Kingdom of Lesotho

Ministry of Education and Training

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GRADE 10 & 11 AGRICULTURE SYLLABUS - PILOT SYLLABUS 2020

National Curriculum Development Centre (NCDC) in collaboration with the Examinations Council of Lesotho (ECoL).

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Grade 10 and 11 Agriculture Panel Members:

1. Khathatso Maraisane — National Curriculum Development Centre
2. 'Mamohau Mohlotsane — National Curriculum Development Centre
3. Mabatho Let'saba — Inspectorate
4. Mpho Maseatile — St.Agnes High School/NCDC
5. Thabiso Moonyane — Honorat Labrecque High School
6. Palesa Mantutle — Masitise High School
7. Lebohang Mot'soane — Ribaneng High School
8. 'Mabokang But'sana — Botha-Bothe Community High School
9. Lehlohonolo Ntsebe — Matikoe High School
10. 'Maliengoane Mohapi — Ntloana-t'soana High School
11. Nt'semelo Mahoete — St.John's High School
12. 'Mamokhitla Ramollo — Likhakeng High School
13. Matheas Mokotso — Leribe Agricultural Skills Training Centre

1. INTRODUCTION

1.1 Rationale.

The Grade 10 and 11 Agriculture syllabus is a two - year programme of study which builds up on the foundation of the basic education. This syllabus will impart to learners the cognitive, psychomotor and affective skills, therefore preparing learners for Grade 11 and self-employment. It is based on four **Curriculum Aspects** which highlight the life challenges and contexts in which the learner is expected to function as an individual and a member of a society. These are: *Effective Communication; Environmental Adaptation and Sustainable Development; Health and Healthy Living* and *Production and Work-related Competencies.*

Through this syllabus the learners will:

- be responsible for themselves, responsive to and respectful of others;
- recognize that as information in its various forms becomes more accessible, need to develop higher cognitive skills of analysis, interpretation and evaluation to use information effectively; (*reflective as learners, developing their ability to learn*);
- be innovative and equipped for new and further challenges;
- be engaged intellectually and socially, ready to make a difference;
- be provided with an insight and understanding of crucial global issues in a rapidly changing world which affect quality of life: the AIDS pandemic, global warming (Climate Change), environmental degradation, maldistribution of wealth, expanding and increasing conflicts, the technological explosion and increased connectivity.

Thus the Grade 10 and 11 Agriculture syllabus will provide opportunities for developing essential, key skills across the various fields of study. Such skills cannot be developed in isolation and they may differ from context to context according to a field of study. The major focus of this syllabus is to promote an appreciation of agriculture as an applied science that will allow learners to explore existing agricultural/ scientific knowledge, skills and attitudes acquired from the study of science and other subjects to address environmental (including Impacts of Climate Change and Climate Smart Agriculture) and socio-economic issues in their day to day lives.

The knowledge and skills acquired from the syllabus will contribute directly to the development of the skills and abilities such as communication; information handling skills; numeric skills; problem-solving skills; social and cooperative skills; self-management and competitive skills; work and study skills; critical and creative thinking; and initiative and independence. Learners will also develop the ability to apply scientific skills; principles; methods and demonstrate their appreciation of agriculture as a profitable business to the individual, community; nation; the region (Southern African Development Countries) and globally.

1.2 SYLLABUS CONTENT AT A GLANCE

1.2.1 The content of this syllabus is designed to encourage a broad, applied and practical Science-based study of agriculture. It includes:

1.2.1.1 Contribution of agriculture to the country economy and choices facing the farmers
1.2.1.2 Economic principles of agriculture
1.2.1.3 Soil erosion, conservation practices and soil temperature
1.2.1.4 Metabolism and reproduction in plants
1.2.1.5 Water sources, water cycle and soil water and drainage of waterlogged soils
1.2.1.6 Treatment, distribution and supply of water for irrigation
1.2.1.7 Fruit trees production and crop protection
1.2.1.8 Improved pasture establishment and methods of fodder conservation
1.2.1.9 Crops and livestock breeding
1.2.1.10 Discuss farm mechanization and farm structures
1.2.1.11 Livestock anatomy, physiology and protection
1.2.1.12 Storage, preservation and marketing of livestock products
1.2.1.13 Hydroponics and organic farming
1.2.1.14 Forest trees production

2. SYLLABUS AIMS AND OBJECTIVES.

2.1 AIMS

The syllabus aims are to:

2.1.1 promote an appreciation of agriculture as an applied science;
2.1.2 stimulate an interest in, and create an awareness of existing problems and opportunities in agriculture;
2.1.3 stimulate positive attitudes by showing that efficient farming can be profitable and rewarding occupation;
2.1.4 demonstrate the value of agriculture to the family and community, so as to show how improved agriculture can contribute to the worldwide campaign for freedom from hunger;
2.1.5 encourage the teaching, in a practical manner, of basic principles and skills in agriculture and of efficient farm business management;
2.1.6 ensure that school takes an active part in rural development by integration of agricultural activities into the school curriculum;
2.1.7 harness and conserve essential agricultural indigenous knowledge and experiences in order to promote biodiversity;
2.1.8 encourage the development of practical areas, ensuring that learners actively participate in the farming event throughout the course, including weekend and during school holidays;
2.1.9 develop initiative, problem solving abilities, scientific methods and self-education so as to encourage resourcefulness and self-reliance;
2.1.10 enhance practical and vocational skills in entrepreneurial competencies and self-reliance for sustainable development;

2.1.11 provide a basis, together with the basic science and mathematics, for more advanced studies in agriculture.

