



ZIMBABWE

MINISTRY OF PRIMARY AND SECONDARY EDUCATION

CROP SCIENCE (NON-FORMAL) SYLLABUS

LEVEL III

2015-2022

Curriculum Development Unit
P.O.BOX MP133
Mount Pleasant
Harare

© All Rights Reserved
2015

ACKNOWLEDGEMENTS

The Ministry of Primary and Secondary Education wishes to acknowledge the following for their valued contribution in the production of this syllabus:

- The National Crop Science (Non-Formal) Syllabus Panel
- Zimbabwe School Examinations Council (ZIMSEC)
- United Nations Children’s Education Fund (UNICEF)

CROP SCIENCE (NON-FORMAL) SYLLABUS LEVEL III

Table of Contents

ACKNOWLEDGEMENTS	ii
1.0 PREAMBLE	5
1.1 INTRODUCTION	5
1.3 SUMMARY OF CONTENT	6
1.4 METHODOLOGY AND TIME ALLOCATION	6
1.4.1 TIME ALLOCATION	Error! Bookmark not defined.
1.5 ASSUMPTIONS	Error! Bookmark not defined.
1.6 CROSS- CUTTING ISSUES.....	Error! Bookmark not defined.
2.0 PRESENTATION OF SYLLABUS	6
3.0 AIMS.....	7
4.0 SYLLABUS OBJECTIVES	7
5.0 TOPICS.....	9
6.0 SCOPE AND SEQUENCE.....	10
6.1 TOPIC 1: CYTOLOGY AND PLANT CLASSIFICATION	10
6.2 TOPIC 2: SOIL FERTILITY AND PLANT NUTRITION	11
6.3 TOPIC 3: PLANT MORPHOLOGY AND PHYSIOLOGY.....	Error! Bookmark not defined.
6.4 TOPIC 4: PRINCIPLES OF CROP BREEDING AND BIOTECHNOLOGY	11
6.5 TOPIC 5: CROP PRODUCTION.....	12
6.6 TOPIC 6: PRINCIPLES OF CROP PROTECTION	12
6.7 TOPIC 7: CONSERVATION FARMING	12
7.0 COMPETENCY MATRIX.....	13
7.0 LEVEL III SYLLABUS	13
7.1 TOPIC 1: CYTOLOGY AND PLANT CLASSIFICATION	13
7.2 TOPIC 2: SOIL FERTILITY AND PLANT NUTRITION	21
7.3 TOPIC 3: PLANT MORPHOLOGY AND PHYSIOLOGY.....	Error! Bookmark not defined.
7.4 TOPIC 4: PRINCIPLES OF CROP BREEDING AND BIOTECHNOLOGY	26
7.5 TOPIC 5: PRINCIPLES OF CROP PROTECTION	29
7.6 TOPIC 6: CROP PRODUCTION.....	33
7.7 TOPIC 7: CONSERVATION FARMING	36
9.0 ASSESSMENT MODEL.....	37
10.0 ASSESSMENT WEIGHTING	38
11.0 CONTINUOUS ASSESSMENT	39

12.0 SUMMATIVE ASSESSMENT.....	40
13.0 SKILLS SPECIFICATION GRID.....	Error! Bookmark not defined.
14.0 ASSESSMENT OBJECTIVES	Error! Bookmark not defined.

CROP SCIENCE (NON-FORMAL) SYLLABUS LEVEL 11

1.0 PREAMBLE

1.1 INTRODUCTION

Zimbabwe embarked on an agrarian Land Reform and therefore it is imperative that learners, in their diversity, acquire necessary Crop Science knowledge and skills to increase food security. This syllabus is designed for Level III learners in Crop Science. It is a learning phase, which covers concepts, principles and practices in crop science. The syllabus will provide learners with a rich experience in identifying, investigating, problem-solving and assessing the viability of sustainable cropping systems. Learners will be assessed through continuous and summative assessments.

1.2 RATIONALE

Agriculture is a learning area studied from Level II (Primary) to Level II (Secondary), therefore, it is imperative for learners to specialize at Level III so as to acquire adequate skills and knowledge to create employment and for further learning opportunities. Specialisation would enable learners to be proactive and productive, add value to the community and national economy. Crop Science stimulates in learners, the responsibility to care for the local and global environment and to adopt sustainable cropping systems. The Crop Science learners will at the end of the learning phase, value the dignity of labour and food sovereignty.

The Crop Science syllabus enables learners to develop the following skills:

- Problem-solving
- Critical thinking
- Decision-making
- Conflict resolution
- Leadership and teamwork
- Self-management
- Communication
- Technology and innovation
- Enterprise development
- Disaster and risk reduction

1.3 SUMMARY OF CONTENT

The learning area will include the study of crop morphology, physiology, breeding, production, and protection. The syllabus will also help learners to acquire skills in value addition, post-harvest techniques and marketing of selected crop.

1.4 ASSUMPTIONS

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

- growing and managing crops.
- sustainable use of agricultural resources
- e-learning
- marketing of agricultural crops

1.5 CROSS- CUTTING ISSUES

The Crop Science learning area will encompass the following cross-cutting themes:

- Disaster and risk reduction
- Enterprise skills
- Environmental issues
- Teamwork
- Sustainable resource utilization
- Digital literacy
- Inclusivity

2.0 PRESENTATION OF SYLLABUS

The Crop Science Non-Formal syllabus is a single document covering Level III. 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 Crop Science to the agricultural development of the country.
- 3.2 develop positive attitudes towards Crop Science as a learning area.
- 3.3 apply psycho-motor and cognitive skills in solving problems encountered in Crop Science.
- 3.4 develop innovativeness in the study of Crop Science by sustainable utilization of local resources.
- 3.5 prepare learners for life and work, in an indigenized economy and increasingly globalised and competitive environment.
- 3.6 ensure learners demonstrate desirable literacy and numeracy including practical competences necessary for life.

4.0 SYLLABUS OBJECTIVES

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

- 4.1 demonstrate the socio-economic importance of Crop Science to the agricultural development of the country.
- 4.2 demonstrate understanding of Crop Science concepts, principles and terminology.
- 4.3 apply scientific principles of Crop Science in a sustainable manner.
- 4.4 apply problem-solving skills in challenges encountered in Crop Science.
- 4.5 design experiments and investigate problems in Crop Science.
- 4.6 design and manage a cropping project sustainably.
- 4.7 apply safety precautions in agricultural practice.

5.0 METHODOLOGY AND TIME ALLOCATION

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

The following are suggested methods of teaching and learning of Crop Science:

- Discussions
- Demonstrations
- Experimentation
- Problem-solving
- Project-based learning
- Research
- E-learning
- Educational tours
- Specimen collections
- Debates
- Seminars
- Design-based learning
- Survey
- Simulation and modeling

NB. The above suggested methods should be enhanced by the application of orthodidactic principles and multi-sensory approaches to teaching. These include tactility, concreteness, individualization, self-activity, totality and wholeness. Teachers are encouraged to address the learners' residual senses.

