ZIMBABWE

MINISTRY OF PRIMARY AND SECONDARY EDUCATION

HORTICULTURE SYLLABUS

FORMS 5 - 6

2015-2022

Curriculum Development Unit
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1.0 PREAMBLE

1.1 INTRODUCTION

Zimbabwe embarked on an agrarian Land Reform to correct colonial land imbalances and empower the previously marginalized Zimbabweans with access to land. In-order to safe guard this important national heritage, ensure food security through sustainable land use, it is important for learners of diverse backgrounds to acquire necessary horticultural knowledge and skills. Horticulture is the art and science of producing fruits, vegetables, flowers, herbs, ornamental plants and also involves landscaping. This syllabus is designed for Form 5 and 6 learners in Horticulture. It is a two year learning phase which covers concepts, principles and practices in horticulture. The syllabus will provide learners with a rich experience in identifying, investigating, problem solving and assessing the viability of sustainable horticultural enterprises in an indigenized economy. Learners will be assessed through continuous and summative assessment.

1.2 RATIONALE

Agriculture is a learning area studied from Grade 3 to Form 4 therefore it is imperative for learners to specialize at Form 5 and 6 so as to acquire adequate horticultural skills and knowledge to create employment and for further learning opportunities. Specialization in horticulture would enable learners to be proactive, productive, add value to the community and national economy. Horticulture stimulates in learners, the responsibility to intensively care and utilize land sustainably for economic development. The Horticulture learners will at the end of the two –year learning phase, value the dignity of labour and food sovereignty.

The Horticulture syllabus enables learners to develop the following skills:

- Research
- Production
- Marketing
- Value addition
- Problem-solving

- Critical thinking
- Decision-making
- Conflict resolution
- Leadership and teamwork
- Self-management
- Communication
- Technology and innovation
- Enterprise development
- Designing skills

1.3 SUMMARY OF CONTENT

The learning area will include the study of background to horticulture, production technology, plant physiology, soil and water management, plant protection, landscaping and ornamental plants, floriculture, vegetable production, fruit production and herb production

1.4 ASSUMPTIONS

It is assumed that learners have practical skills and knowledge in:

- Crop production
- horticulture production
- sustainable use of agricultural resources
- e-learning
- marketing of horticultural products

1.5 CROSS- CUTTING ISSUES

The Horticulture learning area will encompass the following cross cutting themes:

- Disaster and risk reduction
- Enterprise skills
- Environmental issues
- Team work
- Sustainable resource utilization
- Digital literacy
- Inclusivity
- Safety and health
- HIV and AIDS
- Gender

2.0 PRESENTATION OF SYLLABUS

The Horticulture syllabus is a single document covering Forms 5- 6. The syllabus has a suggested list of resources to be used during teaching and learning.

3.0 AIMS

The syllabus aims to help learners to:

3. 1 develop an appreciation of the socio-economic importance of horticulture to agricultural development of the country

3.2 develop positive attitudes towards Horticulture as a learning area

3.3 apply competences in solving horticulture related problems

3.4 demonstrate innovativeness in the sustainable utilization of local resources in intensive horticulture production

3.5 apply value addition skills in the processing and marketing of horticultural products to meet food security and economic standards

3.6 demonstrate desirable literacy and numeracy skills including practical competences necessary for life

3.7 prepare for life and work in an indigenized economy, increasingly globalised and competitive environment

4 SYLLABUS OBJECTIVES

By the end of the learning phase learners should be able to:

4.1demonstrate an understanding of the importance of horticulture in socio-economic development

4.2 apply scientific principles in horticultural production

4.3 evaluate resources necessary for horticulture production

4.4 demonstrate an understanding of plant protection principles

4.5 demonstrate the sustainable utilization of local resources

4.6 efficiently produce and market horticultural products

4.7 add value to horticultural products

4.8 design and carry out research work on horticulture production for economic development of the nation

4.9 prepare and implement a sustainable horticultural project proposal

5.0 METHODOLOGY AND TIME ALLOCATION

5.1 METHODOLOGY

Learner centred and hands on approaches should be used in the development of concepts and skills. These approaches should be inclusive and encourage curiosity as well as promote practical oriented learning. Emphasis should be placed on equipping learners with practical skills. Linkage between theory and practice should be implemented in the teaching and learning of horticulture

The following are suggested methods of teaching and learning of horticulture:

- Discussions
- Demonstrations
- Experimentations
- Problem-solving
- E – learning
- Debates
- Specimen collections
- Research
- Project-based learning
- Educational tours
- Design-based learning
- Survey
- Simulation and modelling

6.0 TOPICS

1. Background to Horticulture
2. Production technology
3. Plant physiology
4. Soil and water management
5. Plant protection
6. Landscaping and ornamental plants
7. Floriculture
8. Vegetable Production
9. Fruit Production
10. Herb and Spice production

7.0 SCOPE AND SEQUENCE

7.1TOPIC 1 BACKGROUND TO HORTICULTURE

TOPIC	FORM 5	FORM 6
Background to Horticulture	• Historical perspective • Branches • Importance • Factors affecting horticulture production	

7.2 TOPIC 2 PRODUCTION TECHNOLOGY

TOPIC	FORM 5	FORM 6
Production technology	• Production systems • Propagation methods • Structures and Equipment used in horticulture production	

7.3 TOPIC 3: PLANT PHYSIOLOGY

TOPIC	FORM 5	FORM 6
Plant structure	• Roots • Stems • Leaves • Flowers	
Plant-water relations	• Water properties • Water movement • Radial movement of water • Water potential	

TOPIC	FORM 5	FORM 6
	• Transpiration •	
Bioenergetics and ATP synthesis	• Photosynthesis • Photosynthetic pathways • Translocation • Cellular respiration	
Plant Growth and Development	• Germination • Meristems • Plant growth • Plant growth regulators	
Environmental factors	• Effects of environmental factors	

7.4 TOPIC 4:SOIL AND WATER MANAGEMENT

TOPIC	FORM 5	FORM 6
	•	
Soil	• Physical properties • Chemical properties • Biological properties • Soil management	
	• Soil moisture • Water and the environment • Soil-water management	

7.5TOPIC 5: PLANT PROTECTION

TOPIC	FORM 5	FORM 6
Plant protection	• Weeds • Pests • Diseases • Safety precautions • Sprayer calibration	

7.6TOPIC 6: LANDSCAPING AND ORNAMENTAL PLANTS

TOPIC	FORM 5	FORM 6
Landscaping	• Landscaping • Principles of landscaping • Designing	
Ornamental plants	• ornamental plants	

7.7TOPIC 7: FLORICULTURE

TOPIC	FORM 5	FORM 6
Flower production	• Origin and uses of flowers • Land preparation • Management practices Post-harvest handling and marketing	• Flower production •

7.8 TOPIC 8: VEGETABLE PRODUCTION

TOPIC	FORM 5	FORM 6
Vegetable production	• Vegetables • Vegetable rotation • Environmental requirements • Nursery • Vegetable management • Harvesting • Post-harvest handling and marketing	• Environmental requirements • Nursery • Vegetable management • Harvesting • Post-harvest handling and marketing

7.9 TOPIC 9: FRUIT PRODUCTION

TOPIC	FORM 5	FORM 6
Fruit production		• Importance of fruits • Classification • Nursery • Propagation • Orchard establishment • Orchard management • Harvesting • Post-harvest handling and marketing

7.10 TOPIC 10: HERB AND SPICE PRODUCTION

TOPIC	FORM 5	FORM 6
Herb production	•	• Herb production •
Spice production	•	• Spice production •

8.0 COMPETENCY MATRIX

FORM 5 SYLLABUSES

8.1 TOPIC 1: BACKGROUND TO HORTICULTURE

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Historical perspective	• discuss the origin of horticulture • explain the development of horticulture	• Origin of horticulture • Development of horticulture locally, regionally and globally	• Discussing the origin of horticulture • Explaining the development of horticulture • Researching on the origins of horticulture	ICT tools with Jaws software Textbooks
Branches of horticulture	• outline the branches of horticulture • describe the branches	• Vegetable production • Flower production • Fruit production • Herb production	• Identifying the branches of horticulture • Discussing the branches of horticulture • Educational touring horticulture farms	ICT tools with Jaws software Horticulturalist
Importance of horticulture	• discuss the socio-economic importance of horticulture • explain the ecological importance of horticulture	• Socio-economic importance • Ecological importance	• Discussing the socio-economic importance of horticulture • Explaining the ecological importance of horticulture • Researching on socio-economic importance of horticulture	ICT tools with Jaws software Horticulturalist
Factors affecting horticulture production	• identify factors affecting horticulture production • discuss how each factor affects horticulture production • discuss mitigatory measures	• Environmental factors • Economic factors • Cultural factors • Religious factors • Political factors	• Discussing the factors affecting horticulture production • Experimenting on how environmental factors affect horticulture production	• ICT tools with JAWS software •

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	against negative effects		• Assessing the impact of cultural, political and religious factors on horticulture production • Generating mitigatory measures against negative effects	

8.2 TOPIC 2: PRODUCTION TECHNOLOGY

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Production systems	• identify production systems in horticulture • describe the nature and function of controlled environments • discuss the strengths and weaknesses of each production system	• Open field • Green house • Shade house • Hot bed • Cold frames •	• Discussing production systems of horticulture crops • Designing controlled environments • Evaluating the strengths and weaknesses of each production systems • Constructing a shade house and demonstrating its use • Educational touring to a green house production system	• ICT tools with JAWS software • Print and electronic media • Green house • Shade house • Hot bed • Cold frames •
Propagation methods	• discuss propagation methods in horticulture • illustrate how to propagate using seeds, layering, cuttings, grafting and budding	• Seed • Suckers • Cuttings • Grafting and budding • Layering • Tissue culture	• discussing propagation methods in horticulture • Demonstrating how to propagate different plants using seeds, cuttings, grafting, budding and layering	• ICT tools with JAWS Software • Print and electronic media • Seed • Vegetative propagules • Tissue

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	• describe the concepts of cloning and tissue culture • outline practical applications of the tissue culture technique •	• Cloning	• Illustrating the concepts of cloning and tissue culture • Viewing video clips on tissue culture techniques in production of horticultural plants • Raising horticulture plants using vegetative propagation methods	
Structures and equipment used in Horticulture	• discuss the structures used in horticulture production • relate the design of the structures to their functions • demonstrate how to use horticultural equipment	• Driers • Storage facilities • Equipment used in horticulture	• Describing structures used in horticulture production • Demonstrating how to use horticultural equipment	• ICT tools with JAWS Software • Print and electronic media • Horticultural tools and equipment

8.3 TOPIC 3: PLANT PHYSIOLOGY

SUB TOPIC: PLANT STRUCTURE

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Roots	• identify parts of the cross-section of a root • outline functions of root parts • prepare root slides	• Root anatomy	• Cutting a root to view the cross-section • Outlining functions of root parts • Preparing slides • Viewing slides • Drawing of the cross-section of a root •	• Roots, stems • ICT tools with JAWS Software • Slide strips • Microscope • Prepared slides •
Stems	• identify parts of the cross-section of a stem • outline functions of the stem parts • prepare stem slides	• Stem anatomy	• Cutting a plant stem • Outlining functions of stem parts • Drawing of the cross-section of stem • Preparing stem slides	• stems • ICT tools with JAWS Software • Slide strips • Microscope • Prepared slides
Leaves	• Identify parts of the cross-section of a leaf	• Leaf anatomy	• Viewing slides	• Leaf samples

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	• Outline functions of leaf parts • Prepare leaf slides		• Drawing the cross-section of a leaf • Labeling parts of the cross-section of a leaf • Outlining functions of leaf parts • Preparing leaf slides	• ICT tools • Slide strips • microscope
Flowers	• Identify parts of thecross-section of a flower • Outline functions of flower parts • Differentiate wind from insect pollinated flower • Distinguish between a male and female flower	• Flower anatomy - Wind - Insect pollinated	• Viewing slides • Drawing of the cross -ection of a flower • Identifying parts of the cross-section of a flower • Describing functions of flower parts • Distinguishing wind from insect pollinated flowers	• Flower samples • ICT tools • Slide strips • Microscope

SUBTOPIC: PLANT-WATER RELATIONS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES

Water properties	• Describe water properties in relation to its functions	• Water properties: - cohesion - adhesion - universal solvent - specific heat capacity - heat of fusion - heat of vaporization	• Discussing water properties • Conducting experiments on water properties	• ICT tools • watersamples
Water movement	• discuss factors that affect water uptake in plants • explain the mechanism of water uptake in plants	• Factors affecting water uptake • osmosis • diffusion • mass flow	• Discussing factors that affect water uptake • explaining the mechanism of water uptake • carrying out experiments to demonstrate water movement	• ICT tools • Potato cubes • Experiment kit
Radial movement of water	• describe water flow pathways from cell to cell	• Pathways of water movement: -apoplast -symplast. - vacuolar	• Discussing water flow pathways from cell to cell. • Illustrating water flow path ways from cell to cell	• ICT tools with JAWS software
Water potential	• explain the components of water potential • design and carry out experiments on water potential • determine water potential	• Water potential - pressure potential - osmotic potential - matric potential	• Discussing the components of water potential • Designing and carrying out experiments on water potential • Calculating water potential	• ICT tools with JAWS software • Potato cubes • Experimental kit

Transpiration	• describe factors affecting the rate of transpiration	• Factors affecting transpiration: - light - temperature - humidity - wind -soil water -plant factors	• Discussing factors affecting the rate of transpiration • Designing experiments to investigate the effects of factors on the rate of transpiration	• Experimental kits

SUBTOPIC: BIOENERGETICS AND ATP SYNTHESIS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES

Photosynthesis	• explain the factors affecting the rate of photosynthesis • describe the light-dependent reactions • explain the process of carboxylation • describe photosynthetic electron transport • describe bio-chemical mechanism by which ATP is synthesized • explain the universal role of ATP as the energy 'currency' in plants	• Factors affecting rate of photosynthesis - light intensity - carbon dioxide concentration - oxygen concentration - water - temperature • Lightdependent reactions : - photolysis of water -cyclic and non-cyclic phosphorylation - • Light-independent reactions • ATP synthesis	• Discussing the factors affecting rate of photosynthesis • Illustrating the effects of environmental factors on photosynthesis • Carrying out experiments on factors affecting photosynthesis • Describing the light-dependent reactions **(** • Describing the process of carboxylation • Illustrating the structure and synthesis of ATP, • Demonstrating the bio-chemical mechanism by which ATP is synthesized • Describing the universal role of ATP as the energy 'currency' in plants	• ICT tools with JAWS software • Plant samples
Photosynthetic pathways	• describe the structural differences between C_3 and C_4 plants • compare the C_3 and C_4 bio chemical pathways • discuss CAM pathway • apply the knowledge of C3 and C4	• Bio-chemical pathways - C_3 - C_4 -Crassulacean AcidMetabolism	• Illustrating C_3, C_4 and CAM pathways • Discussing the structural differences between C_3 and C_4 plants • Differentiating C_3, C_4 and	• ICT tools with JAWS software • Plant samples • Print Media

	plants in horticulture production	(CAM)	CAM bio-chemical pathways	
Translocation	• relate the phloem structure to its functions. • describe the translocation mechanism of different photosynthates • explain the significance of translocation in plants	• Phloem structure • Mechanisms: - Active - Mass flow - Diffusion	• Describing the structure of the phloem and relate it to its functions. • Discussing translocation mechanism of different photosynthates • Carrying out experiments to verify translocation in plants • Discussing the importance of translocation in plants	• ICT tools with JAWS software • Plant samples • Print Media
Cellular respiration	• outline the factors affecting respiration • describe the process of respiration. • discuss the significance of respiration in plants • apply the knowledge of cellular respiration in horticulture .	• factors affecting cellular respiration • Glycolysis • Kreb's cycle • Electron transport chain • Significance of respiration in plants	• Discussing factors affecting respiration • describing, the process of respiration • discussing the significance of respiration in plants • Applying the knowledge of respiration in plants	• ICT tools • Fruits • Seeds • Plant samples

SUB TOPIC: PLANT GROWTH AND DEVELOPMENT

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Seed germination	• discuss requirements for seed	• Requirements for optimum	• Examining the	• ICT tools with JAWS software

	germination • describe the process of seed germination • distinguish between epigeal and hypogeal germination • test seed for viability • discuss the different types of seed dormancy • describe the methods of over-coming dormancy	germination: - water - temperature - oxygen - light • Seed germination processes: - imbibition - enzyme activation • Types of seed germination: - epigeal - hypogeal • Seed viability • Types of seed dormancy • Overcoming dormancy	requirements for seed germination • Describing the process of seed germination • Carrying out experiments on the conditions necessary for germination • distinguishing between epigeal and hypogeal germination • . • Determining seed viability • Discussing types of seed dormancy • Carrying out experiments on over-coming seed dormancy	• Seed samples • Tetrazolium trichloride • Controlled environment
Meristems	• describe the types of plant meristems • apply the knowledge of meristems in horticultural crops	• Meristems: -apical -intercalary -lateral -basal	• Discussing types of plant merestems • Locating the meristematic sites on a plant • Discussing the importance of meristems in horticulture plants	• ICT tools with JAWS software • Meristems
Plant growth	• explain the concepts of growth and development • describe the phases of plant growth	• Growth and development: - primary and secondary growth - determinant and	• Discussing growth and development in plants • Describing how cell division and enlargement	• ICT tools with JAWS software • Plant samples • Grafted plants

	• differentiate determinant from indeterminant growth habits	indeterminant growth	lead to plant growth • Contrasting determinant and indeterminate growth habits	
Plant Growth Regulators	• describe the effects of plant growth regulators on plant growth and development • apply the knowledge of plant growth regulators in horticulture	• Gibberillins • Cytokinins • Ethylene • Auxins • Abscisic acid	• Discussing effects of plant growth regulators on growth and development • Using plant growth regulators in horticulture production	• Plant growth regulators • Horticulturalist/Agronomist

SUB TOPIC: ENVIRONMENTAL FACTORS

KEY CONCEPT	LEARNING OBJECTIVES **Learners should be able to**:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Effects of environmental factors	• explain the effects of environmental factors on horticultural production	• Environmental factors: - air circulation - drainage - light - humidity - temperature - moisture - soil fertility	• Discussing the effect of environmental factors on crop productivity. • Designing and carrying out experiments on responses of plants to environmental factors •	• plant samples • ICT tools with JAWS software

8.4 TOPIC 4: SOIL AND WATER MANAGEMENT

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Physical properties	• describe physical properties of soil • determine the physical properties of the soil • discuss the importance of soil physical properties to plant growth	• Soil texture • Soil color • Soil structure • Soil air • Bulk density • Particle density • Porosity	• Discussing the importance of soil physical properties • Determining the physical properties of soil • Relating bulk density to soil structure and porosity	• Soil samples • ICT tools with JAWS software
Chemical properties	• explain the effects of soil pH to crop production • correct soil pH for specific plants using suitable agents • explain the significance of cation exchange •	• Soil pH • Cation Exchange Capacity (CEC)	• Discussing the effects of soil pH on crop production • Determining soil pH • Applying pH correcting agents • Discussing the importance of cation exchange capacity •	• Soil samples • pH meters • ICT tools with JAWS softwares • Liming materials
Biological properties	• describe the importance of soil organisms in crop production • explain the factors that influence activities of soil organisms	• • Soil macro organisms: - earthworms - Termites - Ants • Soil micro organisms: - bacteria - Fungi - Nematodes - Protozoa	• Discussing the importance of soil organisms in crop production • Outlining the factors that influence activities of soil organisms • Carrying out experiments to determine presence of organisms in soil	• Soil samples • Plant samples • ICT tools with JAWS software
Soil management	• explain the roles of macro and micro elements in plants	• Plant nutrients	• Discussing the roles of macro and micro elements	• Soil sampling tools • Fertilizer samples

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	• apply the principles of soil sampling in collecting soil samples • interpret soil analysis results • determine fertilizer requirements per given plant • differentiate the fertilizer types according to nutrients composition and formulation • select the appropriate application method • justify choice of appropriate soil conservation methods for specific areas • carry out appropriate soil conservation methods for an enterprise	• • Types of fertilize • Application methods • Calculations • Soil sampling and analysis • Soil conservation	• Collecting soil samples • Analyzing soil results • Collecting plant samples showing deficiency symptoms • Calculating fertilizer requirements • Classifying the fertilizer types according to formulation and nutrient composition • Choosing the appropriate application methods • Identifying appropriate soil conservation methods • Implementing soil conservation measures	• Organic matter samples • Mulching materials • Digging tools • ICT tools with JAWS software • Plant samples
Soil moisture	• discuss the importance of soil moisture • describe the forms of soil moisture • explain the terms used in soil water relations • determine soil moisture content • determine available soil moisture for plant uptake	• Importanceof soil moisture • Capillary • Hygroscopic • Gravitational • terms used in soil water relations : - field capacity - available water capacity - wilting point	• Discussing the importance of soil moisture • Outlining the forms of soil moisture • Describing the terms used in soil water relations • Designing and carrying out an experiment on soil moisture content • Calculating available soil moisture	• Soil moisture meter • Tension meters • Soil samples • ICT tools with JAWS software

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Water and the environment	• discuss factors that influence soil moisture availability • manage soil moisture in horticulture production	• Factors affecting soil moisture availability - Soil texture - Organic matter content - Soil structure - Soil temperature - Transpiration - Soil salts	• Researching on factors influencing soil moisture availability • Carrying out experiments to investigate the effects of the environment on soil moisture availability	• Plants organic matter • Soil samples • ICT tools with JAWS software
Soil-water management	• describe different irrigation systems which are suitable for horticulture • evaluate plant-water requirements using the principles of irrigation scheduling • describe various methods of conserving soil moisture	• Irrigation systems • Irrigation scheduling • Conservation methods	• Discussing different irrigation systems • Calculating plant- water requirements • Discussing various methods of conserving soil moisture • Touring horticulture enterprises	• ICT tools with JAWS software • Evaporation pan • Irrigation specialist • Irrigation equipment

8.5 TOPIC 5: PLANT PROTECTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Weeds	• outline the socio-economic importance of weeds • identify weeds • classify weeds • describe mechanisms that make weeds persistent • explain the mechanisms of crop-weed competition • describe the principles of weed management practices	• Socio-economic importance of weeds. • Identification • Classification • Weed persistence mechanisms • Crop-weed competition: - inter and intra-specific competition • Principles of Weed Management: - prevention - eradication - Integrated Weed Management(IWM)	• Discussing the socio-economic importance of weeds • Carrying out a project on weed identification and specimen preservation • Describing weed persistence mechanisms • Describing crop-weed competition • Discussing the principles of weed management	• Weeds • Herbicides • ICT tools
Pests	• outline the socio-economic importance of pests • identify pests	• Socio-economic importance of pests: - insects - mites	• Discussing the socio-economic importance of insect , mite and nematodes • Identifying and classifying	• Pest specimens • ICT tools with JAWS software

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	• classify pests according to feeding habits • describe the life cycle of pests • describe pest management practices	- nematodes • Identification of pests • Classification of .pests according to feeding habits • Life cycle: - Complete metarmorphosis - incomplete metarmorphosis - Vivipary • Pest management	pests according to feeding habits • Describing the life cycle of pests • Collecting and preserving local pest species • Describing pest management practices	• Pesticides • Hand lenses • Micro scopes • Entomologist
Diseases	• outline the socio-economic importance of diseases • classify diseases according to causal agent • describe signs and symptoms of diseases • describe disease cycle • describe modes of transmission • discuss disease management practices	• Socio-economic importance of diseases. • Classification of diseases - bacterial - fungal - viral • Signs and symptoms • Disease cycle • Modes of transmission • Disease management	• Discussing the socio-economic importance of diseases • Classifying diseases into bacterial, viral and fungal • Examining signs and symptoms of diseases • Discussing disease cycle • Describing modes of transmission • Administering disease management operations	• ICT tools with JAWS software • Specimens of infected plants • Plant pathologist
Safety precautions	• describe safe handling of agro-chemicals • outline safe storage procedures and disposal of agro-chemicals • discuss the effects of agro-chemicals to the environment	• Safety precautions: - Handling - Storage - Disposal	• Discussing safe handling of agro-chemicals • Demonstrating safe handling of agro- chemicals • Researching on the effects of agro-chemicals to the environment	• ICT tools with JAWS software • Safety clothing • Chemical Labels

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Sprayer calibration	• calibrate a knapsack sprayer	• Calibration	• Calibrating sprayer	• Knapsack Sprayers • Agro-chemical dealers • ICT tools with JAWS software

8.6 TOPIC 6: LANDSCAPING AND ORNAMENTAL PLANTS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Landscaping	• outline the importance of landscaping • identify landscaping features • outline the use of elements in landscaping	• Importance • Features: -plants, (trees, shrubs, hedges, turfs) • Hardscape (stones, pavements, bricks) -Buildings -Water (Fountains, ponds) • Elements : - Line(Bed lines, hardscape lines, path lines, fence lines, tree lines or plant) - Form- (informal and formal) - Colour (warm, cool) - Visual weight (high, low)	• Discussing the importance of landscaping • Discussing the usefulness of features in landscaping • Describing the use of elements in landscaping	• Trees • Shrubs • Turfs • Pavements • Bricks • Stones • Water • Landscaping specialist • ICT tools with JAWS software

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
		- Texture (fine, coarse)		
Principles of landscaping	• explain the principles of landscaping	• Proportion • Order • Repetition • Unity	• Discussing the principles of landscaping	• Trees • Shrubs • Turfs • Pavements • Bricks • Stones • Landscaping specialist • ICT tools with JAWS software
Designing	• carry out needs analysis for specific areas • select appropriate features to satisfy the needs of the area • apply different principles and elements of landscaping in designing	• Needs analysis • Selection of the appropriate features • Arrangement of features into elements	• Assessing needs • Choosing appropriate features to satisfy the needs of an area • Arranging different features into elements in carrying out landscaping	• Trees • Shrubs • Turfs • Pavements • Bricks • Stones • Landscaping specialist • ICT tools with JAWS software
Ornamental plants	• outline the importance of ornamental plants • discuss the factors that influence choice of ornamental plants • establish ornamental plants • manage established ornamental plants	• Importance • Selection of indigenous and exotic ornamental plants : - trees - shrubs - flowers - herbs - turfs • Plant establishment	• Discussing the importance of ornamental plants • Describing the factors that influence choice of ornamental plants • Planting ornamental plants • Caring of established plants	•Trees •Shrubs •Turfs •Stones •Landscaping specialist • ICT tools with JAWS software

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
		• Maintenance : - watering - pruning -fertilizing - mowing - shaping - training - spiking		

8.7 TOPIC 7: FLORICULTURE

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Flower production	• discuss the origins and importance of flowers • describe the agronomic practices followed in flower production • manage a named flower from land preparation to marketing • discuss the post-harvest care of flowers	• Origins and uses • Land preparation • Management practices • Harvesting • Handling and marketing	• Discussing the origins and importance of flowers • Describing the agronomic practices followed in flower production • Establishing and managing flowers • Discussing the post-harvest handling of flowers **NB** Learners should study and produce one plant from the following groups: - Cut flower (roses, chrysanthemum, protease, hyperecum)	• ICT tools with JAWS software • Plant samples • Flower samples • Pots

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
			- Pot flower- (African violet, poinsettia)	

8.8 TOPIC 8: VEGETABLE PRODUCTION
SUB TOPIC: VEGETABLE PRODUCTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Vegetables	• discuss the socio-economic importance of vegetables • describe the classes of vegetables • describe types of vegetable gardens • discuss the significance of	• Importance • Classification - Use - - scientific - familiesedible part • Vegetable gardens – - home garden - floating garden	• Discussing the socio-economic importance of vegetables • Classifying vegetables • Describing types of vegetable gardens • Discussing the significance of vegetable	• ICT tools with JAWS software • Vegetable samples

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	vegetable gardens	- truck gardens - market gardens - vegetable forcing garden	gardens	
Vegetable rotation	• explain the principles of vegetable rotation • discuss the benefits of vegetable rotation • design a four-crop cycle vegetable rotation	• Principles • Benefits • Rotational sequence	• Describing the principles of vegetable rotation • Discussing the benefits of vegetable rotation. • Designing a four-crop cycle vegetable rotation	• ICT tools with JAWS software •
Environmental requirements	• describe the soil and climatic requirements of vegetables	• Soil • Climatic requirements	• Discussing soil and climatic requirements of vegetables	• ICT tools with JAWS software • Vegetables
Nursery	• outline factors to consider when selecting a nursery site of a named vegetable • discuss factors to	• Establishment - Site selection - Cultivar selection	• Explaining factors to consider when selecting a nursery site • Discussing factors to consider when choosing appropriate vegetable	• ICT tools with JAWS software • Nursery site • seeds

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	consider when choosing appropriate vegetable cultivars • manage the nursery	• Management practices	cultivars • Carrying out the nursery management practices of a named vegetable	
Vegetable management	• describe the planting and transplanting of a named vegetable • discuss the management of a named vegetable • prepare physical and financial records	• Planting and transplanting • Management: -moisture -fertilizers -weeds -pests -diseases • Record-keeping	• Discussing planting and transplanting of a named vegetable • Discussing management practices of a named vegetable • Growing a named vegetable • Keeping records of vegetables **NB**: One vegetable should be studied and grown from each of the following groups: -legumes: peas/green beans/cowpeas. -leaf: cabbage/lettuce/spinach -bulbs: onion/garlic -tubers: Irish potato, yams(madhumbe)	• Print and electronic media • ICT tools with JAWS software • Crop inputs
Harvesting	• discuss maturity indices of vegetables • describe methods of harvesting vegetables	• Maturity indices • Methods	• Identifying maturity indices of vegetables • Harvesting mature vegetables	• ICT tools with JAWS software • Print and electronic media
Post-harvest handling and	• describe the storage facilities for	• Storage facilities • Preservation facilities	• Describing the storage facilities for vegetables.	• ICT tools with JAWS software

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
marketing	vegetables. • discuss the preservation methods and facilities for vegetables • adding value to vegetables • describe the marketing of vegetables	• Preservation methods • Value addition • Marketing	• Discussing the preservation methods and facilities for vegetables • Processing vegetables • Marketing vegetables • Touring a vegetable market	• Vegetables • Samples of processed vegetable products • Print and electronic media

FORM SIX

8.9 TOPIC 7: FLORICULTURE
SUB TOPIC: FLOWER PRODUCTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Flower production	• discuss the origin and the importance of flowers • describe the agronomic practices followed in flower production. • discuss the post-harvest care of flowers • manage a named flower from land preparation to marketing	• Origin and uses • Land preparation • Management practices • Harvesting • Handling and marketing	• Discussing the origin and importance of flowers • Describing the agronomic practices followed in the flower production • Discuss the post-harvest care of flowers • Establishing and managing a flower **NB Learners should only study and produce one plant from the following groups:** - **Bed flowers-(pertunia, sweet pea, marigold)** - **Indigenous (cacti,elephant ear, aloe)**	• ICT tools with JAWS software • Plant samples • Flower samples • Pots

8.10 TOPIC 8: VEGETABLE PRODUCTION

SUB TOPIC: VEGETABLE PRODUCTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Environmental requirements	• describe the soil and climatic requirements of vegetables	• Soil requirements • Climatic requirements	• Discussing soil and climatic requirements of vegetables	• ICT tools with JAWS software • Vegetable samples • Print and electronic media
Nursery	• outline factors to consider when selecting a vegetable nursery site • discuss factors to consider when choosing appropriate vegetable cultivars • establish and manage avegetable nursery	• Establishment - site selection - cultivar selection • Management practices	• Explaining factors to consider when selecting a nursery site • Discussing factors to consider when choosing appropriate vegetable cultivars • Carrying out the nursery management practices of a named vegetable	• ICT tools with JAWS software • Nursery site • Seeds • Print and electronic media
Vegetable management	• describe the planting and transplanting of a named vegetable • discuss the management of a named vegetable • prepare physical and financial records	• Planting and transplanting • Management: -moisture -Fertilizers -Weeds -pests -diseases • Record keeping	• Discussing planting and transplanting of a named vegetable • Discussing management practices of a named vegetable • Growing a named vegetable • Keeping records of vegetables **NB: One vegetable should be studied and grown from each of the following groups:** **-roots: irish potato/ beetroot/carrot/sweet potato** **-fruit vegetables: tomatoes/okra/pepper/mharupwa** **-cucurbits: cucumbers, melons,**	• Print and electronic media • ICT tools with JAWS software • Crop inputs • Seeds of selected varieties

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
			squashes, butternuts, mapudzi/amakhomane, pumpkins/manhanga/amathanga) -indigenous leaf vegetables: ulude/munyevhe/imbuya/mowa/tsine	
Harvesting	• discuss maturity indices of vegetables • describe methods of harvesting vegetables • harvest mature vegetables	• Maturity indices • Methods	• Identifying maturity indices of vegetables • Discussing methods of harvesting mature vegetables • Harvesting mature vegetables	• ICT tools with JAWS software • Print and electronic media
Post-harvest handling and marketing	• describe the storage facilities for vegetables • discuss the preservation methods and facilities for vegetables • describe the process of value addition in vegetables • describe the marketing of vegetables • add value to vegetables • market vegetables	• Storage facilities • Preservation facilities • Value addition • marketing	• Describing the storage facilities for vegetables. • Discussing the preservation methods and facilities for vegetables • Processing vegetables • Marketing vegetables • Touring a vegetable market	• ICT tools with JAWS software • Samples of processed vegetable products • Storage facilities • Print and electronic media

8.11 TOPIC 9: FRUIT PRODUCTION

SUB TOPIC: FRUIT PRODUCTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Importance	• outline the socio- economic importance of fruit production	• Socio-economic importance	• Discussing socio-economic importance	• ICT tools with JAWS software
Classification	• classify fruits according to their climatic origins	• Origins : - exotic (tropical, sub-tropical, temperate) - indigenous	• Grouping fruits according to their origins	• Fruits • ICT tools with JAWS software
Nursery	• discuss factors influencing choice of a nursery site • discuss factors to consider when choosing appropriate fruit cultivars • establish fruit tree nursery • carry out management practices in a nursery	• Site selection • Cultivar selection • Establishment • Management	• Discussing factors affecting choice of a nursery site • Discussing factors to consider when choosing appropriate fruit cultivars • Preparing fruit tree nursery • Managing a nursery	• Trays • Pots • Pockets • Fertilizers • Propagation medium • ICT tools with JAWS software • Planting material
Propagation	• use appropriate propagation method	• Methods: - Seed - Cuttings - Grafting - Layering - Budding	• Selecting appropriate propagation methods • Propagating fruit trees	• ICT tools with JAWS software • Seeds • Cuttings • Layering materials • Budding equipment

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
		- Tissue culture - Suckers		• Rooting hormones • Plants • Suckers
Orchard establishment	• explain the factors which influence site selection • describe orchard land preparation • explain the usefulness of different planting patterns • peg planting stations • prepare a planting hole • plant fruit trees	• Site selection • Land preparation • Planting patterns • Orchard pegging • Planting holes • Planting	• Discussing the factors influencing site selection • Preparing land for an orchard • Discussing the usefulness of different planting patterns • Laying out planting stations • Digging out planting holes • Planting fruit trees	• ICT tools with JAWS software • Fruit trees • Seedlings • Planting boards • Pegs • Lines • Digging tools • Organic matter • Fertilizers
Orchard management	• construct conservation structures in an orchard • carry out appropriate management practices in an orchard	• Conservation structures: -Basins -ridges • Management practices: -watering -fertilizer application -stacking -pruning -training -weed control -disease control -pest control	• Constructing conservation structures • Engaging in appropriate management practices: -watering fruit trees -fertilizing fruit trees -staking and training fruit trees -pruning -controlling weeds, pests and diseases	• Fertilizers • Pesticides • Fungicides • ICT tools with JAWS software • Knapsack sprayers
Harvesting	• identify harvesting indices • harvest fruits using appropriate harvesting method	• Harvesting Indices • Timing • Methods	• Determining harvesting indices • Harvesting • Touring orchards	• Fruit tress • Harvesting equipment • ICT tools with JAWS software
Post-harvest handling	• grade the fruits according to	• Handling and	• Grading	• ICT tools with JAWS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
and marketing	set standards • package the graded fruits • process fruits for marketing • determine the price of the produce • market the fruits • prepare production and financial records	Marketing : - grading - packaging - weighing - ripening - value addition - storage - transportation	• Packing • Processing • Pricing • Selling • Compiling production and financial records • Touring fruit processing plants **NB: NB: One fruit crop should be studied and grown from each of the following groups:** **Group A** **<u>Tropical</u> – Mango, banana, avocado, guava** **Group B** **<u>Subtropical-</u> Citrus, granadilla, grapes** **Group C** **<u>Temperate</u>** **- Apples, peaches, plums** **Group D** **<u>Indigenous</u>-** **Mawuyu/umkhomo/baobab, mapfura/amaganu, mutohwe/uxakuxaku, nyii/mnyi, masawu, mukute, muzhanje**	software • Packaging material • Weighing equipment • Ripening hormones

8.12 TOPIC 10: HERB AND SPICE PRODUCTION

SUB TOPIC: HERB PRODUCTION

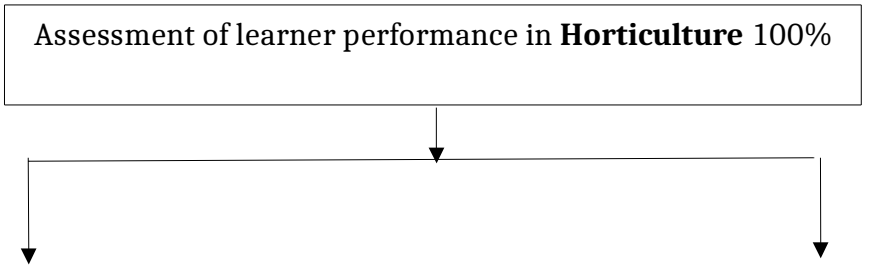
KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Herb production	• outline the origins and uses of herbs • select appropriate production system • describe land preparation • discuss the management of herbs • harvest, handle and process herbs • market herbs • keep records	• Origins and uses of herbs • Production system - open field - shade • Land preparation • Management practices • Harvesting • Post-harvesting handling and marketing	• Discussing the origins and uses of herbs • Choosing appropriate production system • Preparing land for the production of selected herbs • Establishing and managing the production of herbs • Harvesting, handling and processing herbs • marketing herbs • preparing records **NB Learners should study and grow at least 3 herbs from the following: aloe, mint, rosemary, lavender, wormwood, sweet basil, lemon grass, thyme, cinnamon**	• ICT tools • Herbalist • Herbs

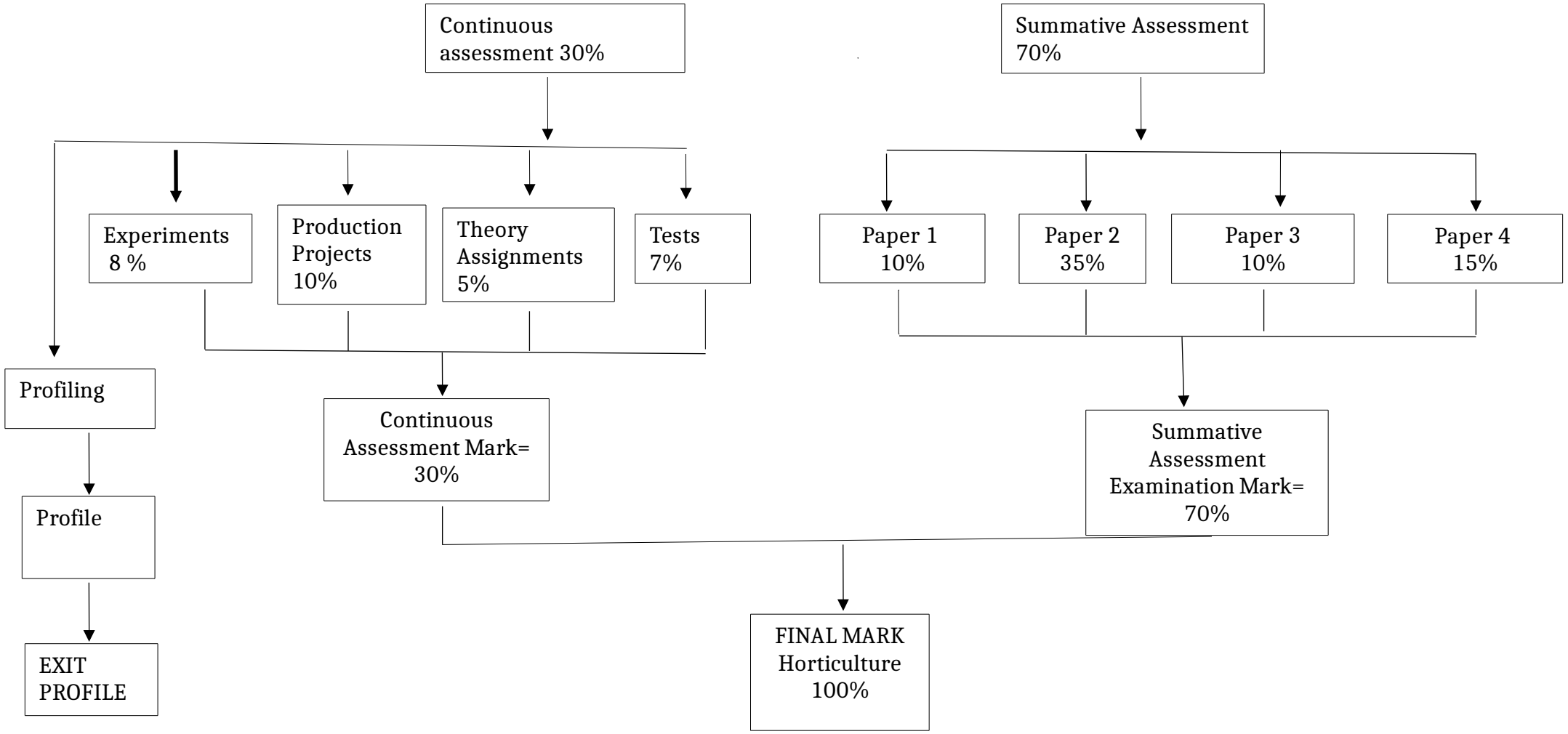
SUB TOPIC: SPICE PRODUCTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Spice production	• outline the origin and uses of spices • select appropriate production system • describe land preparation • discuss the management of spices • post-harvest, handle and process spices • market spices • keep records	• Origins and uses of spices • Production system - open field - shade • Land preparation • Management practices • Harvesting • Post-harvesting handling and marketing	• Discussing the origins and uses of spices • Choosing appropriate production system • Preparing land for the production of selected spices • Establishing and managing the production of spices • Harvesting, handling and processing the spices • Marketing spices • Preparing records **NB Leaners should study and grow at least 3 spices from the following: ginger, garlic, chillies, greenpepper, coriander, mustard, paprika, sesame, onoins**	• ICT tools • Herbalist • Spices • ICT Tools with JAWS software

9.0 ASSESSMENT MODEL

Horticulture learning area will be assessed through continuous and summative assessment




Continuous assessment 30%
Summative Assessment 70%
Experiments 8 %
Production Projects 10%
Theory Assignments 5%
Tests 7%
Paper 1 10%
Paper 2 35%
Paper 3 10%
Paper 4 15%
Profiling
Continuous Assessment Mark= 30%
Summative Assessment Examination Mark= 70%
Profile
EXIT PROFILE
FINAL MARK Horticulture 100%

ASSESSMENT COMPONENT	WEIGHTING
Continuous assessment	30%
Summative assessment	70%

ASSESSMENT OBJECTIVES

Learners will be assessed on their ability to demonstrate knowledge and understanding, application of knowledge and experimental skills

Knowledge and understanding

- discuss, describe, identify and demonstrate specific horticultural facts, principles, relationships, concepts, practical techniques and terminology
- summarise and explain any given horticultural information

Application of knowledge

- illustrate, interpret, solve and criticize specific phenomena of horticulture
- schedule, test and experiment, using horticultural facts and principles
- compare, contrast and criticise any procedures, processes and techniques employed in horticulture

Experimental skills

- design and develop experimental activities in Horticulture

- report, illustrate and interpret observations correctly
- assess and justify methods of production employed in horticulture
- compose, construct and organise given horticultural facts into diagrams, tables and graphs
- analyse, interpret and evaluate results from any given horticultural activity

SCHEME OF ASSESSMENT

Skills Specification Grid

ASSESSMENT SKILL	**PAPER 1**	**PAPER 2**	**PAPER 3**	**PAPER 4**
Knowledge with understanding	50	40	15	10
Application of knowledge	30	40	35	40
Experimental skills	20	20	50	50
Total	**100**	**100**	**100**	**100**

CONTINUOUS ASSESSMENT 30%

Assessment will be done through:
Theory Assignments 5%,
Tests 7%,
Production Project s 10%,
Experimental Tests 8%.

ASSESSMENT MODE	FORM 5 WEIGHTING	FORM 6 WEIGHTING
Theory assignments	2,5%	2,5%
Tests	3,5%	3,5%
Production Projects	5%	5%
Experimental tests	4%	4%
Theory assignments	2 per year	2 per year
Tests	2 per year	2 per year
Production projects	2 for the 2 levels	
Experimental tests	2 per year	2 per year

SUMMATIVE ASSESSMENT 70%

Learners are required to sit for papers 1 to 4.

PAPER DESCRIPTION	DURATION	MARKS	WEIGHTING
Paper 1	1 hour	40	10%
Paper 2	2 hours 30mins	100	35%
Paper 3	2 hours	40	10%
Paper 4	4 terms	100	15%

PAPER 1
Consists of multiple choice questions from the whole syllabus. Candidates will be required to answer all 40 questions. Paper total 40

PAPER 2

This is a structured free response paper which has 2 sections namely A and B. Both sections are set from any part of the syllabus.

SECTION A
Candidates will be required to answer all questions in this section. Six questions will be set. Each question is carries10 marks
Section total 60 marks

SECTION B
Essay type questions will be set from any part of the syllabus. Four questions will be set and candidates will be required to answer any 2 questions. Each question carries 20 marks.
Total for section 40
Paper total 100

PAPER 3
A practical examination will be set from any part of the syllabus. The paper will be based on experiments, investigations, observations and calculations. Full instructions will be given where unfamiliar material or techniques will be required. Two compulsory questions are set. Each question carries 20 marks.
Paper total 40

PAPER 4
Candidates will be required to carry out an experimental or a survey project. Candidates will design and carryout the project work on any part of the syllabus. The research project must emphasize both theoretical and practical aspects of Horticulture.

A project report of 2 500 to 3000 words should be prepared and submitted by candidates.
Paper total 100marks

10.1 Appendix

The following equipment and materials should be available to successfully implement this learning area;

- Controlled environment
  -Green houses
  -Incubators
  -Growth room
- Driers:
  - Air driers
  - Oven driers
- E-learning Solutions software
- Computers
- Land for practical
- Gardening tools
- Cold frames
- Shed house
- Irrigation equipment
- Sprayers
- Protective clothing