

**GRZ
NOT FOR SALE**



**Republic of Zambia
Ministry of Education**

ISBN: 978-9982-00-941-9

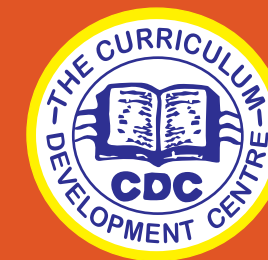


Printed by

Zambia Educational Publishing House

AGRICULTURAL SCIENCE SYLLABUS

**SECONDARY EDUCATION ORDINARY LEVEL
FORM 1 - 4**



**DEVELOPED BY THE CURRICULUM DEVELOPMENT CENTRE
LUSAKA
2024**

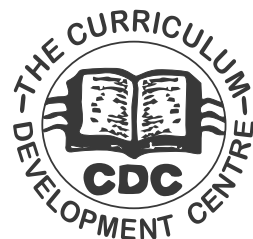


Republic of Zambia
MINISTRY OF EDUCATION

AGRICULTURAL SCIENCE SYLLABUS

SECONDARY EDUCATION ORDINARY LEVEL

FORM 1 – 4



Developed by The Curriculum Development Centre

2024

© Curriculum Development Centre, 2024

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior written permission of the copyright owner.



ISBN: 978-9982-00-941-9

First Published 2024 by
Zambia Educational Publishing House
Light Industrial Area
Chishango Road
P. O. Box 32708
Lusaka, Zambia

Printed by:
Zambia Educational Publishing House (ZEPH)

TABLE OF CONTENTS

VISION	v
PREFACE	vi
ACKNOWLEDGEMENT	vii
INTRODUCTION	viii
Objectives	viii
Competences to be Developed.. ..	x
Methodology.....	xi
Rationale	xi
Time and Period allocation.....	xii
Assessment	xiii
FORM 1	1
1.1.0 AGRICULTURE IN ZAMBIA	2
1.2.0 SOIL SCIENCE.....	4
1.3.0 CLIMATE-SMART AGRICUTURE.....	6
1.4.0 FARM STRUCTURES AND MACHINERY	7
1.5.0 CROP PRODUCTION	8
1.6.0 LIVESTOCK PRODUCTION	9
FORM 2	10
2.1.0 AGRICULTURE IN ZAMBIA	11
2.2.0 SOIL SCIENCE.....	16
2.3.0 CLIMATE-SMART AGRICULTURE.....	12

2.4.0 FARM STRUCTURES AND MACHINERY .	12
2.5.0 CROP PRODUCTION	13
2.6.0 LIVESTOCK PRODUCTION	15
2.7.0 FARM MANAGEMENT	20
FORM 3	21
3. 1.0 SOIL SCIENCE.....	22
3.2.0 CLIMATE SMART AGRICULTURE.....	22
3.3.0 FARM STRUCTURES AND MACHINERY .	23
3.4.0 CROP PRODUCTION	24
3.5.0 LIVESTOCK PRODUCTION	25
3.6.0 FARM MANAGEMENT	28
FORM 4	30
4.1.0 CLIMATE-SMART AGRICULTURE.....	31
4.2.0 FARM STRUCTURES AND MACHINERY .	31
4.3.0 CROP PRODUCTION	33
4.4.0 LIVESTOCK PRODUCTION	34
4.5.0 FARM MANAGEMENT	36
SCOPE AND SEQUENCE.....	38

VISION

Quality, life long education for all which is accessible, inclusive and relevant to individual, national and global needs

PREFACE

The Ordinary level Agricultural Science Syllabus has been reviewed in order to provide a national age-appropriate curriculum for learners at Form1 to 4. The syllabus aims to provide quality education that is aligned with the Competence-Based Curriculum and 21st Century Skills. It aims to impart the knowledge, skills, values and positive attitudes that will enable learners to live and grow into productive and useful members of their communities and the Zambian society at large.

The topics provided in this syllabus are: Agriculture in Zambia, Soil Science, Climate-Smart Agriculture, Farm Machinery, Crop Production, Animal Production and Farm Management. These are aimed at facilitating hands-on and minds-on experiences through manipulation of real objects, interaction with nature and learning through research and practical work. Thus, the learners will develop knowledge, desirable lifelong skills, values and positive attitudes needed for their personal and national development.

Cross cutting themes and emerging issues such as *National Values and Principles, Life Skills and Health Education, Climate Change and Financial Education* have been incorporated in the syllabi to ensure that learners cultivate a mindset, skills, values and positive attitudes that prepare them to live responsible lives and be protected from life threatening vices.

It is hoped that the syllabus will make learning at Secondary school level more meaningful and enjoyable as it is highly activity oriented and allows for a smooth transition from Ordinary Secondary school level to either Advanced Secondary school level, Tertiary or the world of Employment.



Joel Kamoko (Mr.)

Permanent Secretary- Educational Services

MINISTRY OF EDUCATION

ACKNOWLEDGEMENT

This syllabus is designed to provide the scope and sequence of topics necessary to be offered in Agricultural Science at Ordinary Secondary School level. It is intended to guide teachers and other experts in the field to appropriately offer relevant lessons in Agricultural Science at Ordinary Secondary School.

Many thanks go to individuals, institutions and organizations that provided the financial and technical support to the successful development of this syllabus. These include; the teachers, lecturers from colleges and public universities in Zambia, Standards Officers, and in particular, officers from the Examinations Council of Zambia, Directorates of National Science Centre, and Secondary Education in the Ministry of Education.

Last but not the least, I recognise the commitment and hard work of all the staff at the Curriculum Development Centre in ensuring that this syllabus comes to reality.



Charles Ndakala (Dr.)
Director – Curriculum Development
MINISTRY OF EDUCATION

INTRODUCTION

Agriculture has been identified as the main driver of the economic transformation and job creation agenda of the *Zambian* government. It, therefore, entails that in secondary schools, farming and agribusiness should be engraved into the curriculum. In this regard, learners should learn that agriculture is not just farming but also includes various agribusiness activities associated with servicing the agricultural sector.

In order to actualise agriculture as the main driver of the economic transformation and job creation agenda in our country, there is need to create a pool of cadres with agricultural expertise. This Agricultural Science Syllabus is designed for learners pursuing Secondary School Ordinary Level in *Zambia*. The syllabus will run from **Form 1 to Form 4**. This is a Competence-Based Agricultural Science course. It is designed to bridge the gap between theoretical knowledge and real-life application, ensuring that learners not only understand agricultural concepts, but gain the competences needed to thrive in the agricultural sector. By emphasising hands-on and minds-on learning activities, the syllabus encourages learners to actively engage with their environment, applying innovative techniques and develop sustainable farming practices and systems. This approach will not only enhance learners' understanding of Agricultural Science, but also equip them with the skills necessary to contribute to food security, environmental conservation, job creation, value addition and economic development of *Zambia*. Therefore, this syllabus is structured to progressively build learners' competences from basic agricultural principles to advanced application, preparing them for dynamic challenges of modern agriculture.

