Republic of Zambia

MINISTRY OF EDUCATION, SCIENCE, VOCATION TRAINING AND EARLY EDUCATION

AGRICULTURAL SCIENCE SYLLABUS

GRADES 8 - 9

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CONTENTS

Preface

The ability to think scientifically and understand scientific processes is becoming a condition for survival in Zambia. It is therefore, imperative that we emphasise the need for learners to develop skills that they can apply in various ways in the environment.

This syllabus emphasises that the approach to be used in the teaching of Agricultural Science should be learner centred. Therefore, the teaching of Agricultural Science at this level of education should develop processes of scientific thinking in learners and includes a vocational orientation of the subject.

It is necessary, therefore, in Agricultural Science for learners to be enabled to apply their own ideas, use their own hands, and conduct their own investigations, however simple. This necessitates balancing the content of what learners learn with the processes by which they learn. This also implies an enhanced role for guided discovery teaching/learning methods/techniques.

This syllabus suggests that the development of scientific thought processes in learners can be approached from a number of starting points. The criteria should be the relevance of the material to the environment and to the possible later sphere of the employment of the learner.

In conclusion, it is hoped that the products of Agricultural Science will be able to adapt and use scientific and technological development and to generate new developments.

Introduction

Agricultural science includes cross-cutting issues such as Environment, Reproductive Health, HIV and AIDS, Hygiene, Nutrition, Substance Abuse, Water and Sanitation.

Methodology

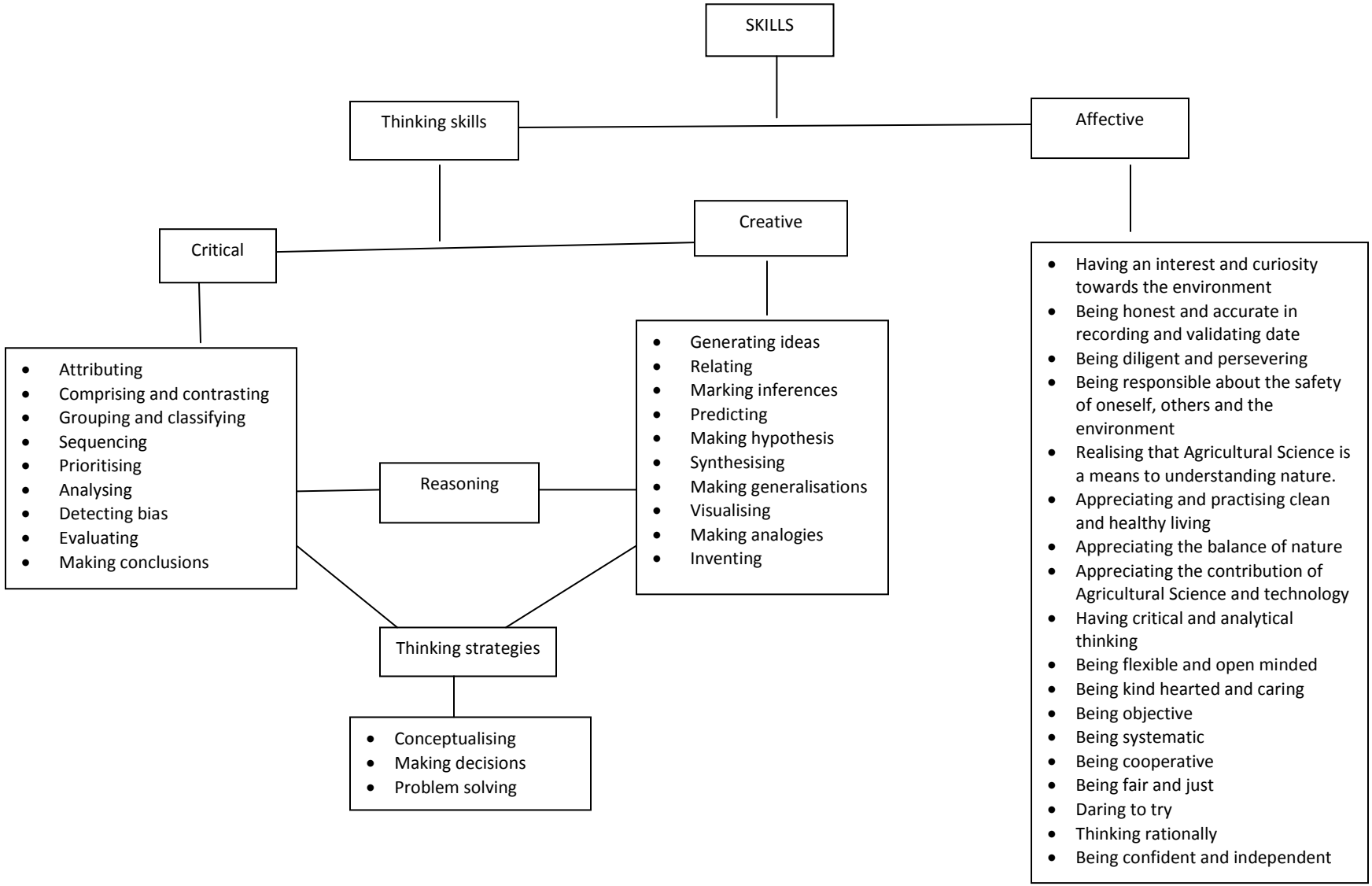
The success of Agricultural Science can be achieved by maximum participation by learners. This subject that enhances creativity, analysis, problem-solving and an investigative approach, can be taught effectively using a variety of methods (techniques) both in the classroom and outside. It is advisable that these are integrated where ever possible. Learners are expected to conduct experiments, study tours, field work and project work.

General Outcomes

There are many general outcomes in this syllabus:

- Demonstrate an understanding of agriculture in Zambia
- Recognise the importance of soil management for sustainable crop production;
- Demonstrate knowledge of crops and their sustainable production;
- Demonstrate knowledge and understanding of the importance of plants and the need for their sustainable utilisation;
- Develop knowledge and understanding of conservation farming
- Develop knowledge of livestock and their production;
- Acquire knowledge of farm structures and maintenance
- Acquire knowledge of farm machinery and maintenance;
- Acquire knowledge and understanding of farm management and
- Develop investigative skills.

