrate the animals successfully or did not meet the time limits get grade B. In other words, students who obtain grade B are not proficient in performing the task.

The action verbs provided under the 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 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 on the next page shows an examination consisting of three papers, Paper 1, Paper 2, Paper 3 and Continuous assessment. 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 continuous assessment 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 continuous assessment 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 about 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 100, and school-based assessment or continuous assessment is marked out of 150, giving a total of 400 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	SBA	Total Marks	% Weight of Dimension
Knowledge and Understanding	40	20	-	20	80	20
Application of Knowledge	20	70	-	30	120	30
Attitudes & Practical Skills	-	-	100	100	200	50
Total Marks	60	90	100	150	400	
% Contribution of Papers	15	35	20	30		100

You will note that Paper 1 has a contribution of 15% to the total marks; Paper 2 has a contribution of 35% to the total marks; Paper 3 has a contribution of 20%, and School-Based Assessment (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 400, 80 marks, equivalent to 20% of the total marks, are allocated to Knowledge and Understanding. 120 marks, equivalent to 30% of the total marks are allocated to Application of Knowledge and 200 marks, equivalent to 50% are allocated to Attitudes and Practical Skills. The weight of each of the three dimensions is indicated in the last column. The ratio of theory to practice in the Crop Husbandry and Horticulture is 50:50.

WAEC's examination structure at the WASSCE consists of two papers in Crop Husbandry and Horticulture. Paper 1 includes 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 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-Term 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

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.

In assigning grades to students' test results, you may apply the above grade boundaries and the descriptors which indicate the meaning of each grade. The grade boundaries are also referred to as grade cut-off scores. 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.

SENIOR HIGH SCHOOL – YEAR 1

SECTION 1

VOCATIONS IN CROP HUSBANDRY AND HORTICULTURE

General Objectives: The student will:

1. recognise vocations and prospects within Crop Husbandry and Horticulture.
2. appreciate the range of skills in practising careers in Crop Husbandry and Horticulture

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 SCOPE AND IMPORTANCE OF VOCATIONS IN CROP HUSBANDRY AND HORTICULTURE	The student will be able to: 1.1.1 identify and describe Careers in Crop Husbandry and Horticulture. 1.1.2 identify, describe and perform tasks in local crop husbandry and horticultural occupations.	Scope of vocations in Crop Husbandry and Horticulture: i. International careers ii. Local careers - Proprietor/Proprietress of SMEs - Managers/Manageress of SMEs - Operatives Description and performance of tasks in crop husbandry and horticultural occupations: Produce marketers - middlemen/women -market-women/men -exporters - importers	Students to: - use digital content to identify international careers in crop husbandry and horticulture - describe international career pathways in crop husbandry and horticulture - conduct a survey and identify crop husbandry and horticultural Small and Medium Enterprises (SMEs) in their locality - interview the persons (listed in content) working in these SMEs and gather information on: i. background information (age, sex, educational qualification, previous training and number of years in the job. ii. how they got the idea to start the jobs iii. source of capital for starting the job iv. list of job tasks v. the steps in performing the tasks vi. benefits derived from the job vii. level of satisfaction achieved in practising the job viii. future prospects in the job - write and present reports on the survey	Discuss a career in crop husbandry or horticulture of your interest?

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 1 (CONT'D)</p> <p>SCOPE AND IMPORTANCE OF VOCATIONS IN CROP HUSBANDRY AND HORTICULTURE</p>	<p>The student will be able to:</p> <p>1.1.3 identify and describe the jobs of crop Husbandry and Horticulture Service Providers.</p> <p>1.1.4 state the role vocations in Crop Husbandry and Horticulture play in personal and national development.</p>	<p>Husbandry and Horticulture Service Providers: Agents of agricultural services and Supplies; fertilizer/seeds/ pesticide sellers, tractor service providers, extension officers, etc</p> <p>Importance of vocations in Crop Husbandry and Horticulture in development: Personal: -source of income -improved social status and livelihood - a secure future National: -human resource development and job creation -food security -improvement of national health and environmental beauty -production of raw material for the industrial sector -increased tax revenue and foreign exchange earnings</p>	<p>Students to:</p> <p>- attach themselves to SMEs for experiential learning</p> <p>Project: - identify and interview Crop Husbandry and Horticulture Service Providers as listed in content. They should gather the following information, analyse, write and present reports: - types of inputs/service, steps in setting the enterprises, sources of supply of the inputs, day to day tasks they perform and the level of satisfaction they derive.</p> <p>- discuss the importance of the SMEs to the individual, communities and the nation as listed in content.</p>	<p>Write a report for presentation on the experiences gained during the period you were attached to an SME.</p> <p>Describe five benefits derived from SMEs</p> <p>Write an essay on the importance of Service Providers in Crop Husbandry and Horticulture.</p>

SENIOR HIGH SCHOOL – YEAR 1

SECTION 2

CULTIVATION OF FIELD CROPS I

General Objectives: The student will:

1. recognise the factors that affect crop production
2. appreciate the importance of Invasive Alien Species in crop production
3. recognise field crops and appreciate their socio-economic importance
4. recognise the importance of observing food quality standards in food crop production
5. understand the basic principles underlying the production and handling of field crops
6. produce cereals and legumes

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 FACTORS AFFECTING CROP PRODUCTION	The student will be able to: 2.1.1 explain how biotic and abiotic factors affect crop growth, development and yield.	Factors affecting crop production: i. Biotic Factors (a) Invasive Alien Species, eg. <i>Chromolaena odorata</i> , <i>Lantana camara</i> , etc. (b) Parasitic Plants: eg: <i>Striga</i> (c). Pests of crops: <i>Larger Grain Borer</i> ii. Abiotic Factors: solar radiation, temperature, wind, rainfall, edaphic, and inorganic elements.	Students to: - brainstorm to give examples of factors which affect crop production - discuss the characteristics of Invasive Alien Species in crop production - describe how each factor influences crop growth, development and yield.	List five factors and explain how they influence crop growth, development and yield. Discuss the economic importance of Invasive Alien Species in crop production.
UNIT 2 CHARACTERISTICS AND IMPORTANCE OF FIELD CROPS	2.2.1 explain the term field crops and describe their characteristics. 2.2.2 identify field crops by their common and scientific names.	Characteristics of field crops	- give examples of field crops - brainstorm to explain the term field crops - describe the general attributes of field crops in terms of growth habit, spacing and intensity of cultivation. - use digital content / real specimens to identify field crops by their common and scientific names and describe their characteristics.	What do you understand by the term field crops. List the similarities and differences between the characteristics of maize and cowpea