The course covers the following content:

1. Agriculture in *Zambia*
2. Soil Science
3. Climate-smart Agriculture
4. Farm Structures and Machinery
5. Crop Production
6. Livestock Production
7. Farm Management

Objectives

The objectives of the Ordinary Level Secondary School Agricultural Science syllabus are to develop a learner who will be able to:

1. Acquire competences required for productive and profitable agriculture through practice and experiential learning.

2. Appreciate the importance of agriculture in the socio-economic development of Zambia.
3. Acquire data based decision-making skills through the scientific principles of observation, data collection, analysis, interpretation and communication of results.
4. Recognise agriculture as a business and a viable livelihood option.
5. Develop positive attitudes, interests, habits and good practices in agriculture and agriculture related fields.
6. Recognise job opportunities in agriculture and agriculture related fields.
7. Acquire techniques for efficient management of agribusinesses.
8. Acquire knowledge and skills needed for further training in agriculture and agriculture related fields.
9. Produce competitive agricultural products.

KEY COMPETENCES TO BE DEVELOPED

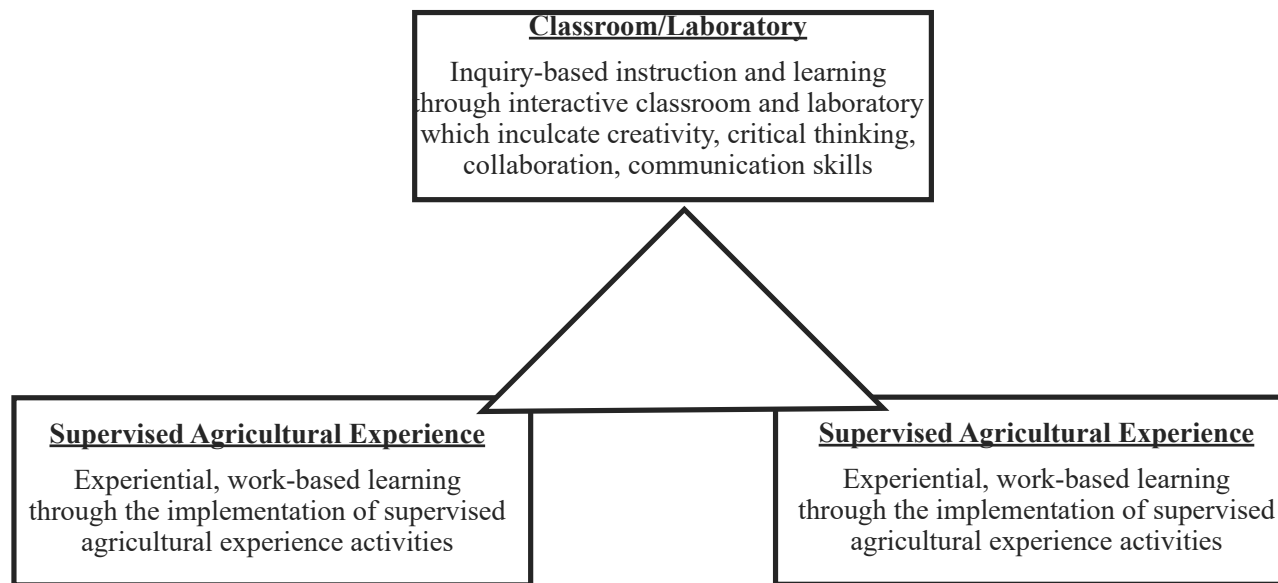
S/N	COMPETENCE	DESCRIPTORS
1	Analytical Thinking	<ul style="list-style-type: none"> • Identify patterns • Compile data, create mental images and address issues • Evaluate solutions
2	Communication	<ul style="list-style-type: none"> • Use mathematical/scientific language in different situations • Express oneself using different media and symbols • Ask for feedback
3	Creativity and Innovation	<ul style="list-style-type: none"> • Explore the objects around them. • Show creativity and innovativeness • Explore areas of interest
4	Collaboration	<ul style="list-style-type: none"> • Solving puzzle in groups • Play with peers to build relationships • Participate in and express themselves through play activities
5	Critical Thinking	<ul style="list-style-type: none"> • Ask and answer simple questions • Classify objects according to their attributes • Manipulate different objects • Solve simple problems in life • Match different things according attributes • Arrange objects according to attributes • Compare similarities or differences between objects • Explore the environment • Differentiate good from bad • Recognize and name items in the environment
6	Environmental Sustainability	<ul style="list-style-type: none"> • Dispose trash in the designated place. • Adhere to best practices in environmental management. • Identify a clean environment. • Identify types of waste in local environment
7	Problem Solving	<ul style="list-style-type: none"> • Make connections/link with the inner world or social environment • Use numeracy patterns and relations to solve problems • Manipulate numbers, shapes and symbols to complete a task

Suggested Teaching Methodology

The methodology of teaching Agricultural Science should embrace the three-circle model which is made up of: classroom/laboratory learning activities, supervised agriculture experience and study tours to farms and other agribusiness industries.

The Agricultural Science three-circle pedagogical model (fig. 1) plays an important part in developing competences that are required for learners of this generation. The model emphasises that the teaching is not just classroom based but also include real world hands own activities and exposure to institution that specialise in agriculture and agriculture related services.

Fig. 1 The Agricultural Science Three-Circle Pedagogical Model



Rationale

The Zambian Competence-Based Agricultural Science syllabus is designed to transform agricultural science by focusing on the development of practical skills and the seven core competences of the curriculum among learners. It shifts the focus from mere acquisition of theoretical knowledge to application of knowledge in practical situations ensuring that learners not only understand agricultural concepts, but also demonstrate the competences needed to thrive in the agricultural sector.

It emphasises hands-on learning and practical activities, encourages learners to actively engage with their environment, apply innovative techniques, and develop sustainable farming practices. The syllabus is structured to progressively build learners' competences from basic Agricultural principles to advanced applications, preparing them for the changing challenges of modern agriculture. This approach not only enhances learners' understanding of agriculture but also equips them with the skills necessary to contribute to food security, environmental conservation, and the economic development of their communities and the country at large.