5.1 TIME ALLOCATION

Two hours per week should be allocated though more time can be created by students to adequately cover the syllabus. Learners should be engaged in at least two educational tours per year and one seminar per term.

6.0TOPICS

- 6.1 Cytology and plant classification
- 6.2 Plant morphology and physiology
- 6.3 Plant nutrition and soil fertility
- 6.4 Principles of crop breeding and bio-technology.
- 6.5 Principles of crop protection.
- 6.6 Crop production.
- 6.7 Conservation farming.

CROP SCIENCE (NON-FORMAL) SYLLABUS LEVEL III

7.0 SCOPE AND SEQUENCE

TOPIC 1: CYTOLOGY AND PLANT CLASSIFICATION

TOPIC	LEVEL III
Classification and Cell biology	<ul style="list-style-type: none">• Classification of plants• Cell structure• Cell division

TOPIC 2: PLANT MORPHOLOGY AND PHYSIOLOGY

TOPIC	LEVEL III
Plant Growth and Development	<ul style="list-style-type: none">• Meristems• Plant Growth• Plant growth regulators
Flower and fruit development	<ul style="list-style-type: none">• Flower initiation and fertilization• Fruit set and seed development
Seed and seed germination	<ul style="list-style-type: none">• Seed structure• Seed germination• Seed dormancy
Plant-water relations	<ul style="list-style-type: none">• Water properties• Water movement• Water potential• Radial movement of water• Transpiration
Bioenergetics	<ul style="list-style-type: none">• Photosynthesis• Cellular respiration• Photosynthetic pathways
Nitrogen Fixation	<ul style="list-style-type: none">• Biological Nitrogen Fixation

TOPIC	LEVEL III
Responses of plants to environmental factors	<ul style="list-style-type: none"> • Environmental factors

TOPIC 3: SOIL FERTILITY AND PLANT NUTRITION

TOPIC	LEVEL III
Soil composition	<ul style="list-style-type: none"> • Main constituents of soils
Soil characteristics	<ul style="list-style-type: none"> • Physical soil properties • Soil chemical properties
Plant nutrition	<ul style="list-style-type: none"> • Essential nutrients
Soil organic matter	<ul style="list-style-type: none"> • Constituents of soil organic matter • Decomposition of organic residues • Factors affecting soil organic matter levels

7.4 TOPIC 4: PRINCIPLES OF CROP BREEDING AND BIOTECHNOLOGY

TOPIC	LEVEL III
Genetics	<ul style="list-style-type: none"> • Genetic terms • Mitosis • Meiosis • Mendelian laws of inheritance
Plant breeding methods	<ul style="list-style-type: none"> • Plant introduction • Plant selection • Hybridization • Genetic engineering

7.5 TOPIC 5: CROP PRODUCTION

TOPIC	LEVEL III
Agronomic principles	<ul style="list-style-type: none">• Agro –ecological zones• Tillage practices• Plant population• Crop rotation
Cereal and Legume Crop production	<ul style="list-style-type: none">• Crop origins, soil and climatic requirements• Crop management• Harvest, Processing and Marketing

7.6 TOPIC 6: PRINCIPLES OF CROP PROTECTION

TOPIC	LEVEL III
Weeds, Pests and Disease management	<ul style="list-style-type: none">• Weeds• Pests• Diseases• Weed management• Safety precautions• Pest management• Disease management• Sprayer calibration

7.7 TOPIC 7: CONSERVATION FARMING

TOPIC	LEVEL III
Principles and practices	<ul style="list-style-type: none">• Conservation farming

8.0 COMPETENCY MATRIX

LEVEL III SYLLABUS

8.1 TOPIC 1: CYTOLOGY AND PLANT CLASSIFICATION

SUBTOPIC: CLASSIFICATION AND CELL BIOLOGY

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Classification of plants	<ul style="list-style-type: none"> classify plants 	<ul style="list-style-type: none"> Classification according to: <ul style="list-style-type: none"> --scientific --families -uses -morphology -life cycle -habitat 	<ul style="list-style-type: none"> Describing life cycle of plants Listing examples of plants under each class Collecting specimens and samples Touring botanical gardens 	<ul style="list-style-type: none"> Plants, plant parts, and products Botanist Print and electronic media ICT tools/Braille Software/jaw software
Cell structure	<ul style="list-style-type: none"> draw a plant cell label parts of a plant cell explain functions of cell parts identify cell organelles outline functions of cell organelles explain the relationship between organelles. 	<ul style="list-style-type: none"> Functions of cell parts: cell wall, cell membrane cytoplasm, nucleus, vacuole. Cell organelles: - Golgi body/apparatus, endoplasmic reticulum, ribosomes, chloroplasts, mitochondria, microtubules. 	<ul style="list-style-type: none"> Drawing and labelling plant cell showing cell parts and organelles Viewing slides showing plant cells Identifying cell parts and structure Describing functions of cell parts and organelles Outlining the relationship between organelles. 	<ul style="list-style-type: none"> ICT tools/Braille Software/jaw software Slides showing plant cell parts and structure Print and electronic media
Cell division	<ul style="list-style-type: none"> describe the process of mitosis explain the significance of mitosis in crop production describe the process of meiosis 	<ul style="list-style-type: none"> Mitosis cycle Significance of mitosis in crop production Meiosis cycle 	<ul style="list-style-type: none"> Describing mitosis Discussing significance of mitosis Describing meiosis 	<ul style="list-style-type: none"> Slides Print and electronic media ICT tools with

	<ul style="list-style-type: none"> explain the significance of meiosis in plant reproduction compare and contrast mitosis and meiosis 	<ul style="list-style-type: none"> Significance of meiosis in plant reproduction Comparison of mitosis and meiosis 	<ul style="list-style-type: none"> Outlining significance of meiosis in plant reproduction Tabulating the differences and similarities between mitosis and meiosis 	/jaws software
--	---	--	--	----------------

TOPIC 2: PLANT MORPHOLOGY AND PHYSIOLOGY
SUB TOPIC: PLANT GROWTH AND DEVELOPMENT

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Meristems	<ul style="list-style-type: none"> describe the types of plant meristems 	<ul style="list-style-type: none"> Meristems: <ul style="list-style-type: none"> -apical -intercalary -lateral -basal 	<ul style="list-style-type: none"> Describing the types of meristems Discussing the types of plant meristems Observing meristems 	<ul style="list-style-type: none"> Meristems, slides, microscopes Print and electronic media ICT tool
Plant growth	<ul style="list-style-type: none"> discuss plant growth and development describe the phases of plant cell growth 	<ul style="list-style-type: none"> Plant growth and development Phases of plant cell growth 	<ul style="list-style-type: none"> Discussing plant growth and development Describing phases of plant cell growth and how they lead to plant growth Experimenting on plant cell growth and development 	<ul style="list-style-type: none"> Plants, tissue culture apparatus Print and electronic media ICT tools
Plant growth regulators	<ul style="list-style-type: none"> describe the effects of growth regulators on plant growth and development. 	<ul style="list-style-type: none"> Gibberillins Cytokinins Ethylene Auxins Abscisic acid 	<ul style="list-style-type: none"> Discussing effects of growth regulators on growth and development. Demonstrating the effect of growth regulators such as on rooting, growth and ripening. 	<ul style="list-style-type: none"> Plants and plant parts Plant growth regulators Recommended textbooks/talking textbooks ICT tools