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 2 (CONT'D)</p> <p>CHARACTERISTICS AND IMPORTANCE OF FIELD CROPS</p>	<p>The student will be able to:</p> <p>2.2.3 classify field crops according to their uses and life cycle.</p>	<p>Classification of field crops.</p> <p>Staple food crops - further grouped under:</p> <ol style="list-style-type: none"> 1. Cereals (maize, rice, sorghum, millet, wheat etc.) 2. Grain legumes (cowpea, groundnut, bambara beans groundnut, soybean, lima bean, pigeon bean, broad bean, jack bean, sword bean, winged bean etc.) 3. Root & tuber crops (cassava, sweet potato, yam, cocoyam, Irish potato, Frafra potato) and 4. Plantains <p>Special purpose field crops - further grouped under:</p> <ol style="list-style-type: none"> 1. Fibre crops (cotton, jute, kenaf, roselle, sisal hemp, flax, etc.) 2. Spice crops (ginger, black pepper) 3. Sugar crops (sugarcane) 4. Oil crops (sunflower) 5. Medicinal crops (moringa, aloe,) 6. Aromatic crops (citronella, lemon grass) 7. Fumitories (tobacco) 8. Masticatories (tigernut) 	<p>Students to :</p> <ul style="list-style-type: none"> - classify field crops on the basis of uses and life cycle. - identify and describe the main parts of a plant that has economic value <p>NB: classification based on uses should cover what is in content. Classification based on life cycle should cover annuals, biennials and perennials.</p> <p>-describe economic parts of the special field crops.</p>	<p>Write an essay on the importance of field crops.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 3</p> <p>FOOD CROP QUALITY AND SAFETY STANDARDS</p>	<p>The student will be able to:</p> <p>2.3.1 describe food crop quality and safety standards and how they are maintained</p> <p>2.3.2 analyse the effects of poor quality crop products on human health</p>	<p>Food Crop Quality and Safety Standards</p> <p>Fresh/Dried / Processed Crop Products:</p> <ul style="list-style-type: none"> - Appearance - Absence of bad odour and flavour - Absence of Agro-chemicals - Acceptable levels of residual agro-chemicals - Absence of living or dead organisms, - Absence of foreign matter, - Absence of moulds, - Absence of faecal matter. <p>Maintenance of quality and safety standards:</p> <ul style="list-style-type: none"> -practice organic farming -use of herbal pesticide -observe pesticide manufacturers' instructions in applying the pesticide -application of correct dosage -observance of time between application and harvest and use -Cleanliness of harvested crop product -cleanliness in packaging, handling and transportation <p>Effects of poor food crop quality on human health</p> <ul style="list-style-type: none"> -pesticide poisoning -infertility - Illness -death, etc. 	<p>Students to:</p> <ul style="list-style-type: none"> - brainstorm to explain the term Food crop product quality - list and describe food crop quality and safety standards - discuss how the quality standards are maintained <p>Project:</p> <p>In groups students conduct a survey of food crop product quality and safety standards in the locality by interviewing farmers processors and consumers. They should find out the extent to which food crop quality standards are observed in the locality and the effects of consuming poor food crop products on health.</p> <p>-use the Futures Wheel to trace the consequences of consuming poor quality food crop products.</p>	<p>Explain the term Food crop quality and safety standards.</p> <p>Outline the procedures in obtaining high quality food crop products</p> <p>Explain five effects of consuming poor quality food crop products on human and animal health.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 6</p> <p>PRODUCTION OF CEREAL CROPS</p>	<p>The student will be able to:</p> <p>2.6.1 classify various types of cereal crops.</p> <p>2.6.2 describe the botanical attributes of cereal crops</p> <p>2.6.3 differentiate between the various cereals on the basis of their botany.</p> <p>2.6.4 match cereal crops with the agro-ecologies suitable for their cultivation.</p> <p>2.6.5 plan and carry out all the land preparation and cultural practices for the production of each cereal crop.</p>	<p>Identification and classification of cereal crops (maize, rice, sorghum, millet)</p> <p>- Botany: structures of root, stem, leaves, panicles, and grains.</p> <p>- Botanical classification of cereal crops - Common varieties of various cereal crops.</p> <p>Geographical distribution, soil and climatic requirements of cereal crops (maize, rice, sorghum and millet).</p> <p>Cultivation of cereal crops (maize, rice, sorghum and millet)</p> <p>Methods of: - land preparation, quality seed selection, seed sowing</p> <p>Cultural practices: supplying, thinning, weeding, Irrigation, fertilizer application, pests and disease control</p>	<p>Students to:</p> <p>- classify cereal crops under kingdom, division, sub-division, class, order, family, genus, species and varieties.</p> <p>- use digital content / real specimens to identify and describe the morphological characteristics of the specified cereal crops. - prepare an album on cereals providing both common and scientific names of each specimen. - draw and label parts of the specified cereal crops - draw and label transverse sections of cereal grains</p> <p>- list and compare the characteristics of various varieties of cereal crops</p> <p>Project: - grow seeds of different varieties of cereal crops and observe them for root, stem, leaf, panicle and seed characteristics. - prepare reports on project</p> <p>- discuss the soil and climatic requirements for specific cereals. -describe the methods of land preparation, sources and qualities of a good seed, and cultural practices listed in content, for the production of the different cereal crops.</p> <p>- prepare farmland (25m X 25m plot) to grow cereals using recommended practices discussed above. -perform and describe the cultural practices in cereal crop production.</p> <p>- use digital content to observe and identify pests and diseases on the crop and describe measures to control them</p>	<p>Make a collection of varieties of cereals and list their scientific names.</p> <p>Draw and label the parts of a named cereal plant Draw and label the transverse section of a named cereal grain.</p> <p>Prepare a farm diary and record all observations and activities carried out on the cereal plot in the school farm.</p> <p>-discuss how agro-ecologies influence the production of cereal crops</p> <p>Draw and label a named pest each of maize and sorghum</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 6 (CONT'D)</p> <p>PRODUCTION OF CEREAL CROPS</p>	<p>The student will be able to:</p> <p>2.6.6 harvest cereal produce, process it for storage and describe their common uses</p> <p>2.6.7 describe the importance of value chains in cereal crop production and marketing.</p> <p>2.6.8 identify and describe careers in cereal crop production and utilisation</p>	<p>- Signs of maturity, methods of harvesting and processing of cereal crops</p> <p>- Uses of cereal crops</p> <p>Value chains in cereal crop production and marketing</p> <p>Careers in Cereal Crop Production and utilisation</p> <p>- International Careers: Handlers and Exporters</p> <p>- Local Careers: Warehouse Managers, Processors, Cereal Crop Farmers, Cereal Crop Vendors.</p>	<p>Students to:</p> <p>NB: Teacher to organise a field trip for students to observe and identify pests and diseases on the crops</p> <ul style="list-style-type: none"> - interview farmers and prepare and present reports on how farmers control the diseases and pests - describe the life cycle of stem borer (<i>Busseola fusca</i>) - draw and label the life cycle of the stem borer (<i>Busseola fusca</i>) - describe the signs of maturity of each crop. - describe the methods of harvesting, processing and storage - demonstrate harvesting, grain processing and storage for the crops - discuss the uses of the various cereal crop produce including the main economic produce, green harvests and stubble. - Discuss how cereal crops contribute to the health and economic development of the nation. - discuss the importance of value chains in cereal crop production and marketing. - use digital content to identify international careers in Cereal Crop Production and utilisation - describe international career pathways in Cereal Crop Production: - conduct a survey and identify Cereal Crop Production: Small and Medium Enterprises (SMEs) in their locality 	<p>Compile a list of pests and diseases observed in the field.</p> <p>Project:</p> <p>Students in groups should establish a cereal crop farm, manage, harvest and market the produce. Students to write and present individual reports on the project.</p> <p>Draw a flow chart and indicate the players in cereal crop value chains</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 6 (CONT'D) PRODUCTION OF CEREAL CROPS			<p>Students to:</p> <ul style="list-style-type: none"> - interview the persons (listed in content) working in these SMEs and gather information on: <ul style="list-style-type: none"> i. background information (age, sex, educational qualification, previous training and number of years in the job. ii. how they got the idea to start the jobs iii. source of capital for starting the job iv. list of job tasks v. the steps in performing the tasks vi. benefits derived from the job vii. level of satisfaction achieved in practising the job viii. future prospects in the job - write and present reports on the survey - attach themselves to SMEs for experiential learning 	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 7 PRODUCTION OF LEGUMINOUS CROPS	<p>The student will be able to:</p> <p>2.7.1 identify various grain legume crops.</p> <p>2.7.2 differentiate between grain legume crops on the basis of their botany.</p> <p>2.7.3 differentiate between the ecological requirements of various grain legumes.</p> <p>2.7.4 plan and carry out all the land preparation and cultural practices required for the establishment of each leguminous crop production.</p>	<p>Identification of grain legume crops:</p> <p>Botany of grain legumes (cowpea, groundnut, soyabean and bambara beans)</p> <p>Soil and climatic requirements of cowpea, groundnut, bambara beans and soyabean .</p> <p>Land preparation methods. Slashing, ploughing, harrowing mounding, ridging.</p> <p>Cultural practices</p> <ul style="list-style-type: none"> - Seed selection and sowing - supplying - thinning - weeding - fertilizer application - pest and disease control 	<p>Students to :</p> <ul style="list-style-type: none"> - use digital content / real specimens to identify and describe characteristics of legume crops with special reference to morphology. - prepare an album of leguminous field crops and indicate both common and scientific names of each item. - draw and label parts of legume crops - examine and describe the characteristics of the various varieties of legume crops in content - draw and label transverse sections of legume grains. <p>Project:</p> <ul style="list-style-type: none"> - grow different varieties of a legume crops and observe them for stem, leaf, root, pod and seed characteristics. (Note the presence or absence of the number and structure of root nodules). - discuss the soil and climatic requirements for specific legume crops. - describe the methods of land preparation, sources and qualities of a good seed, and cultural practices listed in content, for the production of the different legume crops. - prepare farmland to grow legumes using recommended practices discussed above. - describe and perform the cultural practices in legume crops - use digital content to observe and identify pests and diseases of the crops and describe measures to control them 	<p>Make a collection of field crop legumes and their scientific names</p> <p>Draw and label the vegetative and floral parts of a typical legume plant.</p> <p>Draw and label the transverse section of a named legume seed.</p> <p>Draw and label root of a legume crop showing nodules.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 7 (CONT'D) PRODUCTION OF LEGUMINOUS CROPS	<p>The student will be able to:</p> <p>2.7.5 match the correct stages of maturity with techniques for harvesting, seed processing and storage.</p> <p>2.7.6 describe the uses of leguminous crops</p> <p>2.7.7 describe the importance of value chains in legume crop production and marketing.</p>	<p>Harvesting and handling of legumes.</p> <p>Uses of cereal crops</p> <p>Value chains in cereal crop production and marketing</p>	<p>Students to:</p> <ul style="list-style-type: none"> - describe the life cycle of the bruchid, <i>Callosobruchus maculatus</i> - draw and label the life cycle of the bruchid, <i>Callosobruchus maculatus</i> <p>NB: Teacher to organize a field trip for students to observe and identify pests and diseases on the crops</p> <ul style="list-style-type: none"> - interview farmers and prepare and present reports on how farmers control the diseases and pests. - demonstrate the control of pests and diseases in legume crops, emphasis on the use of organic and integrated pest management. <ul style="list-style-type: none"> - describe the stages and signs of maturity of each crop - discuss the problems associated with too early or too late harvesting of legume crops - describe the techniques of harvesting, processing and storage of grain legumes - demonstrate harvesting, grain processing and storage of the crops - attach themselves to legume crop farmers for experiential learning <p>-discuss the uses of the various legume crop produce including the main economic produce.</p> <p>-discuss the importance of value chains in legume crop production and marketing.</p> <p>-explain the linkages of value addition and explore the careers in legumes production</p>	<p>Compare groundnut and soyabean on the following requirements: rainfall, humidity, temperature, light intensity and soil texture.</p> <p>Compile a list of pests and diseases observed in the field.</p> <p>Project: Students establish legume crop farm and, manage, harvest and market produce. Students write reports on the project.