A Competence-Based Agricultural Science Syllabus for Ordinary Secondary School Level therefore, is a strategic response to the challenges and opportunities presented by the agricultural industry. It will produce a generation of learners who are not only knowledgeable but also skilled, innovative, and prepared to lead in the agricultural sector, driving progress toward a more sustainable and food-secure future.

The syllabus will achieve this by using the “Three-Circle Pedagogical Model” to:

- Bridge the gap between theory and Practice
- Respond to Industry Needs
- Promote Sustainable Agriculture
- Enhance Critical Thinking and Problem-Solving
- Promote Entrepreneurship,
- Enhance Employability
- Foster Lifelong Learning and Adaptability
- Support National and Global Agricultural Goals

Time Allocation

Time allocation for this syllabus will require at least twelve (12) periods of 40 minutes per period as shown in the table below. However, all the lessons must be taught as double periods of 80 minutes per lesson.

The increased number of periods has taken into account the time needed to carryout projects and practical tasks that will equip learners with the necessary agricultural competences by acquiring knowledge, skills, positive attitudes and values for a productive life.

Table 1: Time allocation for O’ Level Agricultural Science

Time	Number of Periods	Number of Minutes per Period
12	40	8 hours

Assessment

The Scheme of Assessment will consist of School-Based Assessment and Summative Assessment that will be conducted by the Examinations Council of Zambia. School Based Assessment will be emphasised by using various methods of testing according to topics and themes at various levels. The Examinations Council of Zambia will prepare detailed procedures on how School-Based Assessments will be conducted by the teachers. The Examinations Council of Zambia will also develop the Assessment Schemes which will provide teachers with guidelines on the competences to be tested.

School Based Assessment will be part of the normal teaching and learning process and therefore, the assessment opportunities will also occur during this normal process.

The assessment opportunities will occur in three forms:

- Observation – watching learners working (good for assessing skills and values)
- Conversation – asking questions and talking to learners (good for assessing knowledge and understanding)
- Product – appraising the learners’ work (writing reports, translation, calculations, presentations, maps, diagrams, models etc.) in this context the product is seen as something physical and permanent that the teacher can keep and look at.

Thus, School Based Assessment activities will be in form of school projects, practical tasks and tests whose marks will contribute to the final grading of the summative assessment administered by the Examinations Council of Zambia.

FORM 1

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
1.1.0 AGRICULTURE IN ZAMBIA	1.1.1 Importance of Agriculture	1.1.1.1 Demonstrate understanding of the importance of Agriculture in Zambia	<ul style="list-style-type: none"> • Classifying Agriculture as an applied science or as a technology • Investigating the value of agriculture (food provision, food security, provision of raw materials, employment, income generation and foreign exchange...). Collecting data, discussing and writing down the importance of agriculture in Zambia • Evaluating the impact of underdevelopment of agriculture in Zambia • Developing new ideas and innovations on how to improve agriculture in Zambia 	<ul style="list-style-type: none"> • Understanding of the importance of agriculture in Zambia demonstrated satisfactorily
	1.1.2 Agricultural Activities in Zambia	1.1.2.1 Explore the main agricultural activities in Zambia	<ul style="list-style-type: none"> • Investigating the main agricultural activities in Zambia: (Crop Production; maize, groundnuts, cassava, soya beans, cabbage, citrus, tomatoes, rape..., Animal Production; cattle, poultry, aquaculture, apiculture, pig production, sheep and goat production, rabbit...) 	<ul style="list-style-type: none"> • Main agricultural activities in Zambia explored accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
	1.1.3 Factors that Influence Agricultural Development in Zambia	1.1.3.1 Explore factors that influence agricultural development in Zambia	<ul style="list-style-type: none"> • Investigating factors that influence agricultural development in Zambia: <i>Environmental factors, social and economic factor, technological factors...</i>) • Investigating agencies and organisations that Support farmers • Illustrating on the map of Zambia; <ul style="list-style-type: none"> (a) main agro-ecological zones in Zambia (b) areas not suitable for dairy farming and ranching (c) areas not very suitable for growing maize 	<ul style="list-style-type: none"> • Factors that influence agricultural development in Zambia explored correctly
	1.1.4 Types of Farmers	1.1.4.1 Classify the types of farmers	<ul style="list-style-type: none"> • Categorising farmers based on level of production, mechanisation and capital investment (<i>subsistence farmers, small scale farmers, commercial farmers...</i>) 	<ul style="list-style-type: none"> • Types of farmers classified appropriately

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
1.2.0 SOIL SCIENCE	1.2.1 Composition of Soil	1.2.1.1 Examine the composition of soil	<ul style="list-style-type: none"> • Describing soil composition • Identifying types of rocks based on their physical characteristics (<i>igneous, sedimentary and metamorphic</i>) • Studying soil and its formation (<i>Weathering - physical, chemical and biological</i>) • Analysing soil composition by means of experiments (<i>air, water, mineral particles, organic matter and living organism</i>) • Analysing the importance of, air, water, mineral particles, organic matter and living organism in the soil 	<ul style="list-style-type: none"> • Composition of soil examined correctly
	1.2.2 Properties of Soil	1.2.2.1 Explore properties of soil	<ul style="list-style-type: none"> • Investigating the types of soils (<i>sand, clay and silt</i>) • Determining the physical characteristics of each type of soils (<i>texture, structure and colour</i>) • Determining the chemical characteristics of each type of soils (<i>soil reaction: testing soil pH, and carryout appropriate action</i>) • Profiling soils in the local environment to determine the suitability of the sites for agricultural purposes 	<ul style="list-style-type: none"> • Properties of soil explored satisfactorily

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
	1.2.3 Soil Fertility	1.2.3.1 Conserve soil fertility.	<ul style="list-style-type: none"> • Describing soil fertility • Investigating factors that determine the fertility of soil (<i>pH, aeration, drainage, temperature, nutrients, humus, water holding capacity, soil microorganisms, pests and diseases...</i>) • Classifying nutrients into major (<i>N.P.K</i>) and minor (<i>boron, zinc, manganese, copper...</i>) • Distinguishing organic fertilisers from inorganic fertilisers • Categorising inorganic fertilisers based on their composition (<i>straight and compound fertilisers</i>) • Maintaining soil fertility (<i>crop rotation, mulching, minimum tillage, cover crops...</i>) • Improving soil fertility (<i>liming, organic and inorganic fertiliser application, improved fallow...</i>) • Making compost manure • Investigating soil erosion and its mitigation to maintain soil fertility 	<ul style="list-style-type: none"> • Soil fertility conserved appropriately