Through this syllabus the learners are required to acquire knowledge, values and develop positive attitudes and skills.


SKILLS
Thinking skills
Affective
Critical
Creative
Attributing
Comprising and contrasting
Grouping and classifying
Sequencing
Prioritising
Analysing
Detecting bias
Evaluating
Making conclusions
Reasoning
Generating ideas
Relating
Marking inferences
Predicting
Making hypothesis
Synthesising
Making generalisations
Visualising
Making analogies
Inventing
Thinking strategies
Conceptualising
Making decisions
Problem solving
Having an interest and curiosity towards the environment
Being honest and accurate in recording and validating date
Being diligent and persevering
Being responsible about the safety of oneself, others and the environment
Realising that Agricultural Science is a means to understanding nature.
Appreciating and practising clean and healthy living
Appreciating the balance of nature
Appreciating the contribution of Agricultural Science and technology
Having critical and analytical thinking
Being flexible and open minded
Being kind hearted and caring
Being objective
Being systematic
Being cooperative
Being fair and just
Daring to try
Thinking rationally
Being confident and independent

Manipulative Skills
These enable learners to:

- Use and handle Agricultural Science apparatus and materials correctly;
- Handle specimens correctly and carefully;
- Draw specimens, apparatus and substances accurately;
- Clean apparatus correctly;
- Stores apparatus, tools and substances correctly and safely

They also need to develop attitudes and values.
Attitudes and values
These include:

- Having an interest and curiosity towards the environment;
- Being honest and accurate in recording and validating data;
- Being diligent and persevering;
- Being responsible about the safety of oneself, others and the environment;
- Realising that Agricultural Science is a means to understanding nature;
- Appreciating and practising clean and healthy living;
- Appreciating the balance of nature;
- Appreciating the contribution of Agricultural Science and technology
- Having critical and analytical thinking;
- Being flexible and open minded
- Being kind hearted and caring
- Being objective;
- Being systematic
- Being cooperative
- Being fair and just;
- Daring to try

- Thinking rationally
- Being confident and independent

This syllabus therefore:

1. Promotes an appreciation of Agricultural Science as an applied science.
2. Demonstrates the value of agriculture to the family and the Community, so as to show that improved Agriculture can contribute to the World-wide Campaign for freedom from hunger;
3. Encourages the teaching, in a practical manner, of basic principles and skills in Agriculture and efficient farm business management;
4. Stimulates an interest in an create an awareness of, existing problems and opportunities in farming;
5. Develops initiative problem-solving abilities, scientific methods and self-education so as to encourage resourcefulness and self-reliance
6. Provides a basis, together with the basic sciences and mathematics, for more advanced studies in Agriculture or for becoming a self-supporting worker.
7. Stimulating positive attitudes by showing that efficient farming can be both a profitable and rewarding occupation and;
8. Develops positive attitudes towards Zambia's natural resource so as to conserve and use them sustainably.

These will be achieved by enabling learners to demonstrate the following intellectual and practical competences;

- Knowledge with understanding.
  - Use of terms, symbols, quantities and units of measurement;
  - Reference to facts, concepts and principles;
- Ideas and information – handling information (writing, graphs, diagrams, tables etc.);
  (i) Organise and present information from various sources.
  (ii) Present information given in one form (numerical data) in another form (graph);
  (iii) Use information to observe trends and draw conclusions.
  - Solving – problems – use knowledge to
  (i) Present explanations for observed facts, and notice connections between them.
  (ii) Make predictions based on observation and

(iii) Solve problems.

- Practical activities
  - Practical competences and techniques

(i) Following instructions.
(ii) Choosing suitable techniques, equipment and materials;
(iii) Using equipment and materials safely and correctly;
(iv) Making and recording observations, measurements and estimates.

- Investigations

(i) Identify problems and plan an investigation
(ii) Organise and carryout an investigation in a systematic way;
(iii) Interpret and evaluate observations and experimental data;
(iv) Evaluate methods and suggest improvements.

- Skills and techniques in livestock production

(i) handling a single/group of farm animals in a safe and correct manner.
(ii) maintaining the health of a farm animal;
(iii) calculating maintenance and production rations of farm animals;
(iv) planning, managing and implementing a feeding programme for the life-cycle of a farm animal;
(v) identifying breeds and types of animals;
(vi) marketing farm animals and their products;
vii) maintaining accurate physical and financial records on an enterprise.

Skills and techniques in Crop production

(i) identifying cultivar and varieties of crops;
(ii) Calculating fertilisers/manure requirements of a crop and estimate crop yield;
(iii) planning, implementing and managing a cropping programme;
(iv) harvesting and marketing a crop and

(v) maintaining accurate physical and financial records on a crop enterprise.

Each unit of this syllabus is introduced with a list of specific outcomes that are an interpretation of the general outcomes for each of the units. These specific outcomes are included and each of them states what the learner should do during and after the course. Therefore, the content of this syllabus is described in terms of learner performance and gives further guidance on what is expected of the learners at each stage of the unit.

Organisation

The materials in this syllabus have been selected from all major areas of agriculture. It is divided into nine units. At the end of the course the learner should be able to demonstrate an achievement of the general outcomes of learning Agricultural Science at this level.

Assessment

Continuous assessment will be emphasised by using various methods of testing according to topics and themes at various levels. The Examinations Council of Zambia (ECZ) will prepare detailed procedures on how continuous assessment will be conducted by the teachers. ECZ will also develop examination syllabus to provide teachers with guidelines on the Outcomes to be tested. The scheme of assessment will consists of school based assessment and final examination that will be conducted by the Examinations Council of Zambia.

School based assessment will be in the form of tests. Tests will be in the form of diagnostic, aptitude, achievement, oral, practice attitude and performance, learners.