</p> <p>Write and present attachment reports</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 LAND PREPARATION AND TECHNIQUES OF RAISING FRUIT CROPS	<p>The student will be able to:</p> <p>3.2.1 prepare land for the cultivation of fruit crops.</p> <p>3.2.2 raise quality fruit crop seedlings/ planting materials for sale.</p> <p>3.2.3 transplant seedlings and care for plants in orchards.</p>	<p>Land preparation: slash and burn, windrow ,lining and pegging, and preparation of holes.</p> <p>Pre-nursery and nursery practices in fruit crop production:</p> <ul style="list-style-type: none"> - nursing -raising seedlings, - budding and grafting -watering, shading, etc. <p>Planting out:</p> <ul style="list-style-type: none"> - planting at stake - transplanting - intercropping <p>General maintenance of fruit crop farms</p> <ul style="list-style-type: none"> - Weeding - Mulching - Pruning - Fertilizer application - Pest and disease control - invasive alien species control 	<p>Students to:</p> <ul style="list-style-type: none"> - describe the different methods of land preparation suitable for various kinds of fruit crops. - explain why nursery practices are adopted in raising most fruit crops - describe the nursery practices in fruit crops production. - explain why budding and grafting are adopted in raising fruit crops - demonstrate budding and grafting - use digital content / real specimens to- identify and describe various types of planting materials (Slips, Suckers, seeds, budded seedlings, etc) used for establishing fruit crops. - describe planting patterns (square, rectangular and triangular) and steps in lining and pegging - demonstrate methods of lining and pegging - describe steps and factors to be considered in transplanting fruit crop seedlings. - describe general maintenance practices in fruit crop production -demonstrate pruning of fruit trees and give reasons for the practice. <p>NB: Teacher to organize field trips for students to observe and carry out the various management practices in fruit crop plantations.</p>	<p>List the various types of planting materials used for fruit crop production, and indicate the crop each type is used for.</p> <p>Discuss the importance of the following practices in fruit crop production: Lining and pegging, Budding, grafting Pruning</p> <p>Calculate the population of plants per hectare assuming the plantation was established with the recommended planting distance of 4m x 4m</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 FRUIT CROPS - HARVESTING, HANDLING AND MARKETING	<p>The student will be able to:</p> <p>3.3.1 appraise the importance of the time and period for harvesting fruit crops.</p> <p>3.3.2 state the uses and nutritional importance of fruits in the diet.</p> <p>3.3.3 describe post-harvest handling procedures for managing fruits.</p> <p>3.3.4 state the channels to local and export markets.</p>	<p>Signs of maturity in fruits:</p> <ul style="list-style-type: none"> - colour - size, - scent /aroma. <p>- Nutritional constituents</p> <p>Post harvest handling</p> <ul style="list-style-type: none"> -Transporting - Sorting - Grading - Washing - Packaging - Processing - Storage <p>Marketing</p> <ul style="list-style-type: none"> - Channels - Quality standards (value chain) for the local and export markets. 	<p>Students to:</p> <ul style="list-style-type: none"> - discuss the importance of rodents, birds, insects (eg. fruit borers), mistletoe and invasive alien species in fruit production - describe signs of maturity in fruit crops - discuss the importance to harvest fruit crops on time - emphasis as sources of vitamins, minerals, fibre, anti-oxidants and phytonutrients for human development - explain the importance of each of the post-harvest handling operations listed in content. - describe steps in post harvest handling procedures as listed in content - demonstrate post harvest handling procedures as listed in content <p>NB: Teacher to organise field trips to nearby fruit crop farms and processing factories for students to observe the handling and processing of harvested fruits. Students to write and present reports on the field trip</p> <ul style="list-style-type: none"> - describe the marketing channels, quality and safety standards for each fruit crop for local and export markets.(emphasis on value addition) <p>NB: Teacher to show a film on local and export marketing of fruit crops to students for discussion.</p> <ul style="list-style-type: none"> - attach themselves to fruit crop farmers for experiential learning 	<p>Write a report on the growth cycle of a fruit crop on the campus.</p> <p>Discuss the roles of the constituents of fruits in the maintenance of the health of humans beings.</p> <p>Write an essay on the topic, post-harvest handling of fruits.</p> <p>Write and present attachment reports.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 GENERAL FUNCTIONS OF ORNAMENTAL PLANTS	The student will be able to: 4.2.1 select ornamentals plants for appropriate purposes.	Functions of ornamental plants - - beautification - conservation - air purification - giving direction - provision of shade - screening - economic purposes (wreaths, bouquet) - educational purposes, etc.	Students to: - discuss the functions of ornamental plants with emphasis on the effect on human health. - Make an album of ornamental plants and indicate their functions. NB: Teacher to inspect and mark the album developed by students	Discuss the benefits of ornamental plants in relation to human health.
UNIT 3 PROPAGATION OF ORNAMENTAL PLANTS	4.3.1 demonstrate methods of propagating ornamental plants.	Seed propagation - i.collection, purification and maintenance of ornamental seeds ii.nursing and planting at stake Vegetative Propagation - leaf - stem - root - storage structures (bulbs, rhizomes)	- describe ornamental plant propagation methods as listed in content. - give the differences between the propagation methods - match ornamental plants with their propagation methods - use internet search engines to identify and describe the various types of containers and media for propagation - discuss the merits and demerits of the various containers and media for propagation. NB: Teacher to explain the use of growth hormone cuttings.	Discuss the merits and demerits of vegetative propagation in ornamental plants. Describe the propagation methods of the following plants: Marigold, Bachelor's Button, Milk Bush and Madras Thorn. Discuss the advantages and disadvantages of using different types of containers for propagation?
UNIT 4 TYPES AND MANAGEMENT OF HOUSE PLANTS	4.4.1 give examples of the various types of house plants and state their uses.	Types of house plants: - based on morphological features i. foliage plants ii. flowering plants, bulbs and corms, miniature trees, cacti and succulent cut lowers, etc. - based on position in the house i.indoor plants (hanging basket, staging plants, solitary plant	- demonstrate methods of propagating ornamental plants - brainstorm to arrive at the meaning of 'house plants'. - use digital content to identify and describe the features of the various types of house plants. NB: Teacher to organize field trips to ornamental shops and producers of potted plants to enable students identify the various types of house plants and enquire on their uses.	Write group reports on the field trip to an ornamental shop and present to whole class Describe the uses of 10 common house plants.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 4 (CONT'D)</p> <p>TYPES AND MANAGEMENT OF HOUSE PLANTS</p>	<p>The student will be able to:</p> <p>4.4.2 design house plants for various purposes.</p> <p>4.4.3 plant and care for house plants.</p>	<p>ii.outdoor plants (light loving plants, specimen plants) iii. partial (plants in semi-shaded areas of house)</p> <p>Design house plants using containers Types of containers Elements of Design: -Colour, Line, Dot, Texture, Shape/ Form and Space. Principles of design: Balance, Repetition, Contrast, Opposition, Dominance, Rhythm, Unity.</p> <p>Planting and management of house plants: - provision of light, air, water; trimming, pruning, fertilizer application, cleaning and polishing, pests, diseases and invasive alien species control.</p>	<p>Students to:</p> <ul style="list-style-type: none"> - prepare albums on house plants Teacher to inspect and mark the albums. - discuss purposes for keeping plants in the house <p>NB: Teacher to organise a field trip for students to visit a potted plant designer to identify and study the activities s/he performs. Students prepare and present a report on the field trip.</p> <ul style="list-style-type: none"> - discuss the factors to be considered in designing house plants - describe the elements of designing house plants - discuss the principles of design - describe tools for designing house plants - use digital content and describe steps in designing house plants - design house plants in containers for various purposes - use ornamental plants to make wreaths, garlands, bouquet's and other flower arrangements <ul style="list-style-type: none"> - describe planting methods of various house plants - plant house plants - describe various ways of maintaining house plants -identify tools used for performing tasks in maintaining house plants - use digital content and describe the steps in performing the tasks involved in maintaining house plants 	<p>Name and describe the characteristics of three locations in a house for house plants. How do these characteristics influence choice of house plants?</p> <p>What are the reasons for keeping house plants?</p> <p>Name three materials that could be suitably used as containers for house plants.</p> <p>Explain four elements of design. How do they affect the production of house plants?</p> <p>State four principles of designing house plants and explain how they influence the design of house plants.</p> <p>Describe the steps in designing a house plant for Indoor, outdoor and partially-light areas.</p> <p>Name the tools used for pruning and trimming house plants</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 4 (CONT'D) TYPES AND MANAGEMENT OF HOUSE PLANTS	The student will be able to: 4.4.4 market house plants.	Marketing house plants	Students to: - perform the tasks involved in maintaining house plants - attach themselves to Potted Plant Designers for experiential learning. - role-play potted plant marketing scene - discuss the factors involved in marketing house plants - package house plants for transporting - price house plants - market house plants - perform cost/benefit analysis	List and explain three factors in packaging house plants for marketing. Write and present attachment reports. Discuss three factors to be considered in pricing house plants Explain the following terms in establishing lawns: seeding, sprigging, sodding, plugging.
UNIT 5 ESTABLISHMENT AND MANAGEMENT OF LAWNS	4.5.1 establish and maintain lawns.	Establishment of lawns i. site preparation ii. planting materials iii. planting - seed propagation - vegetative propagation (sprigging, sodding, plugging)	- discuss the importance of lawns - discuss the principles involved in the establishment and management of lawns. - use digital content and identify and describe the characteristics of ornamental plants used for lawns. - match lawn grasses with their environmental preferences (shade loving, light loving, partial shade loving), eg: -Carpet grass (<i>Axonopus compressus</i>) -Bermuda/Bahama grass(<i>Cynodon dactylon</i>) -Japanese cushion grass (<i>Zoysia japonica</i>) -Love grass (<i>Chrysopogon aciculatus</i>) - St. Augustine's grass (<i>Stenotaphrum secundatum</i>) - use digital content and prepare an album of plant use for lawns - demonstrate activities involved in establishing a lawn. - establish a lawn in the school.	Outline the measures you will take to establish a lawn on a plot of land measuring 20m by 20m with a big tree in the middle of the plot. Discuss five tasks in maintaining lawns. Describe steps in using a mower for maintaining lawns Discuss the importance of spiking and re-seeding in the maintenance of lawns.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 5 (CONT'D)</p> <p>ESTABLISHMENT AND MANAGEMENT OF LAWNS</p> <p>UNIT 6</p> <p>ESTABLISHMENT AND MANAGEMENT OF HEDGES</p>	<p>The student will be able to:</p> <p>4.6.1 establish and maintain hedges.</p>	<p>Management of lawns</p> <ul style="list-style-type: none"> - watering - weeding/raking - aeration (spiking) - re-seeding - fertilizer application - mowing, - disease and pest control, (invasive alien species control) <p>Characteristics of hedging plants</p> <p>Establishment of hedges:</p> <ul style="list-style-type: none"> - Site preparation - lining and pegging -trench preparation <p>Planting and planting materials:</p> <ul style="list-style-type: none"> - seeds -vegetative parts <p>Management practices e.g.</p> <ul style="list-style-type: none"> - watering - supply - pruning 	<p>Students to:</p> <ul style="list-style-type: none"> - list tasks involved in maintaining lawns - identify and discuss tools and equipment used in maintaining lawns - describe steps in tasks involved in maintaining lawns - demonstrate the use of mowers. - perform tasks involved in maintaining lawns - survey invasive alien species on school lawns. <ul style="list-style-type: none"> - discuss the importance of hedges - use digital content to observe various types of hedges particularly the shapes trimming - identify and describe the characteristics of hedging plants, e.g. Madras thorn, Pride of Barbados, Milk-bush, Hibiscus and Ice plant. - discuss factors to be considered in selecting hedging plants - identify activities involved in the establishment of hedges. - describe the steps in performing tasks in establishing hedges - establish and manage hedges on the school compound. 	<p>Write out in a sequential manner, the steps in performing the following tasks during the establishment of a hedge.</p> <ol style="list-style-type: none"> i. Site preparation ii. lining and pegging iii. trench preparation iv. planting seeds