2.2 OBJECTIVES

The main objective of the syllabus is therefore to equip learners with the necessary knowledge, skills and attitude that will enable them to enter Grade 10and/or the world of work.

2.3 ASSESSMENT OBJECTIVES (AOs)

There are three assessment objectives that describe the knowledge, skills and abilities that candidates are expected to demonstrate at the end of Grade 9. They reflect those aspects of the aims that will be assessed.

AO1 Knowledge with understanding

Candidates should be able to demonstrate agricultural knowledge and understanding in relation to the correct use of:

1. facts, concepts, principles pattern, models and theories
2. terms, symbols, quantities and units
3. the techniques, procedures and principles of safe agricultural practice
4. The subject content defines the factual knowledge that the candidates may be required to recall and explain. Questions testing these objectives will often begin with one of the following words: *define, state, name, describe, explain or outline.*

AO2 Handling information, application and problem solving

Candidates should be able - using oral, written, symbolic, graphical and numerical forms of presentation to:

1. locate, select, organise and present information from a variety of sources;
2. translate information to identify patterns, report trends and draw inferences;
3. use information to identify patterns, report trends and draw inferences;
4. present reasoned explanations for phenomena, patterns and relationship
5. make predictions and propose hypothesis
6. solve problems, including some of a quantitative nature

These assessment objectives cannot be precisely specified in the content because questions testing such skills may be based on information that is unfamiliar to the candidates. In answering such questions, candidates are required to use principles and concepts that are within the syllabus and apply them in a logical, reasoned or deductive manner to a novel situation. Questions testing

these objectives will often begin with one of the following words: discuss, predict, suggest, calculate, or determine.

AO3 Practical skills and investigations

Candidates should be able to:

1. use and organize techniques, apparatus and material; use and organize techniques, apparatus and materials;
2. observe, measure and record;
3. interpret and evaluate experimental observations and data;
4. plan and carry out investigations (and, where appropriate, make predictions and propose hypothesis).

2.4 ASSESSMENT GUIDE AND DESCRIPTION OF PAPERS

2.4.1 Relationship between assessments objectives are summarized in the table below:

ASSESSMENT OBJECTIVE	APPROXIMATE WEIGHTING
AO1: Knowledge with understanding	30%
AO2: Handling information and problem solving	40%
AO3: Experimental skills and investigations	30%

Teachers should take note that there is greater weighting of 70% for skills (including handling information, problem solving, practical, and experimental and investigation skills) than for knowledge and understanding which 30% is. Teachers' scheme of work and sequence of learning activities should reflect this balance, so that the aims of the syllabus may be met and the candidates are fully prepared for assessment.

2.4.2 Assessment Grid/Specification

ASSESSMENT OBJECTIVE	Paper 1 (marks)	Paper 2 (marks)
AO1: Knowledge with understanding	43	0
AO2: Handling information and problem solving	57	0
AO3: Experimental skills and investigations	0	90

2.4.3 GRADE DESCRIPTORS

Criteria for the standard of achievement likely to have been shown by candidate awarded Grades **A, B** and **F** are shown below. The standard of achievement required for the award of Grade **C,** include the criteria for Grade **F**. Similarly, the standard of achievement required for the award of Grade **A** includes criteria for Grade **C**.

Grade A candidate should be able to:

- relate facts to principles and theories and vice versa
- state why particular techniques are preferred for a procedure or operation
- select and collect information from a number of sources and present it in a clear, logical form
- process data from a number of sources to identify patterns and trends
- generate a hypothesis to explain facts, or find facts to support a hypothesis

Grade C candidate should be able to:

- link facts to situations not specified in the syllabus
- describe the correct procedure(s) for a multi-stage operation
- select a range of information from a given source and present it in a clear, logical form
- identify patterns or tends in a given information
- solve problems involving more than one step, but with a range of variables
- generate a hypothesis to explain a given set of facts or data

Grade F candidate should be able to:

- recall facts contained in the syllabus
- indicate the correct procedure for a single operation
- select and present a single piece of information from a given source
- solve problems involving one step or more step if structured help is needed
- identify a few patterns or trends where minor manipulation of data is needs
- recognize which of two given hypothesis explains a set of facts or data

2.4 ASSESSMENT AT GLANCE

The syllabus will be assessed in two ways that is theory and coursework

Paper	**1**	**Theory**
1 hour 45 minutes		
This paper has two sections		
Section A: consists of compulsory, short, structured questions worth 70 marks.		
Section B: Candidates answer two out of five free response questions, each question is worth 15 marks		
Total marks : 100 marks		
Weighting: 70 %		

Paper 2 Teacher assessed Coursework-testing practical and investigatory skills
Coursework assessment marked by teacher and moderated by Examination Council of Lesotho. Detailed instruction for teacher assessment will be available from Examination Council of Lesotho.
When planning practical work, teachers should make sure they do not contravene any school, Education authority and Examination Council of Lesotho regulations.
Total marks :90 (Practical skills 60, investigatory skills 30)
Weighted: 30 (Practical skills 20%, investigatory skills 10%)

3. LEARNING CONTENT

4.1 The curriculum content outlined below is designed to provide guidance to teachers as to what will be assessed in the overall evaluation of learners. They are not meant to limit, in anyway, the teaching programme of any particular school.