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
	1.2.4 Soil Water	1.2.4.1 Investigate soil water and retention	<ul style="list-style-type: none"> • Describing soil water and retention of water. • Experimenting on drainage and water holding capacity of different soil types • Demonstrating capillarity of different soil types • Analysing the types of soil moisture and their significance to crop production (<i>hygroscopic, gravitational, capillary and water... </i>) • Practising the different methods of irrigation (<i>surface, sub surface, overhead irrigation</i>) and their effects on the environment • Interpreting the significance of the water cycle to agriculture 	<ul style="list-style-type: none"> • Soil water and its retention investigated correctly
1.3.0 CLIMATE-SMART AGRICULTURE	1.3.1 Climate-Smart Agriculture	1.3.1.1 Demonstrate understanding of Climate-Smart Agriculture	<ul style="list-style-type: none"> • Describing Climate-Smart Agriculture • Investigating the key characteristics of Climate - Smart Agriculture • Identifying factors that affect practicing of Climate-Smart Agriculture in Zambia • Analysing the benefits of Climate- Smart Agriculture in Zambia 	<ul style="list-style-type: none"> • Understanding of Climate- Smart Agriculture demonstrated appropriately

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
	1.3.2 Application of Drones	1.3.2.1 Use drones to enhance productivity in agriculture	<ul style="list-style-type: none"> • Describing drones • Identifying types of drones used in agriculture • Evaluating the importance of drones in agriculture • Applying drones in various agricultural purposes 	<ul style="list-style-type: none"> • Drones to enhance productivity in agriculture used efficiently
	1.3.3 Climate Change	1.3.3.1 Show understanding of climate change and its causes	<ul style="list-style-type: none"> • Describing climate change • Distinguishing climate change from climate variability • Analysing the effects of greenhouse gas on the climate • Investigating the main causes of climate change (<i>Volcanic activities, wild fires, burning of fossil fuels, farming...</i>) • Relating the effects of climate change to the development of agriculture in Zambia. • Identifying ways of mitigating the effects of climate change on agriculture 	<ul style="list-style-type: none"> • Understanding of climate change and its causes demonstrated correctly
1.4.0 FARM STRUCTURES AND MACHINERY	1.4.1 Garden Tools and Equipment	1.4.1.1 Use Garden tools and equipment for better production	<ul style="list-style-type: none"> • Identifying different garden tools and equipment • Handling garden tools and equipment appropriately • Practicing the proper care, maintenance and storage of garden tools and equipment • Identifying major parts of knapsack sprayer and their functions • Improvising of garden tools and equipment 	<ul style="list-style-type: none"> • Garden tools and equipment used accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
<p>1.5.0 CROP PRODUCTION</p>	<p>1.5.1 Vegetable Production</p>	<p>1.5.1.1 Grow a variety of vegetables</p>	<ul style="list-style-type: none"> • Exploring the common vegetables grown in the local environment according to their groups, varieties and discuss their value (<i>leafy, solanaceous, legume, roots, cucurbits and miscellaneous</i>) • Choosing one representative vegetable from leafy, solanaceous, legume and miscellaneous for practicing • Selecting a site suitable for vegetable production • Designing a simple crop rotation plan including a legume vegetable (<i>solanaceous-legume-miscellaneous-leafy</i>) • Analysing the characteristics of common pests of vegetables (<i>feeding characteristics; piercing and sucking, biting and chewing</i>) • Analysing mode of action for pesticides (<i>contact and systemic</i>) • Practicing effective weed control methods (<i>chemical, mechanical, cultural and biological</i>) • Observing the safety when applying pesticides. • Managing vegetable growing from nursery stage to harvesting (<i>seedbed preparation, sowing/planting, irrigation, weeding, fertilizer</i>) 	<ul style="list-style-type: none"> • A variety of vegetables grown accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<p><i>application, pest and disease control, harvesting)</i></p> <ul style="list-style-type: none"> • Adding value, storing and marketing vegetables. • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	
1.6.0 LIVESTOCK PRODUCTION	1.6.1 Importance of Livestock	1.6.1.1 Demonstrate understanding of the importance of livestock production	<ul style="list-style-type: none"> • Describing livestock Production • Evaluating the economic value of livestock • Exploring the challenges faced in livestock production (<i>Pest and diseases, nutrition, market...</i>) 	<ul style="list-style-type: none"> • Understanding the importance of livestock demonstrated accordingly
	1.6.2 Nutrition and Feed Formulation in Livestock	1.6.2.1 Formulate animal feeds	<ul style="list-style-type: none"> • Identifying different types of livestock feeds • Describing the nutritive value of feed. (<i>proteins, carbohydrate, fats, fiber, minerals, vitamins water</i>) • Distinguishing between maintenance and production ration • Formulating rations for specific animals 	<ul style="list-style-type: none"> • Animal feed formulated correctly