Time and Period allocation

A time allocation of 6 x 40 minutes periods per week should be allocated to Agricultural Science for satisfactory coverage of the syllabus.

Crops, livestock and machinery to be studied

Learners should study the following crops and livestock:

Grades 8

Vegetables

Three vegetables should be studied from the following

- Tomatoes or Irish potatoes
- Rape or Chaumolier or Cabbage
- Beans or peas

Livestock

Two types of poultry should be studied

- Broiler chickens
- Layer chickens

Farm machinery

The following should be studied

- tools
  -garden tools -bricklayer tools -Carpentry tools -machinery tools
- animal drawn implements
  - plough
  - harrow - ridger
  - planter - cultivator
- Riper
- Sprayer

Grade 9

Fields crops

The following three crops should be studied

1. Maize
2. Groundnuts – should be studied in detail and a brief outline of other crops.
   - Rice

- Cassava
- Sweet potatoes
- Sorghum

3. Cotton – should be studied in detail and a brief outline of other crops.
   - Sunflower
   - Sugarcane
   - Wheat
4. Fruits

   Citrus – should be studied in detail and a brief outline of other crops.
   - Bananas
   - Guavas
   - Paw-paws
   - Pineapples
   - mangoes
5. Livestock

   Cattle and one animal should be studied from the following list
   - pigs
   - rabbits
   - goats

   At least one of the animals studied should be kept in the school.
6. Farm machinery

   The following tractor drawn implements should be studied:
   - plough – (mouldboard plough)
     - (disc plough)
   - harrow
   - cultivator
   - planter

GRADE 8

General Outcomes	**Key Competences:**
• Develop an understanding of Agriculture in Zambia • Develop skills, values and positive attitudes of Agriculture in Zambia • Develop an understanding of the importance of soil management for sustainable crop production • Develop skills, values and positive attitude on soil science • Develop knowledge of crops and their sustainable production. • Develop investigative skill. • Demonstrate Knowledge and understanding of the importance of plants and the need for their sustainable utilisation • Develop Knowledge and understanding of the conservation farming • Develop Knowledge of livestock and their production • Acquire Knowledge of farm structures and maintenance • Acquire Knowledge of farm machinery and maintenance • Acquire Knowledge and understanding of farm management	• Demonstrate the ability to grow and manage various types of vegetables and fruits • Demonstrate the ability to rare and manage all types of chickens up to point of sale. • Show the ability to handle and use animal drawn implements

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.1 Agriculture in Zambia	8.1.1Agriculture practice and industry	8.1.1.1 Explain the importance of Agriculture in Zambia 8.1.1.2 state the importance of sufficient food production in Zambia . 8.1.1.3 Describe the role of Agriculture in the economy of Zambia	• Importance of Agriculture in Zambia • Importance of food production: Food provision, food security, employment, provision of raw materials, Income and foreign Exchange, • Raise income, food security, job creation	• Communicating the contribution of agriculture to the food security and economy of Zambia.	• Appreciating the role of agriculture in Zambia's food security and the economy • Cooperating in group activities.
	8.1.2Agricultural activities in Zambia	8.1.2.1 Outline the main agricultural activities in Zambia 8.1.2.2 Identify on a map of Zambia areas that are not suitable for dairy farming and ranching. 8.1.2.3 Identify on a map of Zambia the main Agro-ecological Regions of Zambia. 8.1.2.4 Identify on a map of Zambia areas that may not be very suitable for growing maize.	• Main agricultural activities: animal and crop husbandry, horticulture, irrigation, fish farming • Refer to tse tse fly infected areas. • Agro-ecological zones of Zambia • Areas with northern plateau soils, areas with western wind blown soils, stony soils of valley sides, areas with swampy soils and areas with flood plains soils.	• Observing the main agricultural activities, Areas and agro-ecological zones of Zambia.	• Appreciating the main agricultural activities. • Being aware of the main agricultural areas of Zambia.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
	8.1.3Factors that influence Agricultural Development	8.1.3.1 Identify factors that influence the development of Agriculture. 8.1.3.2Explain how the factors affect agriculture development 8.1.3.3Explain the need for farmers to diversify the production of crops and livestock.	• Factors: e.g. climate, transport, road infrastructure • Effects of climate, Marketing, road infrastructure, transport and Research on agriculture. • Need for farmers to diversify production of crops and livestock	• Communicating the factors that influence the development of agriculture in Zambia • Evaluating the need for agricultural diversification.	• Being aware of the factors that influence agricultural development in Zambia. • Cooperating in group activities.
	8.1.4Farmer Support	8.1.4.1 Investigate agencies and organisations that assist farmers in input procurement, marketing and agriculture extension.	• Agencies and organisations that assist farmers.	Investigating agencies and organisations that assist farmers.	• Listening to others with respect • Cooperating in group activities
	8.1.5Types of farmers	8.1.5.1 Explain the differences between small scale and Commercial farmers. 8.1.5.2 Identifying the main Commercial farming areas in Zambia	• Small scale and commercial farmers. • Main commercial farming areas in Zambia. • Reasons why these areas are suitable for commercial farming	• Comparing small scale farmers with commercial farmers. • Identifying the main commercial farming areas on the map.	• Cooperating in group activities • Being aware of the types of farmers in Zambia.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.2Soil Science	8.2.1Soil formation	8.2.1.1 Explain the meaning of the term soil. 8.2.1.2 Describe factors that are involved in soil formation.	• Water, wind, temperature, living things in soil formation.	• Communicating the factors that are involved in soil formation	• Being aware of factors involved in soil formation
	8.2.2Composition of soil	8.2.2.1 Demonstrate the composition of soil. 8.2.2.2 Explain the importance of soil components.	• Inorganic matter, humus, water, air, living organisms. • Importance of soil components	• Observing the components of soil.	• Appreciating the composition and importance of soil.
	8.2.3 Soil profile	8.2.3.1 Identify different layers of a soil profile. 8.2.3.2 Explain differences in soil profiles. 8.2.3.3 Explain the importance of top and sub-soils. 8.2.3.4 Relate choice of crop to be grown on depth of layers of soil. 8.2.3.5 Relate the importance of the layers of soil to agricultural value of soil.	• Soil profile (Top soil, sub-soil, parent rock) • Soil profiles from different areas. • Importance of top and sub soils • Choice of crop and depth of soil layers • Importance of soil layer to agricultural value of soil.	• Identifying the layers of soil in a profile. • Comparing soil profiles for different areas. • Relating the layer of soil to agricultural value of soil.	• Being Safety conscious. • Being aware of the different layers of soil in a profile. • Cooperating in group activities .
	8.2.4.Soil texture	8.2.4.1 Explain the meaning of soil texture.	• Meaning of soil texture.	• Communicating the texture of soil.	• Appreciating soil texture