SUB TOPIC: FLOWER AND FRUIT DEVELOPMENT

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Flower initiation and fertilization	<ul style="list-style-type: none"> explain how vernalisation and photoperiodism influence flower initiation. describe gamete formation in plants. describe pollination mechanisms in plants. explain the concept of double fertilization in plants. 	<ul style="list-style-type: none"> Vernalisation Photoperiodism Gamete formation: <ul style="list-style-type: none"> -ovule - pollen grain <ul style="list-style-type: none"> • Pollination • Double fertilization 	<ul style="list-style-type: none"> Explaining how vernalisation and photoperiodism influence initiation Describing formation of gametes and pollination mechanisms Experimenting on pollination Discussing double fertilization in plants Watching video clips on pollination and fertilization in plants. 	<ul style="list-style-type: none"> Flowering plants Print and electronic media ICT tools/Braille Software/jaw software Video clips
Fruit set and seed development	<ul style="list-style-type: none"> describe the structural changes that occur after fertilization in plants differentiate endospermous and non-endospermous seed development 	<ul style="list-style-type: none"> Structural changes in plants: <ul style="list-style-type: none"> -ovules -ovary -integuments Endospermous and non-endospermous seed development 	<ul style="list-style-type: none"> Describing the structural changes that occur after fertilization in plants Discussing differences between endospermous and non-endospermous seed development 	<ul style="list-style-type: none"> Fruits and seeds Print and electronic media ICT tools/Braille Software/jaw software Video clips

SUB TOPIC: SEED AND SEED GERMINATION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Seed structure	<ul style="list-style-type: none"> describe the internal and external parts of a seed describe functions of seed parts 	<ul style="list-style-type: none"> Seed structure: -cereals -legumes Functions of seed parts 	<ul style="list-style-type: none"> Identifying parts of a seed Describing functions of seed parts Dissecting seeds to observe internal seed structure 	<ul style="list-style-type: none"> Cereal and legume seeds Slides Print and electronic media <ul style="list-style-type: none"> ICT tools/Braille Software/jaw software
Seed germination	<ul style="list-style-type: none"> discuss requirements for seed germination. describe the processes of seed germination distinguish epigeal and hypogeal germination 	<ul style="list-style-type: none"> Requirements for seed germination: -water, -temperature, -oxygen Seed germination processes (imbibition and enzyme activation) Types of seed germination: -epigeal, -hypogeal 	<ul style="list-style-type: none"> Discussing requirements for seed germination Describing the processes of seed germination Distinguishing epigeal and hypogeal germination Experiments on germination 	<ul style="list-style-type: none"> Seeds, germination substrates Print and electronic media <ul style="list-style-type: none"> ICT tools/Braille Software/jaw software
Seed dormancy	<ul style="list-style-type: none"> test seed for viability discuss the different types of seed dormancy describe methods of overcoming dormancy 	<ul style="list-style-type: none"> Seed viability Types of seed dormancy: physical, physiological Overcoming 	<ul style="list-style-type: none"> Testing for seed viability Discussing the different types of seed dormancy. Discussing ways of overcoming seed dormancy. 	<ul style="list-style-type: none"> Seed samples Recommended textbooks/talking textbooks ICT tools/Braille

		dormancy	<ul style="list-style-type: none"> Designing and carrying out experiments on seed dormancy. 	Software/jaw software
--	--	----------	--	-----------------------

SUBTOPIC: PLANT-WATER RELATIONS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Water properties	<ul style="list-style-type: none"> describe water properties in relation to its functions 	<ul style="list-style-type: none"> Water properties such as thermal capacity, heat of fusion, heat of vaporization, specific heat capacity, anomalous expansion, universal solvent, cohesion and adhesion 	<ul style="list-style-type: none"> Describing water properties in relation to its functions Demonstrating water properties in relation to its functions 	<ul style="list-style-type: none"> Water, apparatus for demonstrating water properties such as capillary tubes Print and electronic media ICT tools/Braille Software/jaw software
Water movement	<ul style="list-style-type: none"> discuss factors that affect water uptake explain the mechanisms of water uptake 	<ul style="list-style-type: none"> factors affecting water uptake mechanisms of water uptake (osmosis, diffusion, bulk flow) 	<ul style="list-style-type: none"> Discussing factors that affect water uptake Explaining the mechanisms of water uptake Demonstrating mechanisms of water movement such as osmosis 	<ul style="list-style-type: none"> Plant parts such potato tubers and, water Print and electronic media ICT tools/Braille Software/jaw software
Water potential	<ul style="list-style-type: none"> explain the components of water potential carry out experiments on osmotic potential 	<ul style="list-style-type: none"> components of water potential (pressure, osmotic, matric, gravitational potential) 	<ul style="list-style-type: none"> Explaining the components of water potential designing and carrying out experiments on water potential 	<ul style="list-style-type: none"> Water, apparatus for demonstrating water potential components Print and electronic media

				<ul style="list-style-type: none"> • ICT tools/Braille Software/jaw software
Radial movement of water	<ul style="list-style-type: none"> • describe water flow pathways from cell to cell 	<ul style="list-style-type: none"> • Pathways of radial water movement: <ul style="list-style-type: none"> - apoplast - symplast - vacuolar 	<ul style="list-style-type: none"> • describing water flow pathways cell to cell 	<ul style="list-style-type: none"> • Plants and/or plant parts • Recommended textbooks/talking textbooks • ICT tools/Braille Software/jaw software
Transpiration	<ul style="list-style-type: none"> • describe environmental factors affecting the rate of transpiration. 	<ul style="list-style-type: none"> • Factors affecting transpiration: <ul style="list-style-type: none"> -light -temperature - humidity - wind - soil-water 	<ul style="list-style-type: none"> • Describing environmental factors affecting the rate of transpiration • Demonstrating factors affecting transpiration 	<ul style="list-style-type: none"> • Recommended textbooks/talking textbooks • ICT tools/Braille Software/jaw software