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 7 (Cont'd) ESTABLISHMENT AND MANAGEMENT OF BEDS AND BORDERS	The student will be able to: 4.7.1 design, prepare and care for beds and borders	Beds and borders: Site preparation Planting - -planting material (seed and vegetative parts) Management - -watering -weed control -pruning and trimming -stirring - fertilizer application - disease and pest control - replacement - invasive alien species	Students to: - brainstorm to explain the terms beds and borders - discuss the differences between beds and borders - explain the principles underlying the design of beds and borders. - discuss the various ornamental plants and materials used for preparing beds and borders. - give examples of plants used in designing beds and borders (edging plants) - design beds and borders (edging plants, stones and concrete) - establish beds and borders - care for beds and borders on the school campus	Explain two differences between a bed and a border. Discuss three principles underlying the establishment of beds and borders. Classify the following plants into either bedding or border plants: i. Zinnia, ii. Bachelor's button, iii. Balsam, iv. Rose v. Odontonema, vi. French marigold

SENIOR HIGH SCHOOL – YEAR 2

SECTION 1

CULTIVATION OF FIELD CROPS II

General Objectives: The student will:

1. cultivate root and tuber crops.
2. establish and maintain cotton and sugar cane farms.
3. use recommended harvesting and post-harvest practices.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 PRODUCTION OF ROOT AND TUBER CROPS	The student will be able to: 1.1.1. differentiate between root and tuber crops	Types of root and tuber crops i.root crops (cassava, sweet potato) ii.tuber crops (yam, cocoyam) Species of yam: <i>Dioscorea rotundata</i> (guinea yam) <i>Dioscorea alata</i> (water yam) <i>Dioscorea cayenensis</i> (yellow yam) <i>Dioscorea dumetorium</i> (bitter yam) <i>Dioscorea esculenta</i> (Chinese yam) <i>Dioscorea bulbifera</i> (aerial yam) <i>Dioscorea praehensilis</i> (bush/wild yam) Species of cocoyam <i>Xanthosoma saggitifolium</i> (tania) <i>Colocasia esculenta</i> (taro)	Students to: - brainstorm to explain the differences between root and tuber crops - use digital content / real specimens to identify and describe the characteristics of root and tuber crops - compare the morphological and anatomical characteristics of root and tuber crops with special emphasis on the formation of storage organs e.g. tuberisation. - visit a yam, cassava, sweet potato or cocoyam farm and observe the morphological characteristics of plants. - classify selected root and tuber crops into: class, order, family, genus, species, varieties and cultivars. - describe the climatic and soil requirements for growing the root and tuber crops listed in content. - select land suitable for root and tuber crops	Discuss three features which distinguish cassava from yam Discuss the distinguishing features of any four species of yam.
	1.1.2 describe the climatic and soil requirements for yam, cassava, cocoyam and sweet potato production.	Ecology - climatic and soil requirements.		Discuss how climatic and soil factors affect the quality and yield of root and tuber crops.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 1 (CONT'D)</p> <p>PRODUCTION OF ROOT AND TUBER CROPS</p>	<p>The student will be able to:</p> <p>1.1.3 prepare land for the production of the selected root and tuber crops.</p> <p>1.1.4 produce various planting materials.</p> <p>1.1.5 plant root and tuber Crops using the recommended spacing.</p>	<p>Land preparation methods – slash, windrow/ burn, mounding, ridging, etc.,</p> <p>Planting materials: stem/vine cuttings, setts, minisett, microsett., regenerated tubers, seedyam bulbils, suckers, tissue culture plantlets.</p> <p>Planting: - recommended spacing - orientation of planting materials.</p>	<p>Students to:</p> <ul style="list-style-type: none"> - describe land preparation methods for root and tuber crop production - prepare land for root and tuber crops using various methods (on the flat, ridges, mounds, in trenches). <ul style="list-style-type: none"> - describe the types of planting materials and how they are produced for the various root and tuber crops (including yam minisett technique and tissue culture) NB: Tissue culture should be simply treated. - demonstrate the techniques for producing the various planting materials for root and tuber crops listed in content <ul style="list-style-type: none"> - describe the recommended spacing for the various crops - plant correctly (orientation of setts and cuttings) roots and tuber crops using recommended spacing. 	<p>Discuss the need for a tool and an implement used in land preparation for the following crops:</p> <p>Sweet Potato, Yam, Cassava, cocoyam</p> <p>Write an essay on the constraints to root and tuber crops production.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) PRODUCTION OF ROOT AND TUBER CROPS	<p>The student will be able to:</p> <p>1.1.6 perform the correct cultural practices in the cultivation of root and tuber crops.</p> <p>1.1.7 harvest the crops without damaging the crop produce and the plant where relevant</p> <p>1.1.8 preserve and process root and tuber crops.</p> <p>1.1.9 outline the uses of root and tuber crops.</p>	<p>Cultural practices – (staking and training, remounding, weeding(invasive alien species), fertiliser application, disease and pest control,</p> <p>Harvesting – Signs of maturity Methods and precautions.</p> <p>Preservation and storage methods (including biological methods)</p> <p>Processing - peeling, slicing, grating, drying, frying/roasting</p> <p>Utilisation - home consumption, animal feed and industrial uses.</p>	<p>Students to:</p> <ul style="list-style-type: none"> - describe the cultural practices for the crops - explain why specific cultural practices are performed for each crop - demonstrate the specified cultural practices for the cultivation of root and tuber crops. - discuss the major pests and diseases and their control. Examples should be cited for each type of crop. Emphasis on integrated pests management. - describe signs of maturity for the crops - discuss harvesting methods and precautions taken during harvesting. - discuss the double harvesting in yam. - explain the basis for piece-meal harvesting - create moist environment for temporary storage of root/ tuber crops - store some root/ tuber crop produce in barns and other structures - describe the techniques of processing root and tuber crops with emphasis on value chain. <p>NB: Teacher to organize field trips to:</p> <ol style="list-style-type: none"> i. processing centres for students to observe processing, curing and storage practices. ii. market places to enable students examine finished products of root and tuber crops. <p>Students to</p> <ul style="list-style-type: none"> - write and present reports on the field trips - demonstrate processing methods for root and tuber crops - establish a sweet potato farm, harvest, cure, process and/or store. - discuss the various uses of root and tuber crops as listed in content in relation to human health. 	<p>Discuss the effects of the various cultural practices on the quality and yield of root and tuber crops.</p> <p>Project: In groups students cultivate the selected root and tuber crops, and practice all the production, harvesting and marketing activities. Students prepare and present reports on the project. Teacher to assess and evaluate the project.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 COTTON PRODUCTION	<p>The student will be able to:</p> <p>1.2.1. identify the species of cotton.</p> <p>1.2.2 describe the climatic and soil requirements for cotton cultivation.</p> <p>1.2.3 explain the distribution pattern of cotton growing areas in West Africa.</p> <p>1.2.4 perform the cultural practices recommended for the growing of cotton.</p> <p>1.2.5 explain the techniques of harvesting and processing of cotton.</p>	<p>Species of cotton - <i>Gossypium herbaceum</i>, <i>Gossypium arboretum</i>, <i>Gossypium hirsutum</i>, <i>Gossypium bardadense</i>, <i>Gossypium peruvianum</i>, <i>Gossypium vitifolium</i></p> <p>Botany – morphological features</p> <p>Ecology - climatic and soil factors for cotton cultivation.</p> <p>Cotton growing areas in West Africa Land Preparation Sowing</p> <p>Cultural practices:- -weed control -fertiliser application -pest and disease control Eg,cotton stainer.</p> <p>Harvesting, ginning and grading</p>	<p>Students to:</p> <ul style="list-style-type: none"> - describe the characteristics of the various species of cotton. - prepare an album of the species of cotton - classify cotton from kingdom, division, sub-division, class, order, family, genus, and species to varieties and cultivars. <p>- describe the root, stem, leaf, fruit and seed of cotton</p> <p>-discuss the environmental and soil factors for cotton.</p> <ul style="list-style-type: none"> - use maps/digital content to describe areas where cotton is grown in West Africa - give reasons why cotton grows in these areas. <ul style="list-style-type: none"> - describe the cultural practices for quality cotton production. - discuss the important pests and diseases of cotton and their control. - draw and describe the life cycle of the cotton stainer - use knowledge of the insect's life-cycle to formulate control measures. <ul style="list-style-type: none"> - describe the processes of harvesting, ginning and grading of cotton. <p>NB: Teacher to organize a field trip to a cotton growing area for students to observe demonstrations on harvesting, ginning and grading of cotton</p>	<p>Distinguish the various species by their major characteristics.</p> <p>Draw the map of West Africa and indicate where cotton is grown.</p> <p>Draw and label the life cycle of the cotton stainer.</p> <p>Students to write a report on a visit to a cotton farm/textile factory</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 CULTIVATION OF SUGAR CANE	<p>The student will be able to:</p> <p>1.3.1 identify the species of sugar cane and describe their morphological characteristics.</p> <p>1.3.2 describe the soil, rainfall and water requirements of sugar cane.</p> <p>1.3.3 plant and care for sugar cane.</p> <p>1.3.4 perform the cultural practices in sugar cane production.</p> <p>1.3.5 identify major factors that affect quality of cane.</p>	<p>Species of sugar cane: <i>Saccharum officinarum</i>, <i>Saccharum barberi</i>, <i>Saccharum sinense</i> and <i>Saccharum edula</i></p> <p>Botany – classification and morphological characteristics.</p> <p>Rainfall, water and soil requirements of sugarcane</p> <p>Land preparation - clearing, ploughing, harrowing, ridging Propagation and planting - Propagating materials - short setts - long setts - soldier setts</p> <p>Planting - spacing, precautions against diseases and pests.</p> <p>Cultural practices - weed control including invasive alien species, earthening –up, fertiliser application, pest and disease control.</p> <p>Factors affecting cane quality.</p>	<p>Students to:</p> <ul style="list-style-type: none"> - use digital content /real specimens to identify the various species of sugar cane. (scientific names). - classify sugar cane from kingdom, division, sub-division, class, order, family, genus, and species to varieties and cultivars. - describe the morphological characteristics of sugar cane (root, stem, leaf and flower). - describe the ideal soil, water requirements and methods of land preparation for sugar cane cultivation. - describe land preparation methods for sugar cane - demonstrate land preparation methods - describe planting materials for sugar cane - discuss the advantages and disadvantages of the various planting materials - demonstrate how planting materials are prepared and treated before planting. - describe the appropriate spacing for suga cane - describe the precautions to be taken in planting sugar cane - plant sugar cane - describe and carry out the specified cultural practices - discuss factors affecting cane quality. 	<p>Discuss the morphological characteristics of sugar cane.</p> <p>Discuss the importance of soil and water in sugar cane cultivation.</p> <p>Explain the following terms as used in sugarcane production: Setts, harrowing, brix, and bargasse</p> <p>Write an essay on factors affecting cane quality.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 (CONT'D) CULTIVATION OF SUGAR CANE	The student will be able to: 1.3.6 harvest sugar cane. 1.3.7 describe the steps in the processing of sugar cane into sugar.	Harvesting - - optimum harvesting time - method of harvesting - frequency of harvesting (ratoon) Processing steps - - crushing/milling -clarification -concentration -crystalisation -refining Precautions - immediate extraction	Student to: - discuss the optimum time, methods and frequency of harvesting - discuss the consequences of observing the harvesting conditions in sugar cane - discuss the precautionary measures to be taken before processing sugar cane -discuss the various stages of sugar cane extraction with emphasis on value chain and health benefits.	Write an essay on the uses of the products and by-products of the sugar cane industry in Ghana. Explain the precautions to be taken to ensure maximum sugar yield during the various stages of sugar extraction.