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
	8.2.5Types of soil	8.2.5.1 Identify different types of soil. 8.2.5.2 Demonstrate the variation of water retention in different types of soil.	• Types of soil: Clay, sand, silt loam • Water retention in different soils	• Identifying different types of soil • Demonstrating water retention of different soils.	• Cooperating in class activities • Appreciating different types of soil.
	8.2.6 Organic(manures) and chemical (artificial) fertilisers	8.2.6.1 Explain the difference between manure and chemical fertilisers. 8.2.6.2 Distinguish between straight and compound fertilisers. 8.2.6.3 Identify fertilisers according to periods of their application. 8.2.6.4 Interpret the composition of fertilisers using the information on their containers. 8.2.6.5 Determine quantities of fertiliser required by a crop given various ratios for various crops. 8.2.6.6 Explain the advantages and disadvantages of manure and chemical fertilisers.	• Manures and fertilisers • Straight (urea, ammonium nitrate, phosphorus); Compound fertiliser (D-compound, X- compound) • Basal and top dressing fertilisers • Composition of fertilisers: Refer to NPK • Quantities of fertiliser required for crops. • Advantages and disadvantages of manure and chemical fertiliser.	• Classifying manures and artificial fertilisers. • Comparing straight and compound fertilisers. • Classifying basal and top dressing fertilisers. • Interpreting the composition of fertilisers using the information on the packing. • Calculating fertiliser dosages for crops.	• Cooperating in groups activities • Being aware of the existence of fertilisers and manures. • Developing interest in order to understand fertilisers and their composition

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.3Crop production	8.3.1Classes and varieties of vegetables	8.3.1.1 Identify vegetables according to groups 8.3.1.2 Name the varieties of each vegetable	E.g. leafy, legume, solanaceous, root, cucurbit and miscellaneous.	• Classifying vegetables according to the groups	• Appreciating the classes and varieties of vegetables • Participating in group activities.
	8.3.2Site for Vegetable growing	8.3.2.1 List factors that make a site suitable for vegetable growing. 8.3.2.2 Explain the importance of factors that make a site suitable for vegetable growing.	• Factors to consider: land level, water, away from big trees, deep soil. • Importance of factors that make a site suitable for a garden	• Communicating factors that make a site suitable for growing vegetables.	• Being aware of factors considered when choosing a site for vegetable growing. • Participating in group activities
	8.3.3Vegetable garden	8.3.3.1 Draw a simple plan for vegetable growing. 8.3.3.2 Explain the importance of vegetable rotation. 8.3.3.3 State the importance of a legume in vegetable rotation	• A plan for vegetable growing. • Importance of vegetable rotation. • Importance of a legume in a vegetable rotation.	• Planning a vegetable garden. • Analysing the necessity for vegetable rotation	• Cooperating in group activities • Asking questions for more understanding
	8.3.4Seedbed preparation	8.3.4.1 Demonstrate how to Prepare plots and seedbed for vegetable growing. 8.3.4.2 Calculate and apply recommended quantities of manure	• Preparing suitable plots and seedbeds for growing vegetables. • Recommended quantities of manures and chemical fertilisers for vegetables	• Demonstrating how to prepare a plot and seedbed for vegetable growing. • Calculating	• Appreciating seedbed preparation. • Cooperating in group activities

		and chemical fertiliser for a particular vegetable.		quantities of fertilisers and manure for a particular vegetable.	
	8.3.5Planting vegetables	8.3.5.1 Demonstrate how to Sow seeds correctly. 8.3.5.2 Demonstrate how to transplant seedlings correctly.	• Sowing seeds • Preparation of Seedlings for transplanting. • Transplanting	• Demonstrating how to sow and /or transplant vegetables • Demonstrating the transplanting of seedlings.	• Appreciating the correct sowing and transplanting of vegetables
	8.3.6Weed Control	8.3.6.1 Explain the importance of weed control in vegetables. 8.3.6.2 Describe the various methods of weed control in vegetables. 8.3.6.3 Demonstrate effective weed control methods for a studied vegetable. 8.3.6.4 Observe the safety rules when applying chemicals in a garden. 8.3.6.5 Explain the effects of herbicides on the environment	• Importance of Weed control • • Methods of weed control(chemical, mechanical, cultural, biological) • Safety rules when applying chemicals. • Effects of herbicides on the environment	• Demonstrating weed control methods • Applying herbicides correctly and safely. • Observing safety rules when applying chemicals	• Being aware of safety rules and effects of herbicides on the environment. • Caring for the environment
	8.3.7.Pest Control	8.3.7.1 Describe a pest. 8.3.7.2 Identify pests in relation to crops they	• Pests • Types of pests	• Observing pests of various named crops.	• Being aware of safety rules and

		attack. 8.3.7.3 Explain ways in which pests cause harm to crops. 8.3.7.4 Demonstrate correct methods of controlling named pests in crops grown. 8.3.7.5 Describe natural pest control methods. 8.3.7.6 Demonstrate how to mix and apply pesticides correctly. 8.3.7.7 Explain safety rules when storing pesticides. 8.3.7.8 Explain the effects of prolonged use and excess pesticides on the environment.	• Harm caused by pests in crops • Controlling named pests in crops • Natural pest control methods • Applying pesticides. • Rules on storage of pesticides. • Effects of excessive pesticides on the environment.	• Demonstrating correct methods of controlling named pests in crops. • Communicating natural methods of pest control • Observing safety rules when storing pesticides • Communicating the effects of prolonged use and excess pesticides on the environment	the effect of pesticides on the environment. • Being aware of natural methods of pest control
	8.3.8 Disease Control	8.3.8.1 Identify the symptoms of diseases on crops 8.3.8.2 Identify the crops attacked by diseases. 8.3.8.3 Explain methods of preventing disease attack on the crops.	• Symptoms of diseases on crops. • Crops attacked by diseases. • Prevention of disease attacks.	• Observing the symptoms/signs of diseases on named crops. • Communicating the methods of preventing disease attack on crops	• Appreciating the prevention and control of diseases • Cooperating in group activities