FORM 2

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
2.1.0 AGRICULTURE IN ZAMBIA	2.1.1 Land Tenure Systems and Land Use	2.1.1.1 Interpret the land tenure systems and land use in Zambia	<ul style="list-style-type: none"> • Describing land tenure and land use • Exploring existing land tenure systems (<i>communal, customary, leasehold, and state land...</i>) • Analysing the effects of land tenure and human population on agriculture • Investigating factors that limit the use of land in different areas of Zambia • Classifying different forms of land use based on: <ul style="list-style-type: none"> (a) Agricultural systems (<i>Agro-forestry, crop production, livestock production and hydroponics...</i>) (b) Farming practices (<i>Rotations, intercropping, mixed farming and monoculture...</i>) 	<ul style="list-style-type: none"> • Land tenure systems and land use in Zambia interpreted correctly
2.2.0 SOIL SCIENCE	2.2.1 Soil Fertility (Nutrient Cycles)	2.2.1.1 Demonstrate understanding of nutrient cycles	<ul style="list-style-type: none"> • Analysing the nutrient cycles (<i>nitrogen and carbon cycles</i>) • Illustrating the nitrogen and the carbon cycles • Applying the nitrogen and carbon cycles in relation to soil fertility 	<ul style="list-style-type: none"> • Understanding of nutrient cycles demonstrated accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
2.3.0 CLIMATE-SMART AGRICULTURE	2.3.1 Climate Change Impact on Agriculture and Food Security	2.3.1.1 Demonstrate understanding of the relationship of climate change, agriculture and food security	<ul style="list-style-type: none"> Exploring effects of climate change on agriculture (<i>Effects on crop and animal production</i>) Exploring how agricultural activities contribute to climate change Discussing food security and its four dimensions (<i>availability, accessibility, utilisation and stability</i>) 	<ul style="list-style-type: none"> Understanding of relationship of climate change, agriculture and food security demonstrated accordingly
2.4.0 FARM STRUCTURES AND MACHINERY	2.4.1 Farm Buildings	2.4.1.1 Construct farm structures	<ul style="list-style-type: none"> Exploring a suitable site for farm buildings (<i>security, direction of prevailing wind, drainage, accessibility, relationship between structures...</i>) Preparing a basic layout and plans for farm buildings Building farm structures using local materials (<i>roads, farm house, fences...</i>) 	<ul style="list-style-type: none"> Farm structures constructed correctly
	2.4.2 Animal and Tractor Drawn Implements	2.4.2.1 Operate animal and tractor drawn implements	<ul style="list-style-type: none"> Comparing animal and tractor drawn implements Preparing animal and tractor drawn implements for appropriate use (<i>mouldboard, disc plough, ridger, planter, ripper, cultivator, boom sprayer, harrow, subsoiler...</i>) Using animal and tractor drawn implements Maintaining animal and tractor drawn implements appropriately 	<ul style="list-style-type: none"> Animal and tractor drawn implements operated accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
<p>2.5.0 CROP PRODUCTION</p>	<p>2.5.1 External and Internal Morphology of Plants</p>	<p>2.5.1.1 Demonstrate understanding of external and internal morphology of plants</p>	<ul style="list-style-type: none"> • Classifying different types of crops based on their life cycle (<i>annual, biennial and perennial</i>) • Analysing the external and internal morphology of plants (<i>roots, stems, leaves and flowers</i>) • Drawing and relating the structure of the parts of the plant to their functions (<i>for a flower include pollination and fertilization</i>) • Comparing types of propagation (<i>seed and vegetative</i>) • Relating the main parts of a seed to germination (<i>plumule, radicle, seed testa, micropyle, cotyledon...</i>) • Identifying suitable conditions for seed germination (<i>temperature, oxygen, moisture, seed viability</i>) • Practising different methods of vegetative propagation (<i>budding, grafting, layering, cuttings and tissue culturing, rhizomes, bulbs and corms...</i>) for suitable crops 	<ul style="list-style-type: none"> • Understanding of external and internal morphology of plants demonstrated appropriately

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
	<p>2.5.2 Field Crop Production</p>	<p>2.5.2.1 Grow cereal crops</p>	<ul style="list-style-type: none"> • Exploring cereal crops locally grown (<i>maize, sorghum, wheat, rice, millet, barley...</i>) • Selecting a site suitable for cereal crop production • Designing a simple crop rotation plan including a cereal and legume crop (<i>cereal-legume-tuber and any other crops</i>) • Determining plant population, seed germination percentage and required inputs per hectare (<i>fertiliser, quantity of seed, pesticides...</i>) • Managing maize and any other locally grown cereal crop from planting to harvesting (<i>field preparation, sowing/planting, spacing and plant population, planting depth, irrigation, weeding, fertilizer application, pest and disease control, and harvesting</i>) • Adding value, storing and marketing cereal crops • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	<ul style="list-style-type: none"> • Cereal crops grown accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
2.6.0 LIVESTOCK PRODUCTION	2.6.1 Poultry Production in Zambia	2.6.1.1 Demonstrate understanding of poultry production	<ul style="list-style-type: none"> • Describing poultry. • Investigating the importance of poultry production in Zambia • Categorizing chickens according to breeds and usage (<i>layers, boilers, duals</i>) • Exploring some of poultry hatcheries in Zambia • Exploring different systems of poultry rearing in Zambia (<i>intensive-battery cage and deep litter, semi-intensive-fold, extensive-free range</i>) • Analysing the characteristics of a good suitable poultry house (<i>leaked proof roof, damp proof concrete floor, proper ventilation, east-west orientation, strong walls, vermin free, footbath...</i>) • Identifying various poultry equipment (<i>feeders, drinkers, heat sources, lighting sources, cages, perches...</i>) • Making various poultry equipment using local materials (<i>drinkers, feeders, heat source, light source, cages, perches...</i>) • Constructing a simple poultry house using locally available materials 	<ul style="list-style-type: none"> • Understanding of poultry production demonstrated appropriately

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
		2.6.1.2 Demonstrate understanding of anatomy and physiology for poultry livestock	<ul style="list-style-type: none"> • Exploring the external structures of chickens • Exploring parts of the digestive system in a dissected chicken • Illustrating the parts of the digestive system of a chicken in relation to their functions • Examining the parts of the reproductive system in a dissected chicken • Illustrating the parts of the reproductive system of a hen in relation to their functions • Relating the structure to the function of the parts of an egg 	<ul style="list-style-type: none"> • Understanding of the anatomy and physiology of chickens demonstrated correctly
		2.6.1.3 Rear broiler chickens to maturity	<ul style="list-style-type: none"> • Managing broiler chickens from day old to market weight (<i>stocking, brooding, rearing</i>) • Preparing a poultry house for the arrival of day-old chicks • Formulating feed for broiler chickens • Carrying out routine management practices (<i>Inspection, weighing, feeding, provision of water, heat provision, light provision, litter management, vaccinations, pest and disease management, culling...</i>) • Adding value and marketing (<i>dressng, packaging, smoking of broiler chickens, storage and marketing</i>) • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	<ul style="list-style-type: none"> • Broiler chickens reared to maturity satisfactorily

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
		2.6.1.4 Rear layer chickens to production age	<ul style="list-style-type: none"> • Managing layer chickens from day old to culling (<i>stocking, brooding, rearing, laying</i>) • Formulating feed for Layer chickens • Carrying out routine management practices (<i>Inspecting, weighing, feeding, providing water, heat and light, vaccinating, pest and disease control, culling, debeaking, illuminating the house, proper egg handling and storage, record keeping...</i>) • Hatching eggs (<i>selection, storage</i>) • Practising incubation of hatching eggs (<i>Temperature regulation, humidity, ventilation, turning</i>) • Adding value and marketing of eggs (<i>collection, storage, packaging and branding of eggs, finding the market of eggs</i>) • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	<ul style="list-style-type: none"> • Layer chickens reared to production age successfully