SENIOR HIGH SCHOOL – YEAR 2

SECTION 2 CULTIVATION OF FRUIT CROPS II

General Objectives: The student will:

1. understand the basic principles underlying fruit crop cultivation.
2. produce various kinds of fruit crops.
3. be able to properly manage fruit crop produce.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 CULTIVATION OF SPECIFIC FRUIT CROPS	The student will be able to: 2. 1.1 classify various types of fruit crops. 2.1.2 differentiate between the various fruit crops on the basis of their botany. 2.1.3 match fruit crops with their environmental requirements.	Classification of fruit crops: Citrus, Pineapple, Mango, Banana, Pawpaw, water melon. - Botanical classification of fruit crops Differences between fruit crops on the basis of: Botany: structures of stem, leaves, roots, fruit and seeds. Fruit crops and their environmental requirements: Geographical distribution, soil and climatic requirements.	Students to: - use digital content / real specimens to identify and describe characteristics of fruit crops with special reference to morphology. - prepare an album on fruit crops with common and scientific names - classify fruit crops under kingdom, division, sub-division, class, order, family, genus, species and varieties. - draw and label distinguishing morphological features of root, stem, leaf, flower, fruit and seed. - use hand lens to examine the anatomical features of fruits and their seeds - draw and label transverse sections of fruits and seeds - discuss the soil and climatic requirements for specific fruit crops. - describe the ecological adaptation of fruit crops . - discuss the effect of climate, physical and chemical soil properties on fruit crop production	Summarise in a tabular form attributes of the fruit crops studied under the following column headings: - common name - scientific name - planting materials - planting distance - common pests - common diseases Project: Grow different varieties of fruit crops and observe them for root, stem, leaf, fruit and seed characteristics. Students to prepare and present reports on project

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) CULTIVATION OF SPECIFIC FRUIT CROPS	<p>The student will be able to:</p> <p>2.1.4 raise planting materials at the nursery.</p> <p>2.1.5 plan and carry out all the land preparation and cultural practices in the production of each fruit crop.</p> <p>2.1.6 harvest mature fruits.</p> <p>2.1.7. use appropriate handling procedures for harvested fruits.</p>	<p>Production of fruit crops -varieties and planting materials - land preparation</p> <p>-cultural practices - weed control - pruning - mulching - pests control - diseases control -the Mediterranean fruit fly</p> <p>Harvesting: - signs of maturity, methods and tools, timing, precautions</p> <p>Post-harvest handling - sorting, grading, packaging, quality and standards, transportation, and marketing</p>	<p>Students to:</p> <ul style="list-style-type: none"> - use digital content /real specimen to list and discuss the characteristics of various varieties of fruit crops - describe the methods of land preparation, sources and qualities of good planting materials in fruit crops (including budding of citrus and grafting of mango) - describe and perform the cultural practices in fruit crops including forcing in pineapples - use digital content / real specimens to observe and identify pests and diseases on the crops and describe measures to control them - draw and label the life cycle of the Mediterranean fruit fly. <p>NB: Teacher to organize a field trip for students to observe and identify pests and diseases on the crops. - interview farmers and prepare and present reports on how farmers control the diseases and pests they encounter especially invasive alien species.</p> <ul style="list-style-type: none"> - describe methods used to control pests and diseases on fruit crops (emphasis on integrated pests management). - describe signs of maturity of fruit crops - determine whether a fruit is ready for harvesting or not - describe the methods, tools, time and precautions in harvesting mature fruits -describe steps in using the tools for harvesting fruit crops - harvest fruits crops without causing damage to the plant and fruit - describe handling procedures for each crop - discuss grading criteria for each fruit crop - grade produce of each fruit crop 	<p>Make a collection of varieties of fruit crops and list their scientific names.</p> <p>Draw and label the parts of the transverse section of a pawpaw fruit</p> <p>Compile a list of pests and diseases observed in the field.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) CULTIVATION OF SPECIFIC FRUIT CROPS	<p>The student will be able to:</p> <p>2.1.8 describe the nutritional and economic importance of each fruit crop.</p> <p>2.1.9 analyse and compare supply and value chains for each fruit crop.</p> <p>2.1.10 describe quality and safety standards in the fruit crop industry.</p>	<p>Nutritional and economic importance of fruits</p> <p>Fruit crop Supply and Value Chains</p> <p>Quality and safety standards: -cleanliness -residue deposits -size -colour</p>	<p>Students to:</p> <ul style="list-style-type: none"> - market produce of fruit crops in local market - describe the nature and demands of export markets for each crop <p>Project: Plan a project for producing fruit crops that can be cultivated in your school and carry out all the cultivation practices</p> <ul style="list-style-type: none"> - discuss the nutritional and economic importance of each fruit crop. - interview various actors in the fruit crop industry and draw supply and value chains for each crop - identify and describe the roles and responsibilities of actors in the supply and value chains - discuss the advantages and disadvantages in supply and value chains in the fruit crop industry - discuss the quality and safety standards in fruit crop production and marketing. 	<p>Describe the precautions you will take when harvesting fruit crops for local and international markets.</p> <p>Analyse supply and value chains of two selected fruit crops and report in class</p>

SENIOR HIGH SCHOOL – YEAR 2

SECTION 3

PRODUCTION OF VEGETABLE CROPS

General Objectives: The student will:

1. recognise the various types of vegetable crops and their importance.
2. maintain safety standards in vegetable crop production.
3. apply appropriate post-harvest techniques.
4. recognize the importance of value chain in vegetable crop production.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 IMPORTANCE OF VEGETABLE CROPS	<p>The student will be able to:</p> <p>3.1.1 differentiate vegetable crops from other crop types.</p> <p>3.1.2. classify vegetables according to the part of economic use and life cycle of plant.</p> <p>3.1.3 list the nutritional and economic importance of vegetables.</p>	<p>Characteristics of vegetable crops</p> <p>Identification and Classification of vegetable crops</p> <p>Importance - i. nutritional ii. socio-economic</p>	<p>Students to:</p> <ul style="list-style-type: none"> - use digital content and real objects to identify and discuss the characteristics of vegetable crops - give the scientific names of various vegetable crops, including cabbage, African spinach, Indian spinach, cocoyam, lettuce, bitter leaf, talinum, cauliflower, broccoli, tomatoes, pepper, garden eggs, cucumber, water melon, okro, sweet pepper, French beans, yard-long beans, agushi, lima bean, shallot, onion, carrot, green gram, radish. 	<p>Discuss how you would distinguish vegetables from other crops.</p> <p>Write down the scientific name of each of the following vegetable crops: cocoyam, carrot, broccoli, water melon, sweet pepper, agushi and shallot</p>
UNIT 2 TYPES OF VEGETABLE CROP PRODUCTION SYSTEMS IN WEST AFRICA	<p>3.2.1 name and describe the various types of vegetable production systems in West Africa.</p>	<p>Types of vegetable production systems - backyard garden/home garden, market garden, truck farming, production for processing, irrigated vegetable farming, dry season farming, vegetable seed</p> <p>Production and Hydroponics Gardening</p>	<ul style="list-style-type: none"> - classify vegetable crops according to uses and life cycle - make biological drawings of economic parts of vegetables from each group.. - discuss the nutritional and socio-economic importance of vegetables. - discuss the features of various types of vegetable production systems. - visit vegetable growing areas to observe the various types of vegetable production in practice - use digital content and explain hydroponics gardening and describe its features. 	<p>Write an essay on the nutritional benefits of vegetable crops.</p> <p>Prepare and present group reports on the socio-economic importance of vegetables</p> <p>Discuss five factors considered in planning a vegetable crop production unit.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 3</p> <p>ENVIRONMENTAL REQUIREMENTS</p>	<p>The student will be able to:</p> <p>3.3.1 outline the environmental factors required for the production of vegetables in West Africa.</p> <p>3.4.1 select suitable a site for vegetable production.</p>	<p>Environmental Factors:</p> <p>i. climatic</p> <p>ii. soil</p> <p>Site selection:</p> <p>-criteria for site selection</p>	<p>Students to:</p> <p>Project:</p> <p>Draw a map of Ghana and show areas of the country where large amounts of vegetables are grown. Draw a chart showing vegetable production locations and indicate the following: name of vegetable crop, planting season, markets, end of the season. Compare the information on each location with the periods of shortage of each vegetable on the Ghanaian market.</p> <p>- discuss the relationship between vegetable crop production and environmental factors with the aid of a map.</p> <p>- discuss factors to be considered in site selection for a vegetable crop enterprise.</p> <p>- select site for developing a vegetable crop farm.</p> <p>- discuss factors to be considered in choosing various land preparation methods</p> <p>- demonstrate the various methods of preparing land for vegetable crop production</p> <p>- discuss the merits and demerits of the various land preparation methods</p> <p>-select and justify land preparation methods for vegetable crop production.</p>	<p>Compare and contrast backyard gardening to market gardening</p> <p>Explain hydroponic gardening and state its advantages and disadvantages.</p> <p>Discuss with examples, environmental factors influencing vegetable crop production in West Africa.</p> <p>Discuss four factors considered in selecting site for a vegetable crop farm.</p> <p>Discuss three land preparation methods in vegetable crop production</p>
<p>UNIT 4</p> <p>SITE SELECTION AND LAND PREPARATION</p>	<p>3.4.2 choose land preparation methods for vegetable production.</p>	<p>Land preparation methods</p> <p>-raised and sunken beds, ridges and flat</p>	<p>- discuss factors to be considered in choosing various land preparation methods</p> <p>- demonstrate the various methods of preparing land for vegetable crop production</p> <p>- discuss the merits and demerits of the various land preparation methods</p> <p>-select and justify land preparation methods for vegetable crop production.</p>	<p>Discuss three land preparation methods in vegetable crop production</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 5</p> <p>NURSERY AND CULTURAL PRACTICES IN VEGETABLE CROP PRODUCTION</p>	<p>The student will be able to:</p> <p>3.5.1 produce healthy vegetable seedlings for transplanting and sale.</p> <p>3.5.2 perform the appropriate cultural practices in vegetable cultivation.</p>	<p>Nursery practices -</p> <ul style="list-style-type: none"> - seed and nursery bed preparation - drilling - pricking out - hardening off - transplanting, etc. <p>Cultural practices:</p> <ul style="list-style-type: none"> - supplying -watering/irrigation - thinning - mulching - staking - weed management - fertiliser application - pruning - pest and disease control 	<p>Students to:</p> <ul style="list-style-type: none"> - describe tasks in seed box /bed preparation including soil sterilisation - prepare seed beds, seed boxes and nursery beds and raise vegetable seedlings - prick-out and harden off vegetable seedlings. - discuss factors to be considered in transplanting. - transplant seedlings under supervision taking all the necessary precautions - watering immediately and applying the starter solution. - discuss factors to be considered in pricing vegetable seedlings - price and sell vegetable seedlings <p>NB: Teacher to organize a field trip for students to observe demonstrations on nursery practices.</p> <ul style="list-style-type: none"> - list the cultural practices in vegetable crop cultivation. - give reasons for performing various cultural practices in vegetable crop production - match the tools needed in vegetable crop production with the various cultural practices - describe the steps involved in performing various cultural practices - perform the cultural practices in vegetable crop production including organic. - attach themselves to vegetable crop farmers for experiential learning in vegetable crop production. 	<ul style="list-style-type: none"> -Give three reasons for preparing nursery beds to a fine tilth -Explain the two factors affecting transplanting of vegetable seedlings. -Explain the need for any three cultural practices carried out in vegetable crop production. -Write out in a sequence the steps involved in: <ul style="list-style-type: none"> i. Staking ii. Mulching iii. Pricking out. Give reasons why you support the following cultural practices in vegetable production: <ul style="list-style-type: none"> i. Supplying ii. Staking iii. pruning iv. mulching v. watering

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 7 (CONT'D) HARVESTING, SEED PRODUCTION AND POST HARVEST HANDLING	<p>The student will be able to:</p> <p>3.7.3 extract, store and market vegetable seeds.</p> <p>3.7.4 preserve and process vegetables for long shelf life after harvesting.</p> <p>3.7.5 describe quality and safety standards in vegetable crop production.</p>	<p>Vegetable Seed Extraction and Storage: pulpy fruits and dry fruits.</p> <p>Preservation and Processing of vegetable crop produce: - pasteurization - refrigeration - drying and milling - curing - pickling - canning, etc.</p> <p>Food quality and Safety Standards: - external quality : shelf life, appearance- colour , shape, etc - internal quality (taste, nutritive value, etc.)</p>	<p>Students to:</p> <ul style="list-style-type: none"> - discuss the various methods of vegetable seed extraction. - demonstrate seed extraction methods - extract seeds from various vegetable crops - discuss vegetable seed storage methods - attach themselves to Vegetable Seed Producers for experiential learning in seed production. - store vegetable seeds - discuss factors to consider in pricing vegetable seeds - price and market vegetable seeds <p>- discuss the various techniques used for preserving vegetables as listed in the content.</p> <p>- explain the term "food quality and safety standards" - give reasons for keeping to quality and safety standards in vegetable production</p> <p>- identify and discuss food quality and safety standards in vegetable crop production - discuss procedures for observing safety standards .</p>	<p>Outline the steps in extracting seed from tomato.</p> <p>-Explain why it is not advisable to add water when fermenting tomato seed for seed extraction -List and discuss three factors to be considered in storing vegetable crop seeds.</p> <p>Outline the processing methods you will use for preparing harvested cabbage for storage.</p> <p>Discuss three effects of keeping quality and safety standards in vegetable crop production.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 8</p> <p>CULTIVATION OF SPECIFIC VEGETABLE CROPS</p>	<p>The student will be able to:</p> <p>3.8.1 differentiate various selected vegetable crops on the basis of their botany.</p> <p>3.8.2 match vegetable crops with their environmental requirements and land preparation methods.</p>	<p>Differences between vegetable crops</p> <p>Botany and importance of selected vegetable crops</p> <p>Leafy vegetables: Cabbage and lettuce</p> <p>Floral vegetables: cauliflower</p> <p>Fruit vegetables: tomatoes, pepper, garden .</p> <p>Pod and see vegetables: French beans and agushi</p> <p>Vegetables with fleshy storage structures: onion and carrot</p> <p>Vegetable crops and their environmental requirements and methods of land preparation.</p>	<p>Students to:</p> <ul style="list-style-type: none"> - discuss the importance of specific vegetable crops. - discuss the botany of the vegetable crops listed in content under the following headings: <p>Classification:</p> <ul style="list-style-type: none"> - classify selected vegetable crops into: kingdom, division, sub-division, class, order, family, genus, species, varieties and cultivars. <p>Morphology and anatomy</p> <ul style="list-style-type: none"> - Use digital content to examine and discuss the structure of the root system, stem, leaves, flowers, fruits and seeds of the vegetable crops listed in content. - examine, draw and label transverse sections of the root, stem, fruit and seeds of the selected vegetable crops - compare the morphological features of the vegetable crops listed in content <ul style="list-style-type: none"> - describe soil and climatic requirements for each crop - match soil and climatic requirements with each crop - describe and demonstrate land preparation methods for the various crops -perform nursery practices (if applicable) -discuss spacing and demonstrate transplanting/planting methods for the vegetable crops. 	<p>Classify the following vegetable crops into class, order, family, genus, species, varieties and cultivars: Tomato, Cabbage, Carrots, French Beans, Lettuce and cauliflower.</p> <p>Discuss the soil and climatic requirements for growing each of the following vegetable crops: Cauliflower, lettuce and carrot.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 8 (CONT'D)</p> <p>CULTIVATION OF SPECIFIC VEGETABLE CROPS</p>	<p>The student will be able to:</p> <p>3.8.3 plan and carry out all the required nursery and cultural practices.</p> <p>3.8.4 maintain quality and safety standards in vegetable crop production</p> <p>3.8.5 harvest vegetable crops without causing damage to plant and produce.</p> <p>3.8.6 determine yield of vegetable crops.</p>	<p>Nursery and Cultural practices</p> <p>Quality and Safety standards in vegetable crops production</p> <p>Harvesting and post harvest handling</p> <p>Yield determination in vegetable production</p>	<p>Students to:</p> <p>Project: Plan a vegetable production project of 10m X 10m size of land. Students perform the nursery and cultural practices (include organic practices) for each vegetable crop, keep records on all the production activities, prepare and present reports on the project.</p> <p>NB: Teacher to organize a field trip to professional vegetable crop growers for students to observe demonstrations on nursery practices, harvesting and handling of produce.</p> <ul style="list-style-type: none"> - demonstrate procedures for keeping to quality and safety standards in vegetable production. - discuss the quality and safety standards for each vegetable crop - discuss signs of maturity of each vegetable crop - discuss precautions to observe in harvesting a vegetable crop - give reasons for the choice of harvesting techniques - harvest vegetable crop produce - discuss procedures for determining yields of Vegetable crops - list parameters for yield determination in vegetable crops - determine yield of vegetable crops - attach themselves to vegetable crop farmers for experiential learning in the production of the specific vegetables. . 	<p>Identify similarities and differences between the cultivation of two named vegetable crops</p> <p>Name two different vegetable crops and compare their quality and safety standards.</p> <p>Discuss the precautions to take in harvesting okro, lettuce, cabbage, onion, cauliflower and tomato.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 8 (CONT'D)</p> <p>CULTIVATION OF SPECIFIC VEGETABLE CROPS</p>	<p>The student will be able to:</p> <p>3.8.7 grade, package and market vegetables according to marketing standards.</p> <p>3.8.8 differentiate the roles of actors/players in vegetable crop supply and value chains.</p>	<p>Vegetable grading, packaging and marketing</p> <p>Vegetable Value Chains</p>	<p>Students to:</p> <ul style="list-style-type: none"> - discuss factors to be considered in grading a vegetable crop (quality standards) - sort and grade vegetable crops - discuss factors to be considered in packaging and transporting a vegetable produce. - package and transport a vegetable to a local market - discuss factors to be considered in pricing harvested vegetable produce. - price vegetable produce. - describe the marketing procedures of a vegetable crop in local and foreign markets (eg. European market) - perform a role- play in marketing a vegetable crop in a local market and in a foreign market - market the vegetable produce in a local market - perform cost/benefit analysis <ul style="list-style-type: none"> - brainstorm to explain the concept of supply and value chains in vegetable crop production - discuss the differences between supply and value chains in vegetable crop production - identify actors in vegetable value chains - discuss the roles of various actors in vegetable value chains - discuss the importance of value chains in vegetable production and marketing - perform a role-play each showing vegetable marketing process in a value chain and in a supply chain - attach themselves to value chain players for experiential learning 	<ul style="list-style-type: none"> -Explain how the differences between tomato and cabbage influence their packaging and transportation to a local market -Describe three factors considered in pricing a vegetable produce. -Write and present a report on the vegetable crop you have produced. -List and discuss the roles of actors in a named vegetable crop value chain. -Draw a flow chart to show the linkage among value chain players. What are the advantages and disadvantages associated with the supply and value chains of vegetable crop production? Write and present reports on the attachment.