CROP SCIENCE (NON-FORMAL) SYLLABUS LEVEL III

SUBTOPIC: BIOENERGETICS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Photosynthesis	<ul style="list-style-type: none"> • explain the factors affecting photosynthesis. • describe light-dependent and light-independent reactions • describe photosynthetic electron transport. • describe the structure and synthesis of ATP. • explain the role of ATP as the energy 'currency' 	<ul style="list-style-type: none"> • Factors affecting photosynthesis • Light harvesting: • CO₂ assimilation • Structure of ATP • Synthesis of ATP 	<ul style="list-style-type: none"> • Explaining the factors affecting photosynthesis (light intensity, water, CO₂ and oxygen concentration). • Experimenting on the factors affecting photosynthesis. • Describing light-dependent and light-independent reactions • Describing the photosynthetic electron transport chain. • Describing the structure and synthesis of ATP. • Explaining the role of ATP as the energy 'currency' 	<ul style="list-style-type: none"> • Plants • Controlled environments • ICT tools/Braille Software/jaw software • Print and electronic media • Video clips
Photosynthetic pathways	<ul style="list-style-type: none"> • describe the structural differences between C₃ and C₄ biochemical pathways • discuss Crassulacean acid metabolism (CAM) pathways 	<ul style="list-style-type: none"> • C₃ biochemical pathways • C₄ biochemical pathways • CAM biochemical pathways 	<ul style="list-style-type: none"> • Describing and illustrating C₃, C₄ and CAM pathways. • Discussing the structural differences between C₃ and C₄ plants. • Differentiating C₃, C₄ and CAM biochemical pathways. • Experimenting on the differences in efficiency in C₃ and C₄ pathways. 	<ul style="list-style-type: none"> • Plant samples • Recommended textbooks/talking textbooks • Slides • ICT tools/Braille Software/jaw software • Video clips

Cellular respiration	<ul style="list-style-type: none"> describe the process of respiration describe the two distinct pathways for the breakdown of starch. explain the universal role of ATP as the energy 'currency' in all living organisms, 	<ul style="list-style-type: none"> Process of respiration: <ul style="list-style-type: none"> -glycolysis -Kreb's cycle -electron transport Starch mobilization: <ul style="list-style-type: none"> -hydrolytic pathway -phospholytic pathway Role of ATP 	<ul style="list-style-type: none"> describing, the process of respiration describing the two distinct pathways for the breakdown of starch. Experimenting on respiration Discussing the universal role of ATP as the energy 'currency' in all living organisms, 	<ul style="list-style-type: none"> Plants Recommended textbooks/talking textbooks ICT tools/Braille Software/jaw software
-----------------------------	---	---	---	--

SUBTOPIC: BIOLOGICAL NITROGEN FIXATION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Biological Nitrogen Fixation	<ul style="list-style-type: none"> describe biological nitrogen fixation in legumes describe the role of N –fixing bacteria in symbiosis with legumes outline the importance of biological nitrogen fixation as alternative to inorganic fertilizers. 	<ul style="list-style-type: none"> Biological Nitrogen Fixation (BNF) 	<ul style="list-style-type: none"> Describing BNF Describing the role of nitrogen-fixing bacteria in legumes Designing and carrying out experiments on efficiency of biological nitrogen fixation (BNF) 	<ul style="list-style-type: none"> Legume plants, Rhizobium inoculants ICT tools/Braille Software/jaw software Recommended textbooks/talking textbooks

SUB TOPIC: RESPONSES OF PLANTS TO ENVIRONMENTAL FACTORS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Environmental factors	<ul style="list-style-type: none"> describe responses of plants to environmental factors outline physiological responses of plants to adverse environmental factors explain the effects of environmental factors on crop productivity 	<ul style="list-style-type: none"> Responses of plants to environmental factors such as wind, drainage, light intensity, 	<ul style="list-style-type: none"> Describing responses of plants to environmental factors. Designing and carrying out experiments on physiological responses of plants to environmental factors 	<ul style="list-style-type: none"> Affected plants Controlled environments Recommended textbooks/talking textbooks

		humidity, temperature, moisture, soil fertility <ul style="list-style-type: none"> • Effects of environmental factors on crop productivity • Physiological responses of plants to adverse environmental factors 	<ul style="list-style-type: none"> • Explaining the effect of environmental factors on crop productivity 	<ul style="list-style-type: none"> • ICT tools/Braille Software/jaw software
--	--	---	---	---

TOPIC 3: SOIL FERTILITY AND PLANT NUTRITION
SUBTOPIC: SOIL COMPOSITION AND CHARACTERISTICS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Main constituents of soil	<ul style="list-style-type: none"> • identify the soil minerals. • describe the four components of soil • discuss the significance of soil water to plant growth. • explain the role of soil air in plant growth and microbial activity 	<ul style="list-style-type: none"> • Primary and secondary minerals • Organic matter • Soil water • Soil air 	<ul style="list-style-type: none"> • Identifying primary and secondary soil minerals. • Describing organic matter: fresh residues, decomposing organic matter, stable organic matter and living organisms. • Discussing the significance of soil water in plant growth, such as, as a universal solvent and medium for nutrient uptake. • Explaining the roles of soil air such as in root and microbial 	<ul style="list-style-type: none"> • Soil samples, rock specimens • Print and electronic media • ICT tools/Braille Software/jaw software

			respiration and organic matter decomposition.	
Physical soil properties	<ul style="list-style-type: none"> describe the significance of soil horizons and catena effect. discuss the significance of soil colour, texture and structure in crop production. describe the management practices of soil structure and texture in crop production. discuss the importance of soil organic matter. determine soil bulk and particle density and porosity. 	<ul style="list-style-type: none"> Soil horizons and catena effect Soil colour: <ul style="list-style-type: none"> -hue -value -chroma Soil texture: <ul style="list-style-type: none"> -importance -management Soil structure : <ul style="list-style-type: none"> -importance -management Soil organic matter : <ul style="list-style-type: none"> --its importance in CEC, soil pH, plant nutrients, moisture retention. density of soils 	<ul style="list-style-type: none"> Describing soil catena effect, soil horizons and their significance in crop production. Examining local soil profiles Discussing the significance of soil colour, texture and structure in crop production Describing the management practices of soil structure and texture Discussing the importance of soil organic matter Determining soil bulk and particle density and porosity 	<ul style="list-style-type: none"> Soils samples, soil profiles Print and electronic media ICT tools/Braille Software/jaw software
Soil chemical properties	<ul style="list-style-type: none"> describe the formation of clay and humus colloids. describe the basic structure of clays. explain the source of negative charges on clay and humus colloids. explain the origins and significance of cation exchange and anion exchange capacity (CEC and 	<ul style="list-style-type: none"> Formation of clay and humus colloids Basic structure of clays: <ul style="list-style-type: none"> -1:1 clays such as kaolinite - 2:1 clays such as montmollilonit e and illite 	<ul style="list-style-type: none"> Describing the formation of clay and humus colloids. Describing the basic clays. Explaining the sources of negative charges on clay and humus colloids. Explaining the origins and significance of cation and anion exchange capacity (CEC and AEC). Determining CEC and base saturation percentage. 	<ul style="list-style-type: none"> Soil samples Soil testing kits Liming materials Fields ICT tools/Braille Software/jaw software Print and electronic media