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
	2.6.2 Pig Production	2.6.2.1 Demonstrate understanding of pig production	<ul style="list-style-type: none"> • Investigating the importance of pig production in Zambia • Categorizing pigs according to breeds (<i>indigenous and exotic breeds</i>). and usage (<i>porkers, baconer</i>) • Comparing indigenous and exotic breeds based on characteristics • Identifying pig breeders in Zambia • Exploring different systems of pig rearing in Zambia (<i>intensive, semi-intensive, extensive/free range</i>) • Analysing the characteristics of a good suitable piggery house (<i>leaked proof roof, strong concrete floor, proper ventilation, east-west orientation, strong walls, proper drainage, footbath...</i>) • Exploring types piggery pens (<i>farrowing pen, boar pen, rearing pen, dry sow pen</i>) including equipment (<i>feeders, drinkers, source of heat...</i>) • Designing a piggery house 	<ul style="list-style-type: none"> • Understanding of pig production demonstrated accordingly
		2.6.2.2 Demonstrate understanding of anatomy and physiology of pigs	<ul style="list-style-type: none"> • Identifying the external parts of pigs • Relating parts of the digestive system of a pig to their functions • Identifying the parts of the reproductive system of a boar and a gilt/sow 	<ul style="list-style-type: none"> • Understanding of the anatomy and physiology of pigs demonstrated correctly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
		2.6.2.3 Manage the pig from birth to slaughter weight	<ul style="list-style-type: none"> • Carrying out routine management practices (<i>selection of breeders - crossbreeding and inbreeding, heat detection, servicing, pregnancy diagnosis, monitoring of gestation period, management of in-pig sow, preparing for farrowing, iron injecting, tail docking, teeth clipping, castration, vaccinations, deworming, identification-ear notching, tattooing, tagging, record keeping, feeding and feed conversion ratio, temperature regulation – creep area, pest and disease control, water provision...</i>) • Adding value (<i>dressing, packaging, smoking, sausage making</i>) and marketing • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	<ul style="list-style-type: none"> • Pig managed to slaughter weight successfully

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
<p>2.7.0 FARM MANAGEMENT</p>	<p>2.7.1 Farm as a Business Unit</p>	<p>2.7.1.1 Demonstrate understanding of a farm as a business</p>	<ul style="list-style-type: none"> • Exploring activities that make a farm as a business • Identifying the resources the farm requires for production (<i>land, labour, capital and entrepreneurship</i>) • Analysing ways of improving production (<i>credit, grants, technology, use of skilled labour, increasing scale of production and product diversification, use of good animal breeds and seeds...</i>) • Keeping farm records (<i>financial records-balance sheet, profit and loss, trading records and production records-labour record, breeding records, health records...</i>) • Discussing the law of diminishing returns • Applying the law of diminishing returns in production • Preparing financial records (<i>profit and loss and balance sheet</i>) 	<ul style="list-style-type: none"> • Understanding of a farm as a business demonstrated correctly

FORM 3

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
3. 1.0 SOIL SCIENCE	3.1.1 Soil Fertility	3.1.1.1 Determine radicals in a sample of fertiliser	<ul style="list-style-type: none"> Analysing the absorption of nutrients by plants (<i>carbonate ions, nitrate ions, sulphate ions, calcium ions, ammonium ions, phosphate ions</i>) Determining the availability of carbonate ions, nitrate ions, sulphate ions, calcium ions, ammonium ions, phosphate ions by carrying out wet tests Determining suitable combination of fertilisers that would improve Soil fertility 	<ul style="list-style-type: none"> Radicals in a sample of fertiliser determined correctly
3.2.0 CLIMATE-SMART AGRICULTURE	3.2.1 Climate-Smart Agriculture Practices	3.2.1.1 Practise Climate-Smart Agriculture	<ul style="list-style-type: none"> Exploring the importance of sustainable agriculture practices for long-term food security Practicing the strategies through which farmers can use to enhance productivity, strengthen resilience and mitigating the effects of climate change (<i>crop rotation, zero tillage/conservation farming...</i>) Enhancing productivity: <ul style="list-style-type: none"> ✓ Zero tillage or no tillage, improved feed management, adoption of nitrogen efficient varieties, livestock manure management, water harvesting irrigation, greenhouse crop production (<i>description,</i> 	<ul style="list-style-type: none"> Climate-Smart Agriculture practices practised correctly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<p><i>value and construction of greenhouses)</i></p> <ul style="list-style-type: none"> ✓ Adapting (<i>use short duration cultivars, adopting varieties resistance to heat and drought, change irrigation practices, early sowing or planting, improve genetics and production of livestock</i>) ✓ Mitigating effects of climate change: (<i>Refer to Agroforestry, aquaponics, reduced use of nitrogenous fertilisers, use of clean and green renewable energy such as a biogas, solar and wind...</i>) 	
3.3.0 FARM STRUCTURES AND MACHINERY	3.3.1 Farm Power	3.3.1.1 Use different sources of power on the farm	<ul style="list-style-type: none"> • Exploring different sources of farm power (human, animal, internal combustion engine, biomass, solar, water, wind...) • Applying different sources of farm power 	• Different sources of power on the farm used correctly
	3.3.2 Brick Laying and Workshop Tools	3.3.2.1 Use brick laying and workshop tools	<ul style="list-style-type: none"> • Exploring different brick laying and workshop tools • Using brick laying and workshop tools • Practicing the proper care, maintenance and storage of brick laying and workshop tools 	• Brick laying and workshop tools used correctly
	3.3.3 Farm Structures	3.3.3.1 Construct basic farm structures	<ul style="list-style-type: none"> • Identifying basic farm structures 	• Construction of basic farm structures demonstrated correctly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<ul style="list-style-type: none"> • Designing basic farm structures • Constructing basic structures using bricklaying principles (<i>Demonstration structures should be done under the supervision of competent bricklayers and carpenters</i>) 	
3.4.0 CROP PRODUCTION	3.4.1 Fruit and Tuber Crop Production	3.4.1.1 Grow fruit crops	<ul style="list-style-type: none"> • Describing a fruit crop • Exploring varieties of the common fruit crops found a local area • Investigating the nutritive and economical value of fruits • Selecting a site suitable for fruit crop production • Carrying out routine management practices on a fruit crop being studied from nursery/in'situ to harvesting (seedbed preparation, sowing/planting-propagation, irrigation, weeding, fertilizer application, pest and disease control, harvesting...) • Adding value, storing and marketing fruits • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	<ul style="list-style-type: none"> • Fruit crops grown successfully
		3.4.1.2 Grow tuber crops	<ul style="list-style-type: none"> • Describing a tuber crop • Exploring varieties of the common tuber crops found in a local area 	<ul style="list-style-type: none"> • Tuber crops grown successfully