SENIOR HIGH SCHOOL – YEAR 3

SECTION 1

CULTIVATION OF TREE CROPS

General Objectives: The student will:

1. recognise the various types of tree crops and their main produce and products.
2. recognise the nutritional and economic importance of tree crops.
3. be aware of the environmental requirements of tree crops.
4. acquire skills in the production and marketing of economic tree crop items.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 CHARACTERISTICS OF TREE CROPS	The student will be able to: 1.1.1 describe the attributes that make tree crops a unique group of plants. 1.1.2 describe the uses of the produce/products obtained from individual tree crops in West Africa.	Characteristics of tree crops Classification of tree crops on the basis of uses Importance of tree crops: -nutritional -economic	Students to: -define tree crops. -classify tree crops on the basis of uses. - use digital content / real specimens (such as leaves, flowers, fruits and seeds) to identify various tree crops by their common and scientific names - brainstorm on the nutritional and socio-economic importance of tree crops. - give examples of crops used for the production of: stimulants/beverages (cacao/coffee/kola), latex (para-rubber), oil (coconut/oil palm/ shea tree), confectionery- (cashew/monkeynut), spices (nutmeg/dawadawa/ prekese/cinnamon), medicinal (moringa,cacao), wood (teak / cassia)	Make a table to show the uses of produce and products obtained from various tree crops in your locality. .

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 ENVIRONMENTAL REQUIREMENTS AND PLANT ADAPTATIONS	<p>The student will be able to:</p> <p>1.2.1 explain the pattern of distribution of tree crops in West Africa.</p> <p>1.2.2 describe the adaptations of various tree crops to their environmental conditions.</p> <p>1.2.3 outline the methods to be used to break dormancy of specific tree crop seeds.</p>	<p>Climatic and soil factors Influencing the distribution of tree crops in West Africa</p> <p>Special adaptations of tree crops to their environment Seed dormancy as ecological adaptation</p> <p>Methods of breaking seed dormancy</p>	<p>Students to:</p> <ul style="list-style-type: none"> - use a map to explain the climatic and soil conditions which influence the distribution of tree crops in West Africa. - discuss the effects of climate, physical and chemical soil properties including soil profile on tree crop production. - describe the ecological adaptation of tree crops including the location of seed gardens in their natural agro-ecologies - describe the adaptations of the tree crops to specific agro-ecological zones. - discuss causes of seed dormancy - describe methods and steps used to enhance germination including: <ul style="list-style-type: none"> -soaking in water -heat and cold treatments -scarification methods 	<p>Discuss the physical and chemical properties of soil required for the cultivation of tree crops</p> <p>Draw the map of Ghana and indicate the ecological zones that favour the cultivation of the following tree crops: Parkia(dawadawa), coffee, kola, cacao, rubber, coconut, shea tree.</p> <p>Write an essay on the importance of seed gardens in tree crop production.</p> <p>Give reasons why some tree crop seeds exhibit dormancy.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 LAND PREPARATION AND TECHNIQUES OF TREE CROP RAISING	<p>The student will be able to:</p> <p>1.3.1. prepare land for the cultivation of tree crops.</p> <p>1.3.2 raise quality tree crop seedlings</p> <p>1.3.3 plant and manage tree crops.</p>	<p>Land preparation:</p> <ul style="list-style-type: none"> - surveying and mapping out - land clearing - windrowing - lining and pegging - holing <p>Pre-nursery and nursery practices:</p> <ul style="list-style-type: none"> - raising seedlings <p>Field planting and management practices:</p> <ul style="list-style-type: none"> - planting out and beating back - weed management - mulching - pests and diseases and their control - pruning - fertiliser application, etc. 	<p>Students to:</p> <ul style="list-style-type: none"> - describe the various land preparation methods used in tree crop cultivation. - demonstrate land preparation methods - describe the recommended steps of pegging, spacing and preparation of holes for planting tree crops. <ul style="list-style-type: none"> - discuss importance of the nursery practices - describe reliable sources of high quality planting materials in the locality. - carry out practices involved in raising tree crop seedlings in the school nursery. <ul style="list-style-type: none"> - describe techniques used in planting and managing tree crops - discuss methods, patterns and time of planting tree crops. - plant tree crop seedlings -discuss causes for poor establishment noting in particular the pre-planting, planting and post-planting precautions to observe. <p>Project: Guide students to carry out the various management practices used in tree crop cultivation either on campus or in a nearby farm.</p>	<p>List the implements used for land preparation and discuss their uses and maintenance .</p> <p>Explain the need for elaborate preparation of planting holes for tree crop seedlings</p> <p>Compare the merits and demerits associated with planting seedlings with bare roots and with ball of earth</p> <p>Prepare and deliver a talk on the techniques of planting and managing tree crops.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 4</p> <p>HARVESTING AND POST-HARVEST HANDLING OF TREE CROPS</p>	<p>The student will be able to:</p> <p>1.4.1 describe the signs of maturity of tree crops produce and indicate optimum harvesting period.</p> <p>1.4.2 describe how produce of tree crops are harvested.</p> <p>1.4.3 apply the appropriate handling procedures for the harvested economic produce and products</p> <p>1.4.4 outline the marketing standards of produce and product for both local and export markets.</p>	<p>Harvesting of tree crops: Signs of maturity, timing, methods and precautions</p> <p>Harvesting techniques</p> <p>Post-harvest handling, e.g. dehusking, fermentation, curing, drying, coagulation, smoking.</p> <p>Quality and safety standards and marketing of tree crops.</p>	<p>Students to:</p> <ul style="list-style-type: none"> - describe general signs of maturity in tree crops - identify and describe the tools and equipment for harvesting tree crops <p>- describe the techniques for harvesting/handling tree crop produce/products.</p> <p>Students to discuss in a general manner harvesting and post harvest handling of tree crop produce</p> <p>NB: Teacher to arrange a visit to tree crop research stations/plantations for students to observe and participate in field activities related to harvesting and post-harvest handling of tree crop produce.</p> <ul style="list-style-type: none"> - use digital content and describe the marketing quality and safety standard requirements for exportable products of tree crops. <p>NB: Teacher to invite a resource person from the Ministry of Trade or Ghana Export Promotion Council to give a talk on quality and safety standards of tree crop produce/products in export markets.</p>	<p>-Discuss signs of maturity in a specific tree crop.</p> <p>Write a report on a field trip you have made to a plantation or a research station for tree crop production</p> <p>List five (5) internet addresses that may be used to obtain information on tree crop produce/product standards for export trade.</p> <p>Discuss the quality and safety standards for Cocoa beans, Palm oil, Shea nut and Kola in export markets.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 5</p> <p>PRODUCTION OF SPECIFIC TREE CROPS</p>	<p>The student will be able to:</p> <p>1. 5.1 classify various types of tree crops.</p> <p>1.5.2 differentiate the various tree crops on the basis of their botany.</p> <p>1.5. 3 match tree crops with their environmental requirements.</p>	<p>Classification of tree crops:</p> <ul style="list-style-type: none"> - Cacao - Cashew - Coconut - Oil palm <p>Botanical classification of selected tree crops</p> <p>Botany: structures of stem, leaves, roots, fruits and seeds of tree crops</p> <p>Environmental requirements: Geographical distribution, soil and climatic requirements.</p>	<p>Students to:</p> <ul style="list-style-type: none"> - use digital content / real specimens to identify and describe characteristics of tree crops with special reference to morphology. - prepare a real/photo album on selected tree crops using their common and scientific names - classify tree crops under kingdom, division, sub-division, class, order, family, genus, species and varieties. <p>- draw and label distinguishing morphological features of root, stem, leaf, flower, fruit and seed of specific tree crops..</p> <p>- use hand lens / digital content to examine the anatomical features of the flowers, fruits and seeds of tree crops</p> <p>- draw and label transverse sections of the fruits and seeds of selected tree crops</p> <p>- discuss the soil and climatic requirements for specific tree crops.</p> <p>Project:</p> <ul style="list-style-type: none"> - grow different varieties of tree crops and observe them for stem, leaf, root, fruit and seed characteristics. <p>Students prepare and present reports on the project</p>	<p>What are the scientific names of Cashew , Cacao and Oil Palm?.</p> <p>Students to put in a tabular form:</p> <ul style="list-style-type: none"> -common name - scientific name - planting materials -planting distance -common pests - common diseases for the major and minor tree crops studied <p>Draw a map of Ghana and show areas where seven tree crops grow well. Give reasons why the tree crops grow well in those areas.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 5 (CONT'D)</p> <p>PRODUCTION OF SPECIFIC TREE CROPS</p>	<p>The student will be able to:</p> <p>1.5.4 plan and carry out all the land preparation and cultural practices in the production of each tree crop.</p> <p>1.5.5 carry out nursery and cultural practices of specific tree crops.</p> <p>1.5.6 harvest tree crops and carry out the appropriate handling procedures for the harvested economic produce/product.</p>	<p>Production of tree crops:</p> <ul style="list-style-type: none"> - varieties and planting materials - land preparation <p>- nursery practices</p> <p>- planting methods and patterns</p> <p>- cultural practices:</p> <ul style="list-style-type: none"> pests control disease control weed control (including invasive alien species) <p>Harvesting of tree crops</p> <ul style="list-style-type: none"> - harvesting - handling - marketing 	<p>Students to:</p> <ul style="list-style-type: none"> - use digital content /real specimen list and discuss the characteristics of various varieties of tree crops -describe the methods of land preparation, sources and qualities of good planting materials <p>- describe and perform nursery practices</p> <p>- describe and perform the various cultural practices used in tree crops production.</p> <p>- use digital content / real specimens to observe and identify pests and diseases on the crops and describe measures to control them.</p> <p>- discuss the life cycle of cocoa aphids</p> <p>- identify invasive alien species.</p> <p>NB: Teacher to organise a field trip to renowned tree crop plantations for students to observe and identify common weeds, pests and diseases on the crops.</p> <ul style="list-style-type: none"> - interview farmers and prepare and present reports on how farmers control the weeds, diseases and pests of specified tree crops <p>- describe signs of maturity of tree crops</p> <p>- describe harvesting tools and steps in using the tools</p> <p>- harvest various tree crop produce.</p> <p>- describe handling procedures for each crop</p> <p>- grade each crop</p> <p>- market tree crop in local markets</p> <p>- describe export markets for each tree crop produce/products</p> <p>Project:</p> <p>a). Plan a project for producing tree crops that can be cultivated in your school and carry out all the cultivation practices</p> <p>b). Organise visits to tree crop farms and practice all the production and marketing activities involved in tree crop cultivation</p>	<p>Draw and label the parts of the fruit and seed of a named tree crop.</p> <p>Draw and label the transverse section of Oil Palm fruit.</p> <p>Project:</p> <p>Students in groups, produce seedlings of a tree crop. Write and present group reports on the project.</p> <p>Compile a list of weeds, pests and diseases observed in the field on Coconut, Cacao and Cashew.</p>