	8.3.9 Harvesting and marketing	8.3.9.1 Identify the signs of readiness for harvesting the crop 8.3.9.2 Demonstrate how to harvest and prepare vegetables for marketing. 8.3.9.3 Describe how to price each Vegetable grown. 8.3.9.4 Calculate the profit or loss 8.3.9.5 Describe how to Store vegetables correctly	• Signs of readiness for harvesting. • Harvesting and preparation of vegetables. • Pricing vegetables for marketing. • Finding a market for vegetables. • Calculation of Profit/Loss • Storing vegetables	• Observing the signs of readiness for harvesting the crop. • Demonstrating how to harvest and prepare the vegetables for marketing. • Marketing the vegetables. • Calculating profit/ loss	• Being aware of crops that are ready for harvesting • Developing interest in entreptreneural activities

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Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.4 Forestry	8.4.1 Importance of trees in soil management	8.4.1.1 Explain the role of trees in soil erosion and infiltration of water. 8.4.1.2 State the role of trees in soil fertility improvement. 8.4.1.3 Identify trees used to make handles and poles. 8.4.1.4 Explain how you can ensure continued supply of	• Role of trees: E.g. soil erosion reduction and infiltration of water into the soil. • Role of trees in soil fertility improvement • Trees for making handles and poles. • Ensuring continuous supply of handle and poles.	• Communicating the importance of trees in soil management • Classifying trees that are used to make handles and poles. • Demonstrating sustainable supplying of poles and handles.	• Appreciating trees • Caring for trees • Conserving trees

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	Skills	Values
		poles and handles from the trees.			
	8.4.2Selecting a site for growing trees	8.4.2.1 Identify factors which make an area suitable for growing trees 8.4.2.2 Explain the importance of the factors that make the area suitable for growing trees. 8.4.2.3 choose a site for growing trees	• Factors that make an area suitable for raising trees. • Importance of factors • Choosing a site for growing trees	• Communicating the factors that make the area suitable for growing trees. • Identifying a site for growing trees.	• Appreciating trees • Caring for trees • Conserving trees

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	Skills	Values
8.5Conservation farming	8.5.1Mixed cropping	8.5.1.1 Describe conservation farming 8.5.1.2 Describe mixed cropping. 8.5.1.3 Explain the role of mixed cropping on soil fertility.	• Meaning of conservation farming • Mixed cropping. • Mixed cropping and soil fertility	• Communicating mixed cropping and its role in soil fertility	• Appreciating mixed cropping and its role in soil fertility. • Conserving the soil
	8.5.2Inter cropping	8.5.2.1 Describe intercropping.	• Intercropping • Importance of intercropping to soil fertility	• Communicating the importance of intercropping to soil fertility.	• Appreciating intercropping
	8.5.3 Mixed farming	8.5.3.1 Describe mixed farming. 8.5.3.2 State the role of mixed	• Mixed farming.	• Communicating the importance	• Appreciating mixed farming

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
		farming in soil fertility	• Mixed farming and soil fertility.	of mixed farming to soil fertility.	• Seeking ways of improving soil fertility
	8.5.4 Land clearing and preparation	8.5.4.1 Describe the use of a suitable hoe in clearing the land for conservation farming. 8.5.4.2 Demonstrate how to make ridges in conservation farming using a hoe.	• Using a hoe to clear land • Preparation of soil using a suitable hoe. • Making ridges using a suitable hoe	• Demonstrating methods of clearing and preparing the land for conservation farming.	• Participating in class activities • Appreciating the use of the hoe in conservation farming
	8.5.7 Chemical fertiliser and manure application	8.5.7.1 Apply chemical fertiliser and manure correctly under conservation farming	• Application of chemical fertiliser and manure in conservation farming	• Applying chemical fertilisers and manures under conservation farming.	• Appreciating the use of fertilisers under conservation farming • Cooperating in group activities
	8.5.8 Planting and weed control	8.5.8.1 Plant correctly using a suitable tool. 8.5.8.2 Control weeds appropriately in a crop grown under conservation farming.	• Planting correctly • Controlling weeds under conservation farming.	• Demonstrating correct planting and weed control under conservation farming	• Being safety conscious when controlling weeds. • Appreciating various methods of weed control in conservation farming
	8.5.9Soil Erosion Control	8.5.9.1. State how to control soil erosion using vetiver hedges 8.5.9.2 Plant vetiver hedges correctly.	• Soil erosion control using vetiver hedges	• Demonstrating how to control soil erosion using vetiver hedges	• Cooperating in group activities • Appreciating the use of vetiver hedges to control soil erosion.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.6 Livestock production	8.6.1 Importance of livestock	8.6.1.1 Describe the importance of livestock in Zambia.	• Fighting malnutrition, income generation, soil fertility	• Communicating the role of livestock in fighting malnutrition and in income generation.	• Appreciating the role of livestock in food security and the improved economy
	8.6.2Parts of Digestive systems	8.6.2.1 Identify parts of the digestive system of a bird and a pig. 8.6.2.2 Describe the functions of the parts of the digestive systems of the animals studied 8.6.2.3 Compare the digestive system of a bird and that of a pig.	• Parts of the digestive system of a bird: Beak, gullet, crop, stomach, gizzard, intestines, cloaca, • Functions of parts of the digestive system of a bird and pig. • Digestive system of a bird and pig	• Observing parts of the digestive systems of a bird and a pig. • Comparing the digestive systems of different animals.	• Being aware of parts of the digestive systems of a bird and a pig. • Appreciating parts of the digestive systems of a bird and a pig.
	8.6.3Parts of the reproductive systems	8.6.3.1 Identify and label the parts of the reproductive system of a female bird. 8.6.3.2 Explain the importance of the reproductive system of a female bird 8.6.3.4 Explain the functions of the parts of the female reproductive parts of a female bird.	• Parts of the reproductive system of a female bird • Importance of the reproductive system of a female bird. • Functions of parts of the reproductive system of a female bird.	• Observing parts of the reproductive system of a bird. • Communicating the functions of the reproductive system of a bird.	• Being aware of the reproductive system of a bird. • Appreciating the importance of the reproductive system of birds