4.2 The learning content is set out in five columns.

- Learning Objective (LO)
- Concepts, skills, values and attitudes.
- Suggested learning experiences
- What to assess
- Suggested learning and teaching resources.

4.3 A Learning Objective (LO) refers to those components of the subject which learners are required to study. The **General Objective** is derived from the topic and comprises the general knowledge, understanding and demonstration of skills on which learners may be assessed. The

Specific Objectives are the detailed and more specified topics of the syllabus which are likely to be assessed. The content material is divided into the following sections:

- General Agriculture
- Soil
- Range
- Crop Husbandry
- Livestock Husbandry
- Farm tools and Implements.

5. **Definitions of terminology used:**

1. **Concept**: a general idea which emerges from a specific situation; once understood it can be applied to different contexts to promote understanding. For example, the concept of the family emerges from awareness of the familiar unit in which people live; it can be applied to groups of animals, plants or words which naturally belong together.
2. **Skills**: abilities which every learner is expected to acquire to help them learn and live well in society; they can be mental, physical or social.
3. **Values**: qualities which are considered to be important, worth preserving and transmitting to the younger generation. For example, Basotho consider honesty and respect to be essential values.
4. **Attitudes:** positions or opinions, what is appreciated or disliked by an individual or a group.
5. **A list of suggested learning experiences:** teaching and learning activities designed to enable learners to achieve a given learning outcome. This is not exhaustive and the teacher is free to use other complementary activities.
6. **What to assess:** in this column, the learning outcome is broken down into several specific, measurable and observable points, against which the teacher can check the learner`s progress. These focus on the process and characteristics of learning rather than the final outcome.
7. **A list of suggested resources:** a list of possible items, materials, persons (etc.) which may be used to help achieve a given learning outcome. This is designed to help all teachers, however many or few resources may be available in their schools and communities.

Grade 10 and 11 Agriculture Syllabus
Overview.

Learning Outcomes (LOs): At the end of Grade 10 and 11, learners should be able to:
1 explain how agriculture contributes to the economy of the country.
2 describe the choices facing the farmers.
3 describe economic principles of agriculture.
4 describe soil erosion and conservation practices.
5 explain the influence of soil temperature on plant growth.
6 describe metabolism and reproduction in plants.
7 discuss the sources of water and the significance of water cycle.
8 discuss soil water and drainage of waterlogged soils.
9 describe treatment, distribution and supply of water for irrigation.
10 explain production of fruit trees.
11 describe crop protection.
12 describe establishment of improved pastures and methods of fodder conservation.
13 describe breeding in crops and livestock.
14 discuss farm mechanization.
15 explain farm structures.
16 describe livestock anatomy and physiology.
17 discuss livestock protection.

18 discuss storage, preservation and marketing of livestock products.

19 describe hydroponics and organic farming.

20 explain production of forest trees.

Grade 10 and 11 Agriculture Syllabus
Activity plan.

At the end of grade 10 &11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
1. explain how agriculture contributes to the economy of the country.	**Concepts** Agricultural economics Imports and exports Employment Income generation: - Foreign exchange (currency conversion) - Ways of payments (cash, cheque, credit and debit, electronic transfer) **Skills** Identification Comparison Observation Evaluation **Values and attitudes** Appreciation Awareness	**Teacher and learners:** • review agricultural economics. • discuss the contribution of agriculture to the economy of the country. • discuss the importance of foreign exchange. • discuss different payment methods.	outline ways in which agriculture contributes to the economy of the country. state the importance of foreign exchange. outline different payment methods.	Internet. Teacher's guide. Resource person. Money. Cheque books. Credit cards. Debit cards.

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
2. describe economic principles of agriculture.	**Concepts** Supply Demand Market Price Opportunity cost Diminishing returns **Skills** Identification Comparison Observation Evaluation Problem solving Critical thinking Drawing Decision making **Values and attitudes** Appreciation Awareness Patience Honesty	• Teacher and learners discuss demand. • Learners draw and interpret demand curve. • Teacher and learners discuss law of demand. • Learners describe factors that affect demand. • Teacher and learners discuss supply. • Learners draw and interpret supply curve. • Teacher and learners discuss law of supply. • Learners describe factors that affect supply. • Learners determine the market price. **Teacher and learners discuss:** • how market prices are influenced by changes in demand and supply over time. • opportunity cost.	define demand. list factors that affect demand. state and interpret the law of demand. draw and interpret the demand curve. define supply. list factors that affect supply. state and interpret the law of supply. draw and interpret the supply curve. use the demand and supply curves to determine the market price. explain opportunity cost.	Internet. Teacher's guide. Chart. Resource person. Text books.