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 5 (CONT'D) PRODUCTION OF SPECIFIC TREE CROPS	<p>The student will be able to:</p> <p>1.5.7 process tree crop produce into industrial products.</p> <p>1.5.8 describe the nutritional and economic importance of each tree crop.</p> <p>1.5.9 analyse and compare supply and value chains for each tree crop.</p> <p>1.5.10 describe quality and safety standards in the tree crop industry.</p>	<p>Processing of tree crops into industrial products</p> <p>Nutritional and economic importance of tree crops</p> <p>Tree Crop Value Chains</p> <p>Quality and safety standards in the tree crop industry</p>	<p>Students to:</p> <ul style="list-style-type: none"> - identify industrial products obtained from the selected tree crops - describe the steps and procedures in processing tree crops into industrial products <p>NB: Teacher to organise visits to tree crop processing industries for students to observe demonstrations of the processing steps and procedures</p> <ul style="list-style-type: none"> - discuss the nutritional and economic importance of each tree crop. <ul style="list-style-type: none"> - interview various actors in the tree crop industry and draw supply and value chains for each crop produce/products - identify and describe the roles and responsibilities of actors in the supply and value chains - discuss the advantages and disadvantages of various supply and value chains in the tree crop industry <p>- discuss the quality and safety standards in tree crop production and marketing.</p> <p>NB: Teacher to invite a resource person from the Ministry of Trade/ Ghana Export Promotion Council/ Cocoa Services Division / Ghana Standards Board/ Food and Drugs Board to give a talk to students on quality and safety standards in tree crop production and marketing.</p>	<p>Outline the processes involved in converting the produce of cacao and coconut into named industrial products.</p> <p>Discuss the stages in the value chain of specific tree crop production</p> <p>Discuss the quality and safety standards in tree crop industry.</p>

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SECTION 2

LANDSCAPING

General Objectives: The student will:

1. appreciate the value of landscaping.
2. understand the basic principles guiding the landscaping of an area.
3. carry out simple landscaping in and around the home and the school.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 SCOPE AND IMPORTANCE OF LANDSCAPING	The student will be able to: 2.1.1 explain the term landscaping. 2.1.2 state the importance of landscaping.	Explanation of landscaping, Importance of landscaping. - beautification - conservation - screening - forest reserve/ green belt - windbreak -etc	Students to: - brainstorm to explain landscaping in terms of assessing/evaluating, designing and undertaking outdoor activities that result in blended, harmonious and scenic environment. NB: Teacher to organise excursions to places (e.g. public parks, compound of houses, area of countryside) which are well landscaped and also to places where no landscaping has been done. -discuss the importance of landscaping to humans and their environment. - explain each of the attributes and how landscaping could be directed to produce the particular effects	Write a report on a visit you have made to a Public park to observe its landscape design Discuss the importance of landscaping.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
<p>UNIT 2</p> <p>FUNDAMENTALS OF LANDSCAPING</p>	<p>The student will be able to:</p> <p>2.2.1 differentiate between the components used in landscape design and the roles each one plays.</p> <p>2.2.2 explain the various principles underlying the design of landscape.</p>	<p>Differences between landscape design Components (materials) and their roles</p> <ul style="list-style-type: none"> - landform - plant materials - water - sculpture and stone work - garden boundaries - ground pattern <p>Principles of design -</p> <ul style="list-style-type: none"> - unity - scale - time - space division - light and shade - texture - tone and colour - style - line - variety - repetition - balance - emphasis 	<ul style="list-style-type: none"> - discuss the principles of design and the components of landscaping. -discuss planting materials. <p>NB: Teacher to arrange a visit to an area well landscaped and aid students to describe the part each of the principles and materials play in the designing of the area. Eg Aburi Botanical Gardens Botanical gardens in the Universities</p> <ul style="list-style-type: none"> - discuss the principles of design exemplifying with the use of the components listed. 	<p>Project: Prepare a landscape design of an area on the school campus and indicate the reasons for the choice of materials.</p> <p>Discuss five principles of design and show how they are applied in landscaping.</p> <p>What is meant by components of landscaping? Explain how the following components influence landscaping:</p> <ol style="list-style-type: none"> i. Landform ii. Water iii. Sculpture and stone work iv. Ground pattern

SENIOR HIGH SCHOOL – YEAR 3

SECTION 3

ENTREPRENEURSHIP IN CROP HUSBANDRY AND HORTICULTURE

General Objectives: The student will:

1. plan and establish an enterprise based on Crop Husbandry and Horticulture.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 ESTABLISHING ENTERPRISES IN CROP HUSBANDRY AND HORTICULTURE	The student will be able to: 3.1.1 identify and describe the factors that should be considered when establishing enterprises.	Factors for establishing enterprises - identification of business opportunities - identification of a product or service needed in a locality - availability of market for produce and / product or service - demand for produce/products or service, etc. Resources – - land - capital - materials and structures - services - labour (personnel) - technical know-how - task analysis	- identify and discuss factors for establishing enterprises	Discuss the importance of business plans Outline the content of a simple business plan Write a report on the task analysis of any Crop Husbandry and Horticultural vocation of your choice.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 (Cont'd) ESTABLISHING ENTERPRISES IN CROP HUSBANDRY AND HORTICULTURE	The student will be able to: 3.2.2 describe procedures for establishing an enterprise.	Procedures for establishing enterprises <ul style="list-style-type: none"> - development of a business plan - registration of business, etc. 	Students to: <ul style="list-style-type: none"> - describe the procedures for establishing an enterprise - discuss the importance of business plans - discuss the format and contents of a business plan <ul style="list-style-type: none"> - prepare a simple business plan - present the plan for a class discussion NB: Teacher to invite a resource person to give a talk on how to develop a business plan and procedures for establishing an enterprise.	i. Write out the outline of a business plan. ii. Describe four procedures in establishing an enterprise.

CROP HUSBANDRY AND HORTICULTURE FACILITIES, EQUIPMENT AND TEACHING-LEARNING MATERIALS

Land	Equipment and Tools	Teaching/Learning Materials
<p>At least five (5) hectares for establishment of field, tree, fruit and ornamental plants.</p> <p>Structures: Laboratory, Farm buildings, etc.</p>	<p>a). Tillage equipment: machines (tractor, power tiller, mower, implements (plough, harrow, planter, slasher, ridger</p> <p>b). Simple Hand tools: measuring tape, cutlass, pickaxe, garden line, shovel, spade, hoe, mattock, etc.</p> <p>c). Irrigation: pumping machine sprinkler, water hose, watering can</p> <p>d). Pest Control: Knapsack sprayer, Mistblower</p> <p>e). Storage:- silo, Refrigerators, Deep Freezers</p> <p>f). Harvesting: combine harvester, cutlass, hoe, go-to-hell, wheelbarrow, shears</p> <p>g). Processing:- solar dryer, blender, grinding mill</p>	<p>Soil: pH kit, sieves, fertilizer, weedicide, pesticide, Others:- charts, pictures, models, maps (distribution of crops, rainfall pattern, soil types)</p> <p>CDRoms, etc</p> <p align="center">-</p>