	8.6.4 Breeds	8.6.4.1 List the various breeds of poultry studied 8.6.4.2 Name some of hybrid poultry hatcheries in Zambia.	• Breeds of poultry • Some hybrid poultry hatcheries in Zambia	• Classifying various breeds of poultry studied.	• Being aware of poultry breeds and hatcheries. • Appreciating poultry breeds.
	8.6.5Brooder house	8.6.5.1 List the characteristics of a good poultry house 8.6.5.2 State the floor space to house Poultry of different ages. 8.6.5.3 List the equipment that must be in a poultry house. 8.6.5.4 Plan a simple poultry house.	• Characteristics of a good poultry house: Refer to Ventilation, protection from rain, protection from predators, easy to clean etc. • Floor space to house poultry of different age • Poultry equipment. • Plan of a poultry house	• Communicating floor space and equipment. • Planning a simple poultry house. • Designing a simple poultry house	• Being aware of a good poultry house and the equipment found in it. • Cooperating in group activities • Developing interest in designing appropriate poultry houses.
	8.6.6Incubation of eggs and Brooding	8.6.6.1 State the principles of Incubation. 8.6.6.2 Recall the right temperature for chicks in a brooder house. 8.6.6.3Brood day old chicks.	• Principles of incubation • Temperature in the brooder house • Day old chicks in the brooder house	• Communicating correct conditions for incubation • Demonstrating brooding in day old chicks.	• Being aware of brooding and incubation. • Appreciating principles of brooding and incubation.

	8.6.7Pests and diseases	8.6.7.1 Identify pests of poultry Studied 8.6.7.2 Explain ways pests cause harm to poultry. 8.6.7.3 Prescribe correct methods of controlling pests in poultry studied. 8.6.7.4 Identify diseases of poultry studied 8.6.7.6 Prescribe correct methods of controlling diseases in poultry studied.	• Pests of poultry • Harm caused to poultry by pests • Controlling pests on livestock. • Livestock diseases. • Methods of controlling diseases in livestock.	• Observing pests and diseases of poultry. • Communicating effects of pests on poultry. • Communicating the correct ways of controlling pests and diseases in poultry.	• Being aware of pests in poultry. • Seeking ways of improving the health of poultry • Actively participating in group activities. • Being safety conscious of diseases of poultry.
	8.6.8Records and Marketing	8.6.8.1 Maintain proper poultry records. 8.6.8.2 Collect, store and market eggs correctly 8.6.8.3 Prepare birds for marketing.	• Poultry records • Collecting, storing and marketing eggs. • Preparing a bird for marketing.	• Demonstrating maintenance of poultry records. • Demonstrating collection, storage and marketing of birds and their products.	• Appreciating poultry records. • Appreciating the collection, storage and marketing of birds and their products.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.7 Farm structures	8.7.1Storage of vegetables	8.7.1.1 Describe an appropriate storage facility for vegetables. 8.7.1.2 Demonstrate how to prepare vegetables for storage	• Preparing vegetables for storage • Preparing vegetables for storage.	• Communicating storage facilities for vegetables • Demonstrating how to prepare vegetables for storage	• Preserving vegetables correctly • Developing innovations in vegetable preservation.
	8.7.3Poultry houses	8.7.3.1 Describe appropriate houses for day old chicks, grower, finisher, point of lay and layer. 8.7.3.2 Plan an appropriate house for a given group of birds. 8.7.3.3 Construct a model of an appropriate house for a given group of poultry.	• Appropriate houses for day old chicks, grower, finisher, point of lay and layer. • Plan for a poultry house • Models of houses for a given group of poultry.	• Classifying houses for various groups of poultry • Designing an appropriate house for a given group of birds. • Constructing models of houses for a given group of poultry	• Caring for poultry • Appreciating suitable houses for various poultry groups • Actively participating in class activities. • Developing innovations in poultry housing

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.8 Farm Machinery	8.8.1 Hand tools	8.8.1.1 Identify some hand tools used at the farm. 8.8.1.2 Demonstrate the proper use of hand tools. 8.8.1.3 Demonstrate the proper care for hand tools	• Hand tools used at the farm • Uses of hand tools • Care for hand tools.	• Demonstrating the use and care for hand tools.	• Caring for hand tools. • Being safety conscious when using hand tools.
	8.8.2 Sprayer	8.8.2.1 Identify major parts of a hand sprayer	• Identifying major parts of a hand sprayer. • Functions of major parts of a hand sprayer.	• Observing the major parts of a hand sprayer and the function	• Being able to correctly use a hand sprayer.
	8.8.3 Animal drawn implements	8.8.3.1 Identify animal drawn implements 8.8.3.2 Identify major parts of animal drawn implements. 8.8.3.3 Explain the functions of major parts of animal – drawn implements.	• Animal drawn implements: Plough, cultivator, riper • Major parts of animal drawn implements. • Functions of major parts of animal drawn implements.	• Identifying the parts of named animal drawn implements. • Communicating the functions of major parts of animal drawn implements.	• Appreciating animal drawn implements. • Cooperating in group activities.