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<ul style="list-style-type: none"> • Investigating the nutritive and economical value of tubers • Selecting a site suitable for fruit crop production • Carrying out routine management practices on a tuber crop being studied from planting to harvesting (<i>seedbed preparation, planting-propagation, irrigation, weeding, fertilizer application, pest and disease control, harvesting...</i>) • Adding value, storing and marketing tubers • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	
<p>3.5.0 LIVESTOCK PRODUCTION</p>	<p>3.5.1 Pasture Management</p>	<p>3.5.1.1 Manage different pastures for livestock</p>	<ul style="list-style-type: none"> • Describing pasture management • Exploring types of pastures (<i>grasses/legumes/fodder</i>) • Carrying out routine management of natural and improved pastures (<i>include ley farming</i>) • Illustrating different grazing management systems • Calculating carrying capacity and stocking rate • Preserving pastures in the form of hay and silage 	<ul style="list-style-type: none"> • Different Pastures for livestock managed correctly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
	<p>3.5.2 Ruminant Animal Production</p>	<p>3.5.2.1 Rear ruminant animals</p>	<ul style="list-style-type: none"> • Exploring innovative ways of improving yield and nutritive value of pastures • Categorising ruminant animals (<i>cattle, sheep and goat...</i>) • Investigating the economic value of ruminant animals • Describing ruminant animals according to breeds and usage (<i>Meat, dairy and farm power</i>) • Exploring different systems of ruminant production in Zambia (<i>intensive and extensive</i>) • Examining the anatomic structures of ruminant animals in relation to their physiological functions (<i>digestive and reproductive systems</i>) • Constructing appropriate housing structures for ruminant animals • Selecting ruminant animals for breeding • Exploring on the different breeding systems such as <i>cross breeding, upgrading, line breeding and inbreeding</i> • Investigating on methods of servicing ruminant animals (<i>natural mating and artificial insemination</i>) 	<ul style="list-style-type: none"> • Ruminant animals reared accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
		3.5.2.2 Manage ruminant animals	<ul style="list-style-type: none"> • Categorising ruminant animals (cattle, sheep and goat...) • Investigating the economic value of ruminant animals • Describing ruminant animals according to breeds and usage (<i>Meat, dairy and farm power</i>) • Exploring different systems of ruminant production in Zambia (<i>intensive and extensive</i>) • Examining the anatomic structures of ruminant animals in relation to their physiological functions (<i>digestive and reproductive systems</i>) • Constructing appropriate housing structures for ruminant animals • Selecting ruminant animals for breeding • Exploring on the different breeding systems such as <i>cross breeding, upgrading, line breeding and inbreeding</i> • Investigating methods of servicing ruminant animals (<i>natural mating and artificial insemination</i>) • Carrying out routine management practices (<i>feeding, water provision, animal handling, castration, heat detection, pregnancy diagnosis, dehorning, weaning, milking, identification- ear</i>) 	<ul style="list-style-type: none"> • Ruminant animals managed successfully

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<p><i>tagging, tattooing, and branding...</i>)</p> <ul style="list-style-type: none"> • Demonstrating skills of identifying, preventing and controlling of the most important diseases and parasites such as <i>east coast fever, heart water, anaplasmosis, foot and mouth disease, anthrax, roundworm, tapeworm, liver fluke tsetse flies and ticks</i> • Investigating and suggesting ways of adding value, storing and marketing of ruminant animal products • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	
<p>3.6.0 FARM MANAGEMENT</p>	<p>3.6.1 Agricultural Economics</p>	<p>3.6.1.1 Demonstrate understanding of agricultural economics</p>	<ul style="list-style-type: none"> • Describing agricultural economics • Applying opportunity cost in agricultural production • Analysing the law of supply and demand • Investigating the effects of controlling prices of agricultural inputs and products on demand and supply • Investigating risks in agriculture (<i>production or yield risks, price or market risks, institution risks, human risks,</i> 	<ul style="list-style-type: none"> • Understanding agricultural economics demonstrated accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<p><i>financial risks, asset risks) and uncertainties in agriculture and ways of mitigating them such as insurance, diversification, input rationing, vertical integration, production and marketing contracts</i></p> <ul style="list-style-type: none"> • Practising insurance policies in agricultural enterprise 	

FORM 4

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
4.1.0 CLIMATE-SMART AGRICULTURE	4.1.1 Research on Climate-Smart Agriculture	4.1.1.1 Carryout research on Climate-Smart Agriculture	<ul style="list-style-type: none"> Identifying basic steps in carrying out research Researching on various aspects of Climate-Smart Agriculture Reporting on the findings on various issues related to Climate-Smart Agriculture 	<ul style="list-style-type: none"> Research on Climate-Smart Agriculture carried out accordingly
4.2.0 FARM STRUCTURES AND MACHINERY	4.2.1 Structures for Water Supply	4.2.1.1 Use different water supply structures on a farm	<ul style="list-style-type: none"> Exploring different sources and structures for water supply on a farm (<i>springs, rivers, lakes, underground water, weirs, wells, boreholes, dams, reservoirs...</i>) Managing water supply systems (<i>maintenance and repair</i>) Investigating the main causes of pollution of water supply systems on the farm Preventing pollution of water supply systems on the farm 	<ul style="list-style-type: none"> Different water supply structures used sustainably
	4.2.2 Engines	4.2.2.1 Demonstrate the operation of engines	<ul style="list-style-type: none"> Describing the internal combustion engine Examining the main parts of the combustion engine (<i>Piston, valves, cylinder head, cylinder, crankshaft, spark plug, connecting rod, cam shaft, injector nozzles</i>) Relating the parts of the engine to their functions (<i>Piston, valves, cylinder head, cylinder, crankshaft, spark</i>) 	<ul style="list-style-type: none"> Operation of engines demonstrated correctly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<p><i>plug, connecting rod, cam shaft, injector nozzles)</i></p> <ul style="list-style-type: none"> • Demonstrating, using models, the working of the two and the four stroke engines • Comparing the petrol and diesel engines 	
		4.2.2.2 Maintain engines of farm machinery	<ul style="list-style-type: none"> • Describing the main systems of an engine (<i>cooling, electrical and lubrication system</i>) • Maintaining main systems of an engine (<i>cooling, electrical and lubrication system</i>) 	<ul style="list-style-type: none"> • Engines of farm machinery maintained correctly
	4.2.3 Farm Mechanisation	4.2.3.1 Demonstrate understanding of farm mechanisation	<ul style="list-style-type: none"> • Describing farm mechanisation • Exploring different types of farm machines • Investigating the advantages and disadvantages of farm mechanisation • Operating different farm machines for small holder farmers • Exploring innovative ways of enhancing operational efficiency of farm machines 	<ul style="list-style-type: none"> • Understanding of farm mechanisation demonstrated accordingly

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
4.3.0 CROP PRODUCTION	4.3.1 Legume Crop Production	4.3.1.1 Grow legume crops	<ul style="list-style-type: none"> • Describing a legume crop (<i>peas, beans, groundnuts...</i>) • Exploring varieties of leguminous crops found in the local area • Investigating nutritive and economical value of a legume crop being studied • Selecting a suitable site for a legume crop being studied • Managing a legume crop being studied from sowing to harvesting (<i>land preparation, sowing, irrigation, weeding, fertilizer application, pest and disease control, harvesting and other routine management practices</i>) • Adding value, storing and marketing of a legume crop • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	<ul style="list-style-type: none"> • Legume crops grown successfully

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
4.4.0 LIVESTOCK PRODUCTION	4.4.1 Apiculture (Bee Farming).	4.4.1.1 Practise Bee farming	<ul style="list-style-type: none"> • Describing bee farming • Investigating the value of bee keeping • Exploring systems of Bee keeping in Zambia (honey hunting, traditional and modern system) • Analysing the advantages and disadvantages of each bee keeping system • Examining the Bee colony (<i>anatomy and roles of worker bees, queen and drones</i>) • Constructing a top bar bee hive • Making protective gear for bee keeping (<i>veil</i>) • Establishing an apiary (<i>requirements, siting, stocking</i>) • Managing an apiary (<i>handling, supplementation, pest and disease control, harvesting...</i>) • Processing, grading honey and hive products for marketing • Analysing yields and quality of the produce for possible improvement • Exploring innovative ways of increasing productivity 	<ul style="list-style-type: none"> • Bee farming practised accordingly
	4.4.2 Aquaculture	4.4.2.1 Rear fish from fingerings to maturity	<ul style="list-style-type: none"> • Describing aquaculture and fish farming • Investigating the value of fish farming in Zambia • Exploring systems of fish farming (<i>Intensive, semi-</i> 	<ul style="list-style-type: none"> • Fish from fingerings reared to maturity successfully

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<p><i>intensive, extensive, integrated fish farming)</i></p> <ul style="list-style-type: none"> • Analysing the advantages and disadvantages of each system of fish farming • Exploring common species of fish suitable for rearing in Zambia • Exploring methods of fish farming (<i>Ponds, Floating cages, tanks, race ways...</i>) • Selecting site and constructing a fish pond (<i>requirements, siting, excavation, pond lining, pond filling, installation of accessories</i>) • Managing a fish pond (<i>Pond accessories, stocking rate, fertilization, nutrition and feeding, monitoring pH, water quantity and quality, oxygen maintenance, pest and disease control, harvesting...</i>) • Harvesting of fish using different methods (<i>Total harvest method and Partial harvest method</i>) • Practising integrated fish farming • Handling, preserving and marketing fish (<i>fish spoilage, fish handling, fish processing and preservation, grading and packaging, marketing...</i>) 	

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<ul style="list-style-type: none"> Analysing yields and quality of the produce for possible improvement Exploring innovative ways of increasing productivity 	
4.5.0 FARM MANAGEMENT	4.5.1 Budgeting	4.5.1.1 Formulate farm enterprise budgets	<ul style="list-style-type: none"> Describing a budget Exploring types of budgets Preparing a budget for an enterprise Preparing a cash flow budget for an enterprise 	<ul style="list-style-type: none"> Farm enterprise budgets formulated appropriately
	4.5.2 Costing and Accounting	4.5.2.1 Utilise costing and accounting to meet financial needs	<ul style="list-style-type: none"> Using costing and accounting to meet financial obligations Distinguishing between direct enterprise costs and overhead costs Calculating gross margins of an enterprise Exploring ways of increasing gross margin of an enterprise Calculating profit/loss of an enterprise 	<ul style="list-style-type: none"> Costing and accounting to meet financial needs utilised correctly
	4.5.3 Farm Valuation	4.5.3.1 Evaluate the value of a Farm	<ul style="list-style-type: none"> Identifying a farm inventory Preparing an inventory of assets on the farm Describing farm valuation Preparing an opening and closing valuation on a farm Applying various methods of calculating depreciation of farm assets 	<ul style="list-style-type: none"> The value of a farm evaluated correctly
	4.5.4 Cooperatives	4.5.4.1 Form Cooperatives	<ul style="list-style-type: none"> Describing a cooperative Investigating how cooperatives are organised 	<ul style="list-style-type: none"> Cooperatives formed successfully

TOPIC	SUB-TOPIC	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	EXPECTED STANDARD
			<ul style="list-style-type: none"> • Exploring the common interests of farmers in cooperative • Forming a cooperative • Analysing the importance of cooperatives 	

SCOPE AND SEQUENCE

S/N	TOPIC	FORM 1	FORM 2	FORM 3	FORM 4
1.	1.0 AGRICULTURE IN ZAMBIA	1.1.1 Importance of Agriculture 1.1. 2 Agricultural Activities in Zambia 1.1.3 Factors that Influence Agricultural 1.1.4 Development in Zambia 1.1.5 Types of Farmers	2.1.1 Land Tenure Systems and Land Use		
2.	2.0 SOIL SCIENCE	1.2.1 Composition of Soil 1.2.2 Properties of Soil 1.2.3 Soil Fertility 1.2.4 Soil and Water	2.2.1 Soil Fertility (Nutrient Cycles)	3.2.1 Soil Fertility	
3	3.0 CLIMATE-SMART AGRICULTURE	1.3.1 Climate Change	2.3.1 Climate Change Impact on Agriculture and Food Security	3.3.1 Climate Smart Agriculture Practices	4.3.1 Research on Climate-Smart Agriculture
4.	4.0 FARM STRUCTURES AND MACHINERY	1.4.1 Garden Tools and Equipment	2.4.1 Farm Buildings 2.4.2 Animal and Tractor Drawn Implements	3.4.1 Farm Power 3.4.2 Brick Layering and Workshop Tools	4.4.1 Structures for water Supply 4.4.2 Engines 4.4.3 Farm Mechanisation
5.	5.0 CROP PRODUCTION	1.5.1 Vegetable Production	2.5.1 External and Internal Morphology of Plants 2.5.2 Field Crop Production	3.5.1 Fruit and Tuber Crop Production.	4.5.1 Legume Crop Production
6.	6.0 LIVESTOCK PRODUCTION	1.6.1 Importance of Livestock 1.6.2 Nutrition	2.6.1 Poultry Production 2.6.2 Pig Production	3.6.1 Pasture Management 3.6.2 Ruminant Animal production	4.6.1 Apiculture (Bee farming) 4.6.2 Aquaculture (Fish Farming)
7.	7.0 FARM MANEGEMENT		2.7.1 Farm as a Business Unit	3.7.1 Agriculture Economics	4.7.1 Budgeting 4.7.2 Costing and Accounting 4.7.3 Farm Valuation 4.7.4 Cooperatives