		• the law of diminishing returns. • Learners draw and interpret a graph showing diminishing returns.	state the law of diminishing returns. draw and interpret a graph showing diminishing returns. interpret how market prices are influenced by changes in demand and supply over time.	

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
3. describe the economic choices facing the farmer.	**Concepts** Production choices: - home grown crops. Financial choices: - savings; - interest rates. Marketing choices: - advertising; - risks and uncertainty; - cooperatives, iInvestment - insurance	**Teacher and learners discuss:** • choices faced by the farmer and decision making based on understanding of economic factors. • how home grown crops helps to save money. • how long term savings help in future. **Under the guidance of the**	explain the choices faced by the farmer in decision making. describe how home grown crops help to save money. explain how long term savings help in future. differentiate between interest rates and discounts.	Internet Text books Billboards Charts Television Radio Resource person

	Skills Identification Comparison Observation Evaluation Decision making Critical thinking Calculations investigation **Values and attitudes** Appreciation Awareness	**teacher, learners:** • carry out a research to investigate the economic value of home grown crops. • calculate interest rates and discounts using percentages. **Teacher and learners discuss:** • interest rates and discounts • methods of advertising farm produce. • cost and benefits of advertising. • risk and uncertainty including its management practices: - cooperatives; - investments (fraud); - insurance.	investigate the economic value of home grown crops. calculate interest rates and discounts using percent. differentiate methods of advertising. outline cost and benefits of advertising. differentiate risk from uncertainty. describe risk and uncertainty management practices (cooperatives, investments and insurance).	

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
4. describe soil erosion and conservation practices.	**Concepts** Effects of soil erosion Prevention and control of soil erosion **Skills** Identification Observation Critical thinking Comparison Decision making Manipulation **Values and attitudes** Awareness Appreciation Care	**Teacher and learners:** • revise types, agents and causes of soil erosion. • discuss effects of soil erosion on soil quality, water quality, crop and animal production and health. **Learners**: • identify ways of preventing soil erosion on arable and non- arable land. • identify ways of controlling soil erosion on arable and non-arable land **In groups learners:** • plant trees around the school campus • plant grass on eroded areas on school campus • apply mulch on arable land • construct gabions and silt traps on non – arable land • construct terraces on arable and non-arable land • practice contour ploughing	list ways of preventing soil erosion on arable and non-arable land. outline ways of controlling soil erosion on arable and non-arable land. explain effects of soil erosion on soil quality, water quality, crop and animal production and health. outline the role of trees and grass on controlling soil erosion. outline the role of gabions and silt traps on controlling soil erosion. outline the role of mulch, terraces and contours on the land.	wire mesh. local environment. sacs. garden tools. stones. mulch. trees. grass. resource person. internet. text books.

		on arable land		

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
5. explain the influence of soil temperature on plant growth.	**Concepts** Effects of soil temperature on plant growth Soil temperature requirement for crops Soil temperature regulation methods **Skills** Experimentation Critical thinking Observation Comparison Reporting **Values and attitudes** Awareness Appreciation Responsibility Patience	**Teacher and learners:** • discuss the effects of soil temperature on plant growth. • discuss soil temperature requirements for different crops. • conduct an experiment on effects of soil temperature on the plant growth. • compare temperature of different soil types. • discuss methods of regulating soil temperature. **Learners:** • apply different methods of regulating soil temperature. • report results of experiments.	state different methods of regulating soil temperature. describe the effects of soil temperature on plant growth.	Plants. Seeds. Soil. Local environment. Internet. Thermometer.

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
6. describe metabolism and reproduction in plants.	**Concepts** Internal structure of the plant Movement of materials through the plant • osmosis • diffusion • photosynthesis • respiration • transpiration • translocation • active transport sexual reproduction Seed dispersal • agents of seed dispersal • importance of seed dispersal **Skills** Experimentation Critical thinking Observation Comparison Reporting Drawing Interpretation Identification	**Teacher and learners:** • revise the external parts of a plant • discuss the internal structure of the leaf, stem and root • learners draw the internal structure of the leaf, stem and root **Teacher and learners:** • discuss the absorption of materials from the soil into the root cells by osmosis, diffusion and active transport • carry out the experiment to demonstrate movement of materials by vascular bundles using any dye in solution and seedlings • describe the gaseous exchange by diffusion in terms of the internal leaf structure and stomata • describe the process of photosynthesis • carry out an experiment to demonstrate the process of photosynthesis	state factors which affect transpiration rate. list agents of seed dispersal. state different parts of plants which are modified as food storage organs. state the importance of seed dispersal. list food materials stored in each modified storage organ of the plant. outline the process of pollination. outline the process of fertilization in a named monocot and dicot plants. differentiate between self and cross pollination. differentiate among	Plants. Specimen. Flowers. Seeds. Petri dishes. Salt. Water. Beaker. Dye. Internet. Charts. Potato. Posters.

	Communication **Values and attitudes** Awareness Appreciation Cooperation Patience Workmanship	• discuss respiration process in plants • discuss the process of translocation of synthesized material to storage organ • describe modification of different parts of plants to form food storage organs and the type of food stored • discuss transpiration in terms of the transpiration stream, loss of water by evaporation and diffusion of water vapour through stomata • identify factors affecting transpiration rate • carry out an experiment to illustrate the process of transpiration • discuss sexual reproduction • discuss the structure and functions of a monocotyledonous (maize) and dicotyledonous (bean) flower with the help of a diagram and specimen • discuss types of pollination • describe fertilization in a maize and bean flower - discuss methods of seeds dispersal with the help of diagrams and specimen	osmosis, active transport and diffusion. describe methods of seed dispersal. describe the process of photosynthesis. describe respiration process. describe the process of translocation in plants. explain the process of transpiration in plants. explain gaseous exchange by diffusion in terms of the internal leaf structure through stomata. draw and label the internal structures of a leaf, stem and root. draw and label the structure of monocot and dicot flowers.	

		Learners: - identify methods of seeds dispersal - explain the importance of seeds dispersal		

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
7. discuss the sources of water and the significance of water cycle.	**Concepts** **Water sources:** - surface water; - lakes; - rivers; - wetlands **Ground/underground:** water aquifer spring wells **Precipitation:** snow; rain; hail; sleet; dew; frost Water cycle.	• Learners brainstorm water sources. **Teacher and learners:** • discuss different water sources from the local environment • identify water sources from the local environment • discuss water cycle and its significance using a diagram. • learners draw and label water cycle	list different water sources. differentiate among water sources. draw and interpret water cycle.	Charts. Posters. Internet. Text books. Local environment.

	Skills Observation. Comparison. Critical thinking. Identification. Interpretation. Drawing. **Values and attitudes** Awareness. Appreciation. Cooperation.			

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
8. discuss soil water and drainage of waterlogged soils.	**Concepts** **Types of soil water:** - gravitational; - capillary; and - hygroscopic. **Drainage.** **Methods of drainage:** - surface; and - subsurface Importance of drainage.	• Teacher and learners discuss three types of soil water **Under the guidance of the teacher learners carry out the experiment to:** • demonstrate gravitational water using three types of soil samples • demonstrate capillary water using any dye in solution and a plant • show hygroscopic water by	list types of soil water state the importance of drainage in relation to respiration of roots, microbial activities, soil pH and leaching mention methods of soil drainage and give examples of each outline effects of poor	Soil samples. Wood ash. Dye. Funnel. Filter paper. Garden tools. Plants.

	Effects of poor drainage. **Skills** Experimentation. Observation. Critical thinking. Reporting. Manipulation. Comparison. Workmanship. Calculation. Analysis. Measuring. Competence. **Values and attitudes** Appreciation. Awareness. Patience. Cooperation. Responsibility.	oven drying the soil **Teacher and learners discuss:** • soil drainage • methods of soil drainage • the importance of drainage in relation to respiration of roots, microbial activities, soil pH and leaching • and identify effects of poor drainage in relation to root respiration, microbial activities, soil pH and leaching **Learners carry out an experiment:** • to compare drainage of three types of soil • using one of the methods to drain water from the soil	drainage in relation to root respiration, microbial activities, soil pH and leaching carry out the experiment to demonstrate gravitational water using three types of soil carry out the experiment to demonstrate capillary water using any dye in solution and a plant carry out the experiment to show hygroscopic water by oven drying the soil carry out an experiment using one of the methods to drain water from the soil carry out an experiment on soil drainage using a soil sample carry out an experiment to compare drainage of water in three types of	Calibrated jar. Water. Internet. Textbooks. Resource person.

			soil	

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
9. describe treatment, distribution and supply of water for irrigation.	**Concepts** Water treatment • sedimentation • flocculation • filtration • chlorination Water distribution Maintenance of pipelines and tap Drip/trickle Irrigation • advantages and disadvantages **Skills** Observation Comparison Workmanship Reporting Cooperation Identification Manipulation Experimentation Critical thinking **Values and attitudes** Awareness	**Teacher and learners discuss**: - water treatment - ways of distributing water from the source to the farm - simple plumbing including pipe-joining, fitting of tap washers and water pumps - maintenance of pipe system - advantages and disadvantages of drip/trickle Irrigation Teacher demonstrates: - one methods of water treatment - fitting of tap washers Learners practice: - Water treatment - Joining and maintenance of water pipe system - drip/trickle Irrigation	state ways of distributing water from the source outline advantages and disadvantages of drip/trickle Irrigation describe joining and maintenance of water pipe system describe fitting of tap washers explain drip/trickle Irrigation explain ways of treating water for safe use report on the field trip undertaken	Charts Posters Tools Resource person Pipes Textbooks Internet Surclips

	Patience Responsibility Appreciation	Teacher and learners undertake a field trip to a nearby water treatment plant		

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
10. explain production of fruit trees.	**Concepts** Socio-economic and nutritional importance of fruit trees Classification of fruit trees Budgeting and Financial planning Shopping list Establishment and management of nursery Land preparation • Site selection	Learners discuss socio-economic and nutritional importance of fruit trees **Teacher and learners discuss**: - classification of fruit trees - budgeting and financial planning in fruit production - With the guidance of a teacher, leaners prepares a shopping list for: - materials needed for establishing a nursery and land preparation - materials needed for storage, processing and preservation of fruits and their products	List classes of fruit trees List proper storage conditions State steps to consider when selecting a site Outline the socio-economic and nutritional importance of fruit trees Outline fruit processing procedures Outline factors determining pricing	Local Environment Tools Nursery Seedlings Internet Chart Billboards Television Posters Fruit dryer

	• Site clearance • Digging holes Planting of one fruit tree found locally including purchase of seedlings Management of fruit trees Storage, Processing and preservation Marketing of fruit trees; advertising Taxation Keeping records **Skills** Decision making Observation Workmanship Competence Manipulation Reporting Calculations **Values and attitudes** Cooperation Awareness Appreciation Responsibility	With a guidance of a teacher, learners: - purchase materials needed for establishing a nursery and land preparation - buy/ pay rent for materials needed for storage, processing and preservation of fruits and their product Teacher and learners discuss: - types of tax (e.g. VAT, land tax) - establishment and management of nursery - factors to consider when selecting site for fruit production - site clearance and cost - steps followed when planting/transplanting fruit trees - management practices in fruit production - storage conditions - processing and preservation - marketing Teacher demonstrates digging of holes and planting/transplanting of trees **Learners practice:** - establishment and management of nursery	Prepare a shopping list for materials needed Prepare income and expenditure account Differentiate between types of tax Describe the procedure followed when planting/transplanting a fruit tree Describe the methods of fruit preservation Describe the methods of advertising Explain establishment and management of nursery Explain different management practices in fruit production Explain marketing strategies of fruits Explain and prepare budgeting and financial planning	Fruits

		- site clearance - digging of holes for planting/transplanting of fruit trees - planting/transplanting one of the fruit trees found locally - management of fruit trees - proper storage - processing and preservation - marketing – advertising and pricing - With the guidance of a teacher, learners prepare income and expenditure account		

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
11. describe crop protection.	**Concepts** **Weeds:** • common weed species • effects of weeds • methods of weed control (cultural, mechanical, biological and chemical) **Pests:**	**Teacher and learner review:** - ways of payment (cash, cheque, debit and credit cards, electronic transfers) - Preparation of Budget, financial planning and shopping list **Teacher and learners discuss :** - common weed species and	list names of diseases caused by bacteria, fungi and virus in crops list common crop pests and the damage they cause identify common weed species	Local weed species Sweeping net Bottles Pest specimen Damaged crop specimen

	• classification: - biting and chewing - piercing and sucking - boring • lifecycles of different crop pests • effects of different crop pests • mode of spread • control measures: - mechanical, &cultural - biological - chemical - integrated pest management and indigenous technologies • mode of action of chemicals **Diseases:** • Common crop diseases: - Bacterial - Fungal - Viral • Mode of infection • Effects • Prevention and control of one crop disease from each class (bacterial,	their classes - effects of weeds - mode of spread and methods of control **learners:** - visit a nearby cropland to collect different weed species - identify and classify common weed species learners collect different crop pests **Teacher and learners:** - classify crop pests according to their mouth parts - discuss the lifecycles of crop pests Teacher describes mode of spread of pests Teacher and learners discuss control measures Learners describe the mode of action of chemicals e.g. systemic, contact and fumigants **Teacher and learners:** - classify diseases into bacterial, fungal and viral diseases - visit nearby cropland to	identify mode of action of chemical control outline effects of weeds, pests and diseases on crops outline proper use and handling of farm chemicals describe mode of infection of bacterial, fungal and viral diseases describe methods of weed, pest and disease control and their effects explain prevention of weeds, pests and diseases draw and label life cycles of different classes of pests report on the diseases observed	Chemicals Water Sprayers Resource person Internet Text books Protective clothing

	fungal and viral) Proper use and handling of farm chemicals Cost of using chemicals Budgeting for chemicals Shopping list **Skills** Listening Communication Identification Comparison Observation Cooperation Drawing Reporting Decision making Critical thinking **Values and attitudes** Awareness Appreciation Responsibility Patience	observe crop diseases • **discuss:** - mode of infection and effects of crop diseases - prevention and control of one named plant disease from each class - proper use and handling of farm chemicals **Learners practice:** - prevention and control of diseases - proper use and handling of farm chemicals		

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
12. describe establishment of improved pastures and methods of fodder conservation.	**Concepts** Establishimproved pasture Manage improved pasture Pasture improvement cost Methods of fodder conservation **Skills** Observation Comparison Workmanship Problem solving **Values and attitudes** Awareness Appreciation Responsibility	**Teacher and learners:** • revise types of pasture vegetation • Discuss: - establishment of improved pastures and budget for improvement cost - management of improved pastures - methods of fodder conservation **Learners:** - Establish and manage an improved pasture - practice fodder conservation methods	list methods of fodder conservation state ways of improving pastures differentiate between methods of fodder conservation describe establishment of improved pastures explain management of improved pastures	Field trip Resource person Local environment Internet Text books Pasture plants and seeds

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
13. describe breeding in crops and livestock.	**Concepts:** Breeding Monohybrid inheritance Selective breeding in crops and livestock Breeding methods: • Cross breeding • In-breeding • Pedigree • Line breeding Genetically modified organisms(GMOs) Financial cost of using GMOs and OVP **Skills** Comparison Calculation Interpretation Identification Drawing Problem solving Observation Reporting Critical thinking Manipulation **Values and attitudes**	• Teacher describes breeding and its importance • Teacher explains the following terms: - Chromosome and illustrate with a diagram - gamete with a diagram - Gene - Allele - Homozygous - Heterozygous - Dominant - Recessive - (All will be illustrated using gametes **(TG)** • Teacher illustrates simple genetic crosses • Learners practice simple genetic crosses • Teacher explains genotype and phenotype **Teacher and learners:** - discuss the importance of phenotype and genotype in crop and livestock breeding - discuss how breeding can improve yield • Teacher explains the role of selection in production of	state the importance of GMOs outline the importance of breeding differentiate between selective breeding and GMOs differentiate between inbreeding and cross breeding distinguish between genotype and phenotype describe effects of breeding on crops and livestock production explain the benefits of natural mating, AI and embryo transfer in livestock production draw genetic crosses calculate and predict	Charts Internet Text books Resource person Models

	Awareness Appreciation Responsibility Patience Cooperation	improved crop varieties and livestock breeds of economic importance **Teacher and learners discuss:** - the difference among natural mating, artificial insemination and embryo transfer/transplant and their importance - cross breeding, inbreeding and their importance - genetically modified organisms (GMOs) - the importance and challenges of GMOs in crop and livestock production including their financial impacts - teacher and learner take a field trip or invite a resource person to demonstrate or discuss AI or embryo transfer	the results of simple genetic crosses involving 1:1 and 3:1 ratios. report on a field trip	

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
14. discuss farm mechanization.	**Concepts:** Common machines used in farming Importance of farm mechanization Factors that limit the use of farm machinery Care and maintenance of farm machinery How to manage money Becoming a critical consumer Managing risk and emotion The importance of money **Skills:** Comparison Observation Reporting Identification Manipulation Workmanship Calculations **Values and attitudes:**	Learners brainstorm common machines used in farming Teacher and learners review risk and uncertainty including its management practices (cooperatives, investments (fraud) & insurance) Learners relate risk and uncertainty including its management practices to mechanization **Teacher and learners discuss:** - the importance of farm mechanisation - factors limiting the use of farm machinery - use of common machines used in farming - care and maintenance of farm machinery - Ways of payment (cash, cheque, debit and credit cards, electronic transfers) - Problems involving depreciation and appreciation of fixed assets - Importance of using technology to save money (movable assets e.g. cattle	list common machines used in farming state the importance of farm mechanization state factors limiting the use of farm machinery Outline different payment methods describe routine care and maintenance of one of the farm machines Calculate depreciation and appreciation percentages of fixed assets Explain how use of technology can save money Explain the importance of planning for retirement through investments Explain and prepare	Charts Textbooks Internet Farm Machines Resource Person

	Appreciation Awareness Patience Responsibility	sold for buying machinery) - Importance of planning for retirement through investments Teacher demonstrates care and maintenance of one of the farm machines Learners carry out routine care and maintenance of one of the farm machines Under the guidance of teacher, learners prepare: - Budget and financial planning for maintenance - Income and expenditure account (including fixed assets) Teacher and learners take a field trip to observe different farm machines.	budgeting and financial planning Prepare income and expenditure accounts for farm machines Learners compile a report on the field trip taken	

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
15. explain farm structures.	**Concepts:** Farm structures: • Fencing • Farm buildings • Farm dam construction **Skills:** Comparison Observation Reporting Identification Manipulation Workmanship Listening Critical thinking Measuring **Values and attitudes:** Appreciation Awareness Responsibility Patience	**Teacher and learners discuss:** - types of fence suitable for different purposes - procedure followed during fence construction Teacher demonstrates fence construction Learners practice fence construction Teacher and learners take a field trip to observe different types of fences **Teacher and learners:** - discuss the properties and uses of locally available building materials: wood, concrete block, stone, brick, metal, earth and thatch - take a field trip to construction site to observe how building materials are being used Learners practice building of farm structures using locally available materials **Teacher and learners discuss:** - features of a farm dam	identify types of fences suitable for different purposes list materials required for construction of foundation, floor, walls and roof state the advantages and disadvantages of each building material outline the importance of fencing describe construction of fence corners explain construction of farm dam draw and label a farm dam	Charts Text books Internet Tools Fences Cement Concrete Sand Posts Plumb line Thatch Corrugated iron sheets Metal Brick Concrete block Stones

		- materials used for farm dam construction Learners practice farm dam construction Teacher and learner undertake a field trip to observe features of a farm dam Report on the field trip undertaken		Water Resource person

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
16. discuss livestock protection.	**Concepts:** Signs of good health Signs of ill health Parasites: • Types - external - internal • Life cycles • Problems in livestock production Diseases: • Classification and spread: - infectious	**Teacher and learners discuss:** - signs of good health in livestock - signs of ill health in livestock - differences between internal and external parasites with examples - life cycles of one internal and one external parasites - problems caused by parasites in livestock production **Learners:** - differentiate signs of ill and good health on live animals	State signs of good and ill-health in livestock Identify a sick from a healthy livestock Outline types of parasites Outline problems caused by parasites and diseases in livestock production Differentiate between antiseptic and	Livestock Internet Charts Posters Chemicals (antiseptic and antibiotics) Veterinary clinic Farmer/ extension officer

	- contagious - notifiable - scheduled - nutritional • Problems in livestock production Prevention and control of disease Importance of livestock hygiene Isolation of sick animals **Skills** Effective communication Identification Comparison Observation Cooperation Critical thinking Workmanship Reporting Listening Drawing **Values and attitudes** Awareness Appreciation Patience Responsibility	at a nearby farm/kraal - draw and label life cycles of one internal and one external parasites of local importance (tick/ tapeworm/mites/lice/ liver fluke) **Teacher and learners discuss:** - spread of infectious diseases - spread of contagious diseases - notifiable disease - scheduled diseases - nutritional diseases - difference between antiseptic and antibiotics - role of antiseptic and antibiotics in prevention and control of diseases - the importance of livestock hygiene - importance of livestock isolation and quarantine Learners practice prevention and control of parasites and diseases Teacher and learners undertake a field trip to veterinary clinic Teacher Invites an expert to talk about animal health	antibiotics Explain infectious diseases Explain contagious diseases Explain Notifiable disease Explain scheduled disease Explain nutritional disease Explain importance of hygiene in livestock protection Explain importance of isolation and quarantine in animal protection Explain one disease from each class under the following: causative agent, mode of spread, signs and symptoms, prevention and control Draw and label a life cycle of internal	Text book

			parasite of local importance Draw and label a life cycle of external parasite of local importance report on the field trip undertaken	

At the end of grade 10 & 11, learners will be able to:	Concepts, skills, values and attitudes	Suggested learning experiences	What to assess: teacher assesses learner's ability to:	Suggested resources
17. discuss storage, preservation and marketing of livestock products.	**Concepts**: Storage conditions Preservation Marketing strategies • Hygiene • Grading • Packaging • Pricing • Advertising **Skills** Manipulation Observation Co-operation Comparison Workmanship Reporting	Teacher and learners revise processing of livestock products and by-products **Teacher and learners discuss:** - storage conditions of products and by-products - preservation methods - marketing strategies **Learners practice :** - preservation methods - marketing strategies Teacher and learners undertake a field trip to observe proper storage, preservation methods	List proper storage conditions of products and by-products Outline preservation methods of livestock products Describe marketing strategies of products and by-products Write a report on field trip undertaken	Posters Internet Textbooks Magazines Charts Livestock products and by-products Preservation equipment

	Identification Critical thinking Advertising **Values and attitudes** Appreciation Awareness Cleanliness Responsibility	and marketing strategies		

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
18. describe hydroponics and organic farming.	**Concepts** hydroponics Types of hydroponics Effects of hydroponics Organic farming Advantages and disadvantages of organic farming **Skills** Identification Comparison Observation Evaluation	**Teacher and learnersdiscuss:** • hydroponics • types and effects of hydroponics • organic farming • advantages and disadvantages of organic farming Learners practice hydroponics and organic farming Teacher and learners take a field trip to observe hydroponics and organic farming	outline types of hydroponics differentiate between the types of hydroponics describe effects of hydroponics explain organic farming outline the effects of organic farming	Internet Local environment Resource person Text books Inputs Cuttings Containers Water

	Workmanship cooperation **Values and attitudes** Appreciation Awareness Responsibility Patience		report on the field trip undertaken	

At the end of grade 10 & 11, learners will be able to:	**Concepts, skills, values and attitudes**	**Suggested learning experiences**	**What to assess: teacher assesses learner's ability to:**	**Suggested resources**
19. explain production of forest trees.	**Concepts** Socio-economic importance of forest trees Classification of forest trees Land preparation	Learners discuss socio-economic importance of forest trees Teacher and learners review establishment and management of nursery **teacher and learners discuss**: - classification of forest trees	List classes of forest trees List proper storage conditions Outline the socio-economic importance	Local Environment Tools Seedlings Internet

	• Site clearance • Digging holes Planting of one forest tree found locally Management of forest trees Storage Processing and preservation Marketing of forest trees **Skills** Decision making Observation Workmanship Competence Manipulation Reporting **Values and attitudes** Cooperation Awareness Appreciation Responsibility	- site clearance - steps followed when planting/transplanting forest trees - management practices in forest production - storage conditions - processing and preservation - marketing Teacher demonstrates digging of holes and planting/transplanting of trees **Learners practice:** - site clearance - digging of holes for planting/transplanting forest trees - planting/transplanting one of the forest trees found locally - management of forest trees - proper storage - processing and preservation - marketing Teacher and learner undertake a field trip to observe management and processing of forest trees	of forest trees Outline forest processing and preservation procedure Describe the procedure followed when planting/transplanting a forest tree Explain different management practices in forest production Explain marketing strategies of forest products Report on the field trip undertaken	Nursery Text books Resource person Charts Posters