	8.8.4Storage for farm machinery	8.8.4.1Prepare hand tools for Storage 8.8.4.2 Choose an appropriate facility for storing hand tools. 8.8.4.5 Describe an appropriate facility for storing animal drawn implements. 8.8.4.6 Prepare animal drawn implements for storage. 8.8.4.7Demonstrate the proper care for animal drawn implements	• Preparing hand tools for storage. • Appropriate facility or storeroom for storing hand tools • Appropriate facility for storing animal drawn implements • Preparing animal drawn implements for storage. • Care for animal drawn implements	• Demonstrating the storage of farm equipment. • Identifying appropriate facilities for storing farm equipment.	• Cooperating in group activities • Caring for farm equipment • Caring for farm implements .

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
8.9 Farm Management	8.9.1 Farm management	8.9.1.1 Describe farm management.	• Farm management	• Communicating information about farm management.	• Being aware of the practices in farm management.
	8.9.2Agricultural economics	8.9.2.1 Describe agricultural Economics	• Agricultural economics.	• Communicating information about agricultural enterprises.	• Appreciating the principles of agricultural economics.
	8.9.3Opportunity cost and production decision	8.9.3.1 Describe the term opportunity cost. 8.9.3.2 Explain the term production decision in Agriculture.	• Opportunity cost. • Production decision	• Communicating opportunity cost and production decisions in agriculture.	• Being aware of opportunity cost and necessary production decisions in agriculture.
	8.9.4Types of credit	8.9.4.1 Describe the types of credit available in Agriculture.	• Types of credit available in Agriculture	• Classifying different types of credit available in Agriculture.	• Appreciating the different types of credit available in agriculture. • Making class presentation

	8.9.5Interest	8.9.5.1 Explain the term interest 8.9.5.2 Explain the difference between simple and compound interests	• Interest • Simple interest and compound interest. • Calculating simple and compound interest	• Communicating the meaning of interest. • Comparing simple and compound interest. • Applying simple and compound interests.	• Appreciating simple and compound interest. • Being aware of entrepreneurship.
	8.9.6Records	8.9.6.1 Explain the importance of various financial documents. 8.9.6.2 Prepare production records. 8.9.6.4 Prepare financial records.	• Importance of financial documents: refer to Receipts, Invoice, delivery note and purchase order. • Preparing production records • Preparing financial records	• Communicating the importance of various farm records. • Demonstrating how to prepare various farm records.	• Appreciating the importance of various farm records • Developing interest in documenting farm activities.
	8.9.7Enterprise	8.9.7.1 Describe the term enterprise. 8.9.7.2 Explain gross output and gross margins of an enterprise.	• Enterprise • Gross output and gross margin of an enterprise.	• Comparing gross output and gross margins of an enterprise.	• Appreciating good management of enterprise
	8.9.8Grading and Standardisation	8.9.18 Explain the term grading. 8.9.19 Explain the term standardisation 8.9.20 Grade produce from an enterprise.	• Grading • Standardisation. • Grading produce.	• Grading different farm produce.	• Appreciating the quality of farm produce.

GRADE 9

General outcomes	**Key Competences**
• Demonstrate an understanding of Agriculture in Zambia • Develop investigative skills • Recognise the importance of soil management for sustainable crop production • Develop knowledge of crops and their sustainable production • Demonstrate knowledge and understanding of the importance of plants and the need for their sustainable utilisation • Develop knowledge and understanding of conservation farming and its role in soil fertility and sustainable agriculture • Develop knowledge of Livestock and their production • Acquire knowledge of farm structures and maintenance • Acquire knowledge of farm machinery and maintenance • Acquire knowledge and understanding of farm management	• Demonstrate the ability to grow and manage various types of cereal and legume crops • Demonstrate the ability to practice animal husbandry through keeping domestic animals. • Show ability to identify and understand the functions of some common tractor drawn farm implements

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
9.1 Agriculture in Zambia	9.1.1 Agriculture practice and industry	9.1.1.1 Identify the importance of functional practical work 9.1.1.2 Investigate interdependence between agriculture and industry	• Learning through doing and practising approved methods of farming. • Agriculture and industry	• Evaluating the importance of practical work in agricultural science	• Appreciating practical work in agricultural science
	9.1.2Effects of human population on Agriculture.	9.1.2.1 Describe the effects of rapid population growth on arable and ranching land. 9.1.2.2 Explain the effects of rapid population growth on the marketing of agricultural produce/products.	• Effects of rapid population growth on arable and ranching land. • Effects of rapid population growth on the marketing of agricultural produce/products.	• Analysing the effects of rapid human population growth on agriculture.	• Appreciating the effects of rapid human population growth on agriculture.
	9.1.3 Farming areas in Zambia	9.1.3.1 Describe the general conditions that favour arable farming and ranching.	• General conditions that favour arable farming and ranching	• Communicating the general conditions that favour arable and ranching farming in Zambia.	• Appreciating the conditions that favour agriculture in Zambia.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
9.2 Soil Science	9.2.1 Characteristics of soils.	9.2.1.1 List the characteristics of clay, sand and loam. 9.2.1.2 List the characteristics of humus.	• Characteristics of clay, sand and loam soils • Characteristics of Humus	• Investigating the characteristics of various soils and humus.	• Being aware of the characteristics of soils.
	9.2.2Soil structure	9.2.2.1 Identify soil with good structure. 9.2.2.2 Explain how to maintain good soil structure.	• Good soil Structure. • Maintaining good soil structure.	• Observing soils with good structure.	• Being aware of the different types of soil structure.
	9.2.3 Plant nutrients	9.2.3.1 Classify nutrients. 9.2.3.2 Describe the importance of nutrients.	• Major and minor nutrients. • Importance of major and minor nutrients.	• Classifying nutrients into major and minor. • Communicating the importance of plant nutrients.	• Cooperating in group activities • Appreciating the importance of major and minor plant nutrients.