	<p>AEC).</p> <ul style="list-style-type: none"> • determine cation exchange capacity (CEC) and base saturation percentage. • discuss the significance of base saturation and exchangeable sodium percentage (ESP). • discuss the causes of soil acidity and salinity. • discuss the effects of soil acidity and salinity on crop growth. • explain methods of correcting soil acidity and salinity. • carry out experiments on soil analysis. • determine soil pH and calculate liming requirements. 	<ul style="list-style-type: none"> • Sources of negative charges such as: <ul style="list-style-type: none"> -isomorphous substitution, -exposed crystal edges • Cation exchange capacity (CEC) and anion exchange capacity • Base saturation • Exchangeable Sodium Percentage (ESP) • Soil pH • Liming • Soil sampling 	<ul style="list-style-type: none"> • Discussing the significance of base saturation and ESP. • Discussing the causes of soil acidity and salinity. • Discussing the effects of soil acidity and salinity on crop growth. • Explaining methods of correcting soil acidity and salinity. • Carrying out soil sampling. • Carrying out experiments on soil analysis. • Testing for soil pH and calculating liming requirements. • Carry out pH correction such as liming of fields • Touring a soil testing lab. 	
--	---	---	--	--

CROP SCIENCE (NON-FORMAL SYLLABUS)

SUBTOPIC: PLANT NUTRITION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Essential Nutrients	<ul style="list-style-type: none"> • explain the roles of macro-nutrients and micro nutrients in plant growth and development . • determine fertilizer requirements in crops. 	<ul style="list-style-type: none"> • macro nutrients: -nitrogen - -phosphorous - -potassium -calcium -sulphur - -magnesium • micro nutrients: -molybdenum -boron, -zinc • Fertilizer requirements 	<ul style="list-style-type: none"> • Explaining the roles of macronutrients and micro-nutrients in plant growth and metabolism. • Determining fertilizer requirements in crops through soil and plant analysis. 	<ul style="list-style-type: none"> • Fertilizer samples • Soil testing kits • Plant samples • Soil samples • Print and electronic media • ICT tools/Braille Software/jaw software

SUBTOPIC: SOIL ORGANIC MATTER

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Constituents of soil organic matter	<ul style="list-style-type: none"> • identify constituents of soil organic matter • 	<ul style="list-style-type: none"> • Organic matter constituents: -organic residues - water-soluble fraction - alcohol-soluble fraction - proteins 	<ul style="list-style-type: none"> • Identifying constituents of soil organic matter • Determining soil organic matter content • 	<ul style="list-style-type: none"> • Soil samples • Constituents of soil organic matter • Print and electronic media • ICT tools/Braille Software/jaw software

<p>Decomposition of organic residues</p>	<ul style="list-style-type: none"> • describe the role of soil organisms in organic matter decomposition • identify organisms involved in different stages of the decomposition process • describe the carbon: nitrogen (C:N) ratio • describe how the C:N ratio affects the rate of decomposition 	<ul style="list-style-type: none"> • Role of soil organisms: <ul style="list-style-type: none"> -bacteria - fungi - termites - earthworms - nematodes - mites • C:N ratio • Mineralisation and Immobilisation 	<ul style="list-style-type: none"> • Describing the role of soil organisms in organic matter decomposition • Identifying organisms involved in different stages of the decomposition process • Describing the C:N ratio and how it affects the rate of decomposition 	<ul style="list-style-type: none"> • Decomposing organic residues • Slides • Print and electronic media • ICT tools/Braille Software/jaw software
<p>Factors affecting soil organic matter levels</p>	<ul style="list-style-type: none"> • describe factors affecting soil organic matter levels. • discuss the benefits of soil organic matter. 	<ul style="list-style-type: none"> • Factors affecting soil organic matter levels: <ul style="list-style-type: none"> -original organic matter composition -soil nitrogen levels -climatic conditions - soil drainage conditions - pH of organic matter - organic matter form/size fraction - soil texture • Benefits of soil organic matter in improving soil properties. 	<ul style="list-style-type: none"> • Describing factors affecting soil organic matter levels • Discussing the benefits of soil organic matter • Experimenting on the effects of organic matter 	<ul style="list-style-type: none"> • Samples of organic residues, soils • Print and electronic media • ICT tools/Braille Software/jaw software

CROP SCIENCE (NCEP) SYLLABUS

TOPIC 4: PRINCIPLES OF CROP BREEDING AND BIOTECHNOLOGY

SUB TOPIC: GENETICS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Principles of genetics	<ul style="list-style-type: none"> describe the structure of a chromosome describe the structure of DNA explain DNA replication describe protein synthesis starting from DNA describe the process of mitosis explain the significance of mitosis in crop production describe the process of meiosis explain the significance of meiosis in crop reproduction compare and contrast mitosis and meiosis outline Mendelian laws of inheritance determine genotype and phenotype ratios outline types of gene expression describe effects of environment on gene expression 	<ul style="list-style-type: none"> Chromosomes DNA and replication Protein synthesis Mitosis: <ul style="list-style-type: none"> Phases Significance Meiosis: <ul style="list-style-type: none"> Phases Significance Comparison of mitosis and meiosis Mendelian laws Gene expression: <ul style="list-style-type: none"> Dominance Co-dominance 	<ul style="list-style-type: none"> Discussing the structure of a chromosome. constructing chromosome model. Explaining DNA replication Illustrating the structure of DNA Describing protein synthesis starting from DNA Describing mitotic cell division Discussing significance of mitosis Describing meiotic cell division Outlining significance of meiosis in crop reproduction Outlining the differences between mitosis and meiosis Explaining the law of independent assortment Describing the law of segregation Determining genotype and phenotype using genetic diagrams Comparing dominance and 	<ul style="list-style-type: none"> Chromosome model Slides Print and electronic media Video clips ICT tools JAWS software Simulation cards

	<ul style="list-style-type: none"> describe the importance of gene expression describe types of mutations 	<ul style="list-style-type: none"> Partial dominance Over dominance Gene-environment interaction Epistasis Gene mutations Chromosomal mutations 	<ul style="list-style-type: none"> co-dominance Describing the effects of environment on gene expression Describing gene mutation Describing types and effects of mutations 	
--	---	---	---	--

SUBTOPIC: PLANT BREEDING METHODS

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Plant introduction	<ul style="list-style-type: none"> explain plant introduction as a breeding method. describe types of plant introduction discuss advantages and disadvantages of plant introduction 	<ul style="list-style-type: none"> Meaning of plant introduction Types of plant introduction Advantages and disadvantages of plant introduction 	<ul style="list-style-type: none"> Describing the meaning and types of plant introduction Discussing the advantages and disadvantages of plant introduction Touring a plant breeding institution. 	<ul style="list-style-type: none"> Plant breeders Plant breeding institution Print and electronic media ICT tools with JAWS software
Plant selection	<ul style="list-style-type: none"> explain selection as a method of plant breeding describe types of selection in plant breeding discuss the advantages and disadvantages of plant selection 	<ul style="list-style-type: none"> Selection in plant breeding Types of plant selection advantages and disadvantages of plant selection 	<ul style="list-style-type: none"> Discussing selection as a method of plant breeding Describing types of plant selection Selecting germplasm Discussing advantages and disadvantages of plant selection Touring plant breeding institution. 	<ul style="list-style-type: none"> Plant breeders Plant breeding institution Print and electronic media ICT tools with JAWS software
Hybridization	<ul style="list-style-type: none"> explain methods of hybridization 	<ul style="list-style-type: none"> Single way cross, double 	<ul style="list-style-type: none"> Discussing methods, 	<ul style="list-style-type: none"> Plant breeders

	<ul style="list-style-type: none"> describe advantages and disadvantages of hybridization describe hybrid seed production compare hybrid seed and, traditional and commercial open-pollinated varieties (OPVs) performances. 	<p>way cross, three way cross</p> <ul style="list-style-type: none"> Advantages and disadvantages hybridization. Principles of hybrid seed production. Commercial OPVs, Traditional or land OPVs and Hybrids. 	<p>advantages and disadvantages of hybridization</p> <ul style="list-style-type: none"> Describing hybrid seed production Touring plant breeding institution. Debating on performance of hybrid seed, traditional OPVs and commercial OPVs Crossing OPV varieties. Collecting seed specimens for school seed bank 	<ul style="list-style-type: none"> Plant breeding institution Seed specimens Print and electronic media ICT tools with jaws software
Genetic Engineering	<ul style="list-style-type: none"> describe genetic engineering as a breeding method. discuss advantages and disadvantages of genetically modified crops . 	<ul style="list-style-type: none"> genetic engineering as a breeding method Tissue culture Gene transfer Advantages and disadvantages of genetically modified crops. 	<ul style="list-style-type: none"> Discussing genetic engineering as a breeding method Discussing advantages and disadvantages of genetically modified crops. Touring of biotechnology institution. 	<ul style="list-style-type: none"> Biotechnologist Biotechnology institution Print and electronic media ICT tools/Braille Software/jaw software Video clips

TOPIC 5: PRINCIPLES OF CROP PROTECTION

SUB TOPIC: WEEDS, PESTS AND DISEASE MANAGEMENT

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Weeds	<ul style="list-style-type: none"> • outline the socio-economic importance of weeds • identify weeds • classify weeds • describe mechanisms that make weeds persistent • explain the mechanisms of crop-weed competition 	<ul style="list-style-type: none"> • Socio-economic importance of weeds. • Weed identification and classification • Weed persistence mechanisms • Crop-weed competition: inter and intra-specific competition 	<ul style="list-style-type: none"> • Discussing the socio-economic importance of weeds • Identifying and classifying weeds • Describing weed persistence mechanisms • Describing crop-weed competition • Touring Weed research stations <p>NB: Learners to collect and preserve local weed species</p>	<ul style="list-style-type: none"> • Weed samples/specimens • ICT tools/Braille Software/jaw software • Herbarium • Recommended textbooks/talking textbooks • Weed specialist
Weed management	<ul style="list-style-type: none"> • outline the importance of weed management. • determine effective timing of weeding. • describe the methods of weed management. • evaluate weed management methods. 	<ul style="list-style-type: none"> • Importance of weed management • Timing of weeding. Methods: - - physical/mechanical - cultural - chemical - biological - integrated weed management (IWM) • Advantages and disadvantages of each weed management method. 	<ul style="list-style-type: none"> • Describing importance of weed management. • Identifying timing of weed management. • Discussing weed management methods. • Evaluating methods of weed management. • Experimenting on weed management. 	<ul style="list-style-type: none"> • Weed samples • Botanist • Agronomist • Herbicides • Print and electronic media • ICT tools/Braille Software/jaw software

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Pests	<ul style="list-style-type: none"> outline the socio-economic importance of pests identify pests classify pests according to feeding habits describe the life-cycle of pests. 	<ul style="list-style-type: none"> Socio-economic importance of pests. Identification of pests and classification according to feeding habits Life-cycle: <ul style="list-style-type: none"> -complete and incomplete metamorphosis -vivipary 	<ul style="list-style-type: none"> Discussing the socio-economic importance of pests Identifying and classifying pests according to feeding habits Describing the life-cycle of pests Collecting and preserving local pest species. <p>NB: learners to study one pest from each of the following groups.</p> <p>Group I- Biting and chewing (termites, locusts, armyworm, cutworm or semi-looper)</p> <p>Group II – Piecing & Sap sucking (aphids, leaf hoppers, whitefly, thrips, red spider mites)</p> <p>Group III – Boring (maize stalk borer, weevil, ball worms)</p> <p>Group IV-Nematodes</p>	<ul style="list-style-type: none"> Pest specimen, Insect pest samples ICT tools/Braille Software/jaw software Entomologist Print and electronic media
Pest management	<ul style="list-style-type: none"> explain the importance of pest management. explain economic threshold and economic injury levels of pests. describe methods of pest management. compare and contrast pest management methods. 	<ul style="list-style-type: none"> Importance Economic threshold, economic injury level Methods of pest management: <ul style="list-style-type: none"> - physical - chemical - biological - cultural - legislative Integrated Pest Management 	<ul style="list-style-type: none"> Discussing importance of pest management. Explaining economic threshold and injury levels of pests on selected crops Describing methods of pest management Comparing pest management methods Scouting for and controlling 	<ul style="list-style-type: none"> Pests Pesticides Entomologist Agronomist Crop fields Recommended textbooks/talking textbooks ICT tools/Braille Software/jaw

		(IPM)	pests	software <ul style="list-style-type: none"> • Video clips • Slides
--	--	-------	-------	--

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Diseases	<ul style="list-style-type: none"> • outline the socio-economic importance of diseases • classify diseases into bacterial, fungal and viral. • describe signs and symptoms of diseases. • describe mode of transmission of diseases 	<ul style="list-style-type: none"> • Socio-economic importance of diseases. • Classification of diseases: <ul style="list-style-type: none"> - bacterial - fungal - viral. • Signs and symptoms of diseases. • Mode of transmission of diseases 	<ul style="list-style-type: none"> • Discussing the socio-economic importance of diseases. • Classifying diseases into bacterial, viral and fungal. • Describing signs and symptoms of diseases. • Describing mode of transmission of diseases • Experimenting on disease symptoms and transmission of diseases) • Watching video clips on diseases • Observing diseased plants in the field or elsewhere <p>NB: Learners to study any one disease from each of the following groups.</p> <p>Group I- Bacterial (wilt, canker, soft rot, bacterial blight)</p> <p>Group II – Fungal (leaf spot, powdery mildew, pythium, downy mildew, fusarium wilt, rusts)</p> <p>Group III –Viral (maize streak virus, mosaic virus, rosette virus,</p>	<ul style="list-style-type: none"> • Diseased plants, plant parts • Slides • Print and electronic media • ICT tools/Braille Software/jaw software • Video clips

			bushy top)	
Disease management	<ul style="list-style-type: none"> • explain importance of disease management • outline the different methods of disease management • compare different methods of disease management 	<ul style="list-style-type: none"> • Importance of disease management • Methods of disease management: <ul style="list-style-type: none"> -cultural -chemical - biological legislative Integrated Disease Management (IPM) • Advantages and disadvantages different methods of disease management. 	<ul style="list-style-type: none"> • Discussing importance of disease management • Describing the different methods of disease management • Comparing methods of disease management • Carrying out disease control operations 	<ul style="list-style-type: none"> • Agro chemicals • Fields • Plants • Agronomist • ICT tools
Safety precautions	<ul style="list-style-type: none"> • describe safe handling of agro-chemicals. • outline safe storage procedures for agro-chemicals. • outline safe disposal of agro-chemicals. 	<ul style="list-style-type: none"> • Safety precautions: <ul style="list-style-type: none"> - handling - storage - disposal 	<ul style="list-style-type: none"> • Discussing safe handling, storage and disposal of agro-chemicals. • Demonstrating safe handling, storage and disposal of agro-chemicals. <p>Practising safe handling, storage and disposal of agro-chemicals.</p>	<ul style="list-style-type: none"> • Protective clothing • Agro-chemical dealers • Storage rooms • Chemicals • Print and electronic media • ICT tools/Braille Software/jaw software
Sprayer calibration	<ul style="list-style-type: none"> • calibrate a knapsack sprayer 	<ul style="list-style-type: none"> • Calibration 	<ul style="list-style-type: none"> • Calibrating sprayers • Demonstrating the functional efficiency of sprayers 	<ul style="list-style-type: none"> • Sprayers • Water • Agronomist • ICT tools/Braille Software/jaw software • Print and electronic media

TOPIC 6: CROP PRODUCTION
SUBTOPIC: AGRONOMIC PRINCIPLES

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Agro-ecological zones of Zimbabwe	<ul style="list-style-type: none"> explain the basis for dividing Zimbabwe into agro-ecological zones. design suitable cropping programmes for each agro-ecological zone 	<ul style="list-style-type: none"> Agro-ecological zones Cropping programmes for each zone 	<ul style="list-style-type: none"> Discussing the basis for dividing Zimbabwe into agro-ecological zones Designing cropping programmes for agro-ecological zones Drawing and identifying agro-ecological zones on the map of Zimbabwe 	<ul style="list-style-type: none"> Agro-ecological map Print and electronic media ICT tools/Braille Software/jaw software
Tillage practices	<ul style="list-style-type: none"> distinguish primary from secondary tillage explain the significance of primary and secondary tillage in crop production 	<ul style="list-style-type: none"> Primary and secondary tillage Significance of primary and secondary tillage 	<ul style="list-style-type: none"> Discussing primary and secondary tillage systems Discussing the significance of primary and secondary tillage Researching on the effectiveness of tillage systems Carrying out tillage practices in the school field 	<ul style="list-style-type: none"> Tillage tools, implements and machinery Fields and crops Print and electronic media ICT tools/Braille Software/jaw software
Plant population	<ul style="list-style-type: none"> calculate plant population per unit area discuss factors that influence plant population discuss implications of plant population in crop production 	<ul style="list-style-type: none"> Plant population factors that influence plant population implications of plant population 	<ul style="list-style-type: none"> Calculating plant population Discussing factors that influence plant population Discussing implications of plant population Comparing calculated populations versus actual field 	<ul style="list-style-type: none"> Crop Fields Print and electronic media ICT tools/Braille Software/jaw software

			plant population	
Crop rotation	<ul style="list-style-type: none"> explain the principles of crop rotation discuss the advantages and disadvantages of crop rotation design a 4-crop rotation cycle 	<ul style="list-style-type: none"> Principles of rotation Crop rotation design Advantages and disadvantages of crop rotations 	<ul style="list-style-type: none"> Discussing the principles of crop rotation Discussing the advantages and disadvantages of crop rotation Designing a 4-crop rotation cycle Practicing crop rotation systems 	<ul style="list-style-type: none"> Different crops Fields and/or gardens Print and electronic media ICT tools/Braille Software/jaw software

SUB TOPIC: CEREAL AND LEGUME CROP PRODUCTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Crop origins, soil and climatic requirements	<ul style="list-style-type: none"> Discuss the origin of a named legume and cereal crop explain the uses of the named legume and cereal crop describe growth stages of a named cereal and legume crop in relation to moisture stress. describe the soil and climatic requirements of a named legume and cereal crop 	<ul style="list-style-type: none"> Origin and crop uses Plant characteristics and growth stages Soil and climatic requirements 	<ul style="list-style-type: none"> Discussing crop origins and uses Describing the critical growth stages of a legume crop and a cereal crop. Discussing soil and climatic requirements of a legume and a cereal crop Observing cereal and legume characteristics at different growth stages 	<ul style="list-style-type: none"> Legume and cereal crops Print and electronic media ICT tools/Braille Software/jaw software
Crop management	<ul style="list-style-type: none"> discuss factors to consider when choosing appropriate legume and cereal crop cultivars describe the planting of a named cereal and legume crop discuss the management of a 	<ul style="list-style-type: none"> Choice of suitable cultivars Planting time and method Management practices such as 	<ul style="list-style-type: none"> Discussing factors considered in the choice of suitable crop cultivars Discussing planting of a named cereal and legume crop Discussing management 	<ul style="list-style-type: none"> Fields Crop inputs Print and electronic media ICT tools/Braille Software/jaw

	<p>named legume and cereal crop</p> <ul style="list-style-type: none"> • identify weeds, pests and diseases of a named cereal and legume crop • discuss ways of controlling weeds, pests and diseases in a named cereal and legume crop. 	<p>irrigation, fertilization, crop protection</p> <ul style="list-style-type: none"> • 	<p>practices of a named cereal and legume crop</p> <ul style="list-style-type: none"> • Growing of selected cereal and legume crops • Keeping records for each crop grown • Experiments on crop management practices <p>NB: One crop should be studied and grown from each group: CEREALS: maize, wheat, sorghum, millets LEGUME: groundnuts, soya beans, field beans, cowpeas</p>	<p>software</p>
<p>Harvesting, Processing and Marketing</p>	<ul style="list-style-type: none"> • describe harvesting indices and methods of a named cereal and legume crops. • describe post-harvest technology of a named legume and cereal crops. • discuss the marketing a named legume and cereal crops • discuss the significance of record-keeping in the production of a named cereal and legume crop. • keep records of a named cereal and legume crop. 	<ul style="list-style-type: none"> • Harvesting indices and methods • Post-harvest technology: storage, value addition, protection • Marketing and records-keeping 	<ul style="list-style-type: none"> • Discussing harvesting indices and methods of a named cereal and legume crop. • Discussing post-harvest technology of a named cereal and legume crop • Harvesting and preparing a named cereal and legume crops for marketing. • Discussing the importance of record-keeping of a named cereal and legume crop. • Keeping records of a named cereal and legume crop 	<ul style="list-style-type: none"> • Crop produce • Harvesting tools, equipment and machinery • Processing equipment and machinery • Storage structures • Recommended textbooks/talking textbooks • ICT tools/Braille Software/jaw software

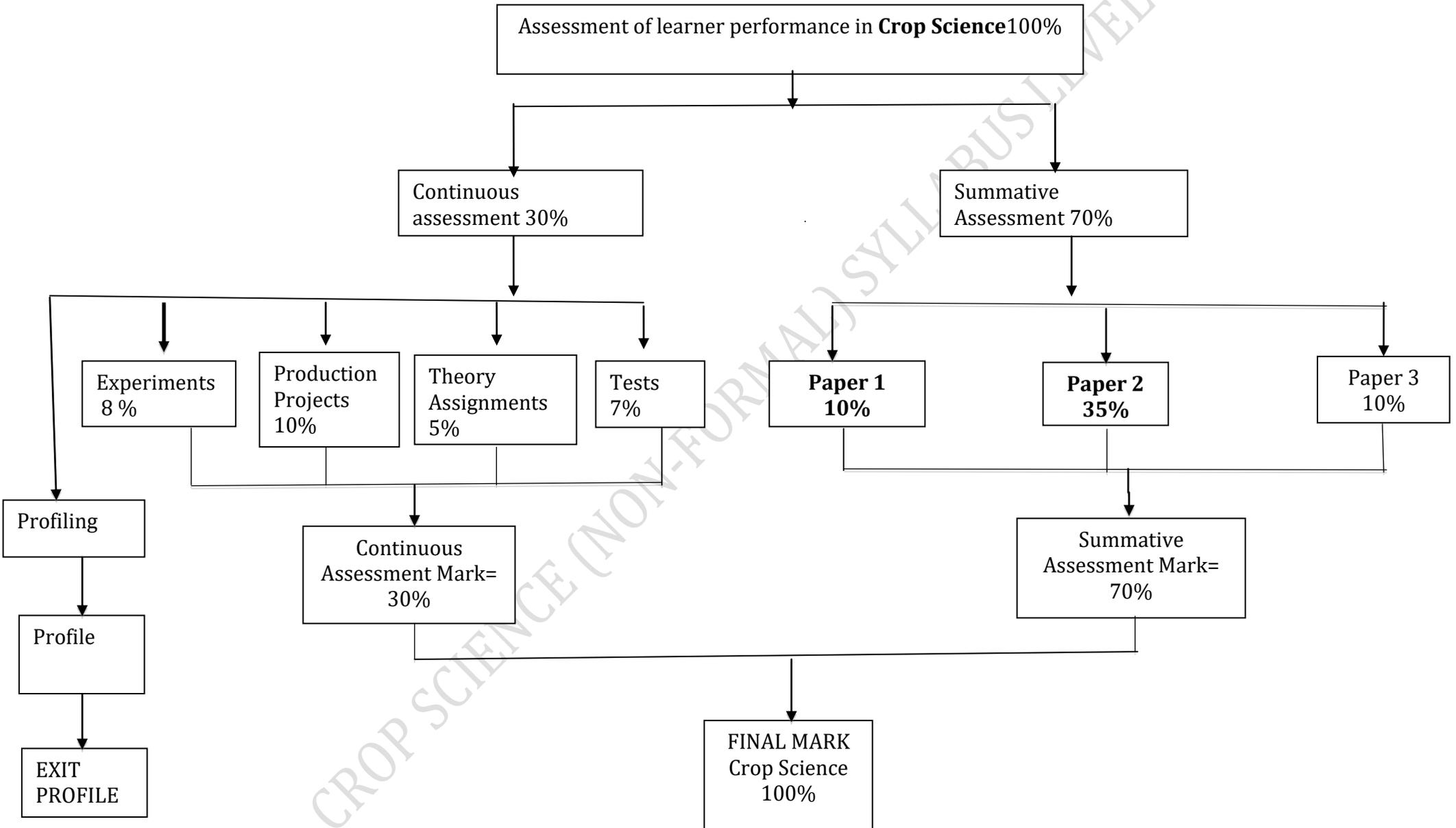
8.7 TOPIC 7: CONSERVATION FARMING
SUBTOPIC: PRINCIPLES AND PRACTICES

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Conservation farming	<ul style="list-style-type: none"> • explain the importance of conservation farming. • outline the components and practices of conservation farming. • describe different conservation farming practices. 	<ul style="list-style-type: none"> • Importance of conservation farming • Components and practices of conservation farming 	<ul style="list-style-type: none"> • Discussing the importance of conservation farming practices • Discussing components and practices of conservation farming • Carrying out conservation farming activities 	<ul style="list-style-type: none"> • Fields and/or gardens • Inputs • Conservation farming specialist • ICT tools/Braille Software/jaw software • Print and electronic media

CROP SCIENCE (NON-FORMAL) SYLLABUS (2014) III

10.0 ASSESSMENT MODEL

Crop Science learning area will be assessed through continuous and summative assessments as illustrated in the following diagram



11.0 ASSESSMENT OBJECTIVES

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

Knowledge and understanding

- Identify, explain, describe, discuss and demonstrate specific crop science facts, principles, relationships, concepts, practical techniques and terminology.
- Summarize and explain given crop science information.
- Maintain accurate physical and financial records of any crop enterprise.

Application of knowledge

- Illustrate, evaluate, interpret, solve and criticize specific phenomena of crop science.
- Schedule, test and experiment, using crop science facts and principles.
- Compare, contrast and criticize any procedures, processes and techniques employed in Crop Science.

Experimental skills

- Design and implement experimental activities in crop science.
- Select and use appropriate equipment and materials to carry out experimental activities safely.
- Report, illustrate and interpret observations correctly.
- Assess and justify methods of production employed in crop science.
- Compose, construct and organize given crop science facts into diagrams, tables and graphs.
- Analyze, interpret and evaluate results from any given crop science activity.

12.0 SKILLS SPECIFICATION GRID

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

13.0 ASSESSMENT WEIGHTING

ASSESSMENT COMPONENT	WEIGHTING
Continuous assessment	30%
Summative assessment	70%

14.0 CONTINUOUS ASSESSMENT 30%

Assessment will be done through:

Theory Assignments	5%
Tests	7%
Production Projects	10%
Experiments	8%

ASSESSMENT MODE	LEVEL III WEIGHTING
Theory assignments	5%
Tests	7%
Production Projects	10%
Experiments	8%

ASSESSMENT MODE	FREQUENCY PER LEVEL
	LEVEL III
Theory assignments	2 per year
Tests	2 per year
Production projects	2 for the 2 levels
Experiments	2 per year

15.0 SUMMATIVE ASSESSMENT 70%

Learners will be required to sit for papers 1 to 4.

PAPER DESCRIPTION	DURATION	MARKS	WEIGHTING
Paper 1	1 hour	40	15 %
Paper 2	2 hours 30 mins	100	40%
Paper 3	2 hours	40	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. Paper Total 100

SECTION A

Candidates are required to answer all questions in this section. Six questions will be set, each question is carries 10 marks.

Section Total 60

SECTION B

Essay type questions will be set from any part of the syllabus. Four questions are set and candidates are required to answer any 2 questions. Each question carries 20 marks. Section Total 40

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 are required. Two compulsory questions will be set, each question carrying 20 marks.

Paper Total 40

CROP SCIENCE (NON-FORMAL) SYLLABUS LEVEL III