	9.2.4 Manures and ashes	9.2.4.1 Explain how dead animals and plant materials are broken down to form humus 9.2.4.2 Investigate the nutrients content of rabbit, chicken, sheep, duck, cow and pig manures. 9.2.4.3 Compare the nutrient content of ashes to that of manure. 9.2.4.4 Explain soil infertility.	• Formation of humus through breaking down of dead matter. • Nutrient content of rabbit, chicken, sheep, duck, pig and cow manures • Nutrient content of animal manure and ash. • Soil fertility: refer to the nutrient content.	• Investigating the nutrient content of different manures. • Comparing the nutrient content of manures. • Comparing the nutrient content of animal manures and ash. • Communicating soil fertility in terms of nutrient content	• Appreciating the nutrient content of animal manures • Actively participating in class activities. • Being aware of soil fertility in terms of nutrients contained.
	9.2.5 Soil reaction	9.2.5.1 Explain the causes of soil acidity and alkalinity. 9.2.5.2 Demonstrate the correction of very high acidity and alkalinity.	• Soil acidity and alkalinity. • Correction of soil acidity and alkalinity.	• Investigating acidity and alkalinity of the soil. • Demonstrating how to correct the acidity and alkalinity of soil.	• Cooperating in group activities • Being aware of the causes of soil acidity and alkalinity.
	9.2.6 Soil erosion	9.2.6.1 Explain causes of soil erosion 9.2.6.2 Describe the effects of soil erosion. 9.2.6.3 Describe the prevention of soil erosion.	• Overgrazing, deforestation, cultural practices, land use • Effects of soil erosion. • Prevention of soil erosion.	• Communicating the causes and prevention of soil erosion.	• Being aware of the causes, effects and prevention of soil erosion

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
9.3 Crop Production	9.3.1 Importance of the crop	9.3.1.1 Investigate the nutritional and economical value of the crop. 9.3.1.2 List the ways in which the crop is used.	• Nutritional and economic value of crops. • Uses of the crop.	• Investigating the nutritional and economic importance of the crop.	• Appreciating the nutritional and economic importance of the crop.
	9.3.2 Ecological requirements of the crop	9.3.2.1 List the ecological requirements of the crop	• Ecological requirements of the crop.	• Communicating the ecological requirements of a crop.	• Appreciating the ecological requirements of the crop.
	9.3.3 Varieties and propagation	9.3.3.1 Identify the varieties of the crop. 9.3.3.2 List the advantages and disadvantages of various methods of propagation.	• Varieties of the crop. • Advantages and disadvantages of various propagation methods.	• Investigating different varieties of the crop. • Communicating the advantages and disadvantages of various methods of propagation.	• Being aware of different varieties of the crop. • Appreciating the various methods of propagation.
	9.3.4 Site suitable for the crop	9.3.4.1 Identify a site suitable for growing the crop.	• Characteristics of a site suitable for growing the crop.	• Identifying a suitable site for growing the crop.	• Asking questions about characteristics of a good site.
	9.3.5 Crop rotation	9.3.5.1 Explain why it is necessary to rotate a crop 9.3.5.2 Draw a plan to fit the crop in a suitable rotation.	• Necessity of crop rotation • Planning for crop rotation	• Planning a suitable crop rotation for field crops.	• Cooperating in group activities • Asking questions about characteristics of a good crop rotation.
	9.3.6 Land preparation	9.3.6.1 Prepare a piece of land for growing of the crop. 9.3.6.2 Prepare sowing/planting	• Preparation of piece of land for growing the crop.	• Demonstrating how to prepare	• Cooperating in groups.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
		stations for the crop.	• Sowing/planting stations.	land for growing a named crop. • Sowing/planting the crop.	• Asking questions on how to prepare the land and sow/plant the crop.
	9.3.7 Manure and fertiliser application	9.3.7.1 Calculate the quantity of fertiliser and manure recommended per unit area. 9.3.7.2 Apply fertiliser and manures recommended correctly. 9.3.7.3 Explain the importance of dressing seeds/planting materials with chemicals before sowing/planting.	• Quantities of manure and fertiliser recommended per hectare. • Fertiliser and manure application. • Dressing seeds/planting materials.	• Calculating the quantities of fertilisers to be applied per unit area. • Communicating the need for dressing seeds with chemicals.	• Appreciating the importance of dressing seeds with chemicals. • Asking questions on the use of fertilisers in crop production.
	9.3.8 Sowing and planting materials	9.3.8.1 Select suitable sowing or planting materials. 9.3.8.2 Demonstrate correct sowing or planting	• Sowing or planting materials. • Planting or sowing	• Identifying suitable planting/sowing materials.	• Being aware of suitable sowing/planting materials. • Participating in class activities.
	9.3.9 Plant population	9.3.9.1 Determine the germination percentage of seeds. 9.3.9.2 Calculate the number of plants per given area.	• Germination percentage of seeds. • Calculating plant population.	• Calculating the germination percentage of seeds and plant population.	• Appreciating germination and plant population.
	9.3.10 Weed Control	9.3.10.1 Explain the importance of weed control in a field crop. 9.3.10.2Demonstrate the methods	• Importance of weed control. • Methods: Chemical,	• Demonstrating the methods of weed control for a named field crop.	• Appreciating weed control. • Cooperating in group activities.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
		of weed control that are applicable to the crop being studied.	Mechanical,		
	9.3.11 Insect pests	9.3.11.1 Identify insect pests of the crop. 9.3.11.2 Suggests ways of controlling the pests.	• Insect pests of the crop. • Ways of controlling pests(Chemical, Mechanical, Biological)	• Investigating the pests of a named field crop. • Demonstrating correct methods of controlling the pests of field crops.	• Being aware of safety rules • Actively participating in class activities.
	9.3.12 Diseases	9.3.12.1 Identify the symptoms or signs of diseases on field crop. 9.3.12.2 Identify the crop attacked by diseases. 9.3.12.3 Explain methods of preventing and controlling disease attack on the crop.	• Symptoms of diseases on a crop. • Crop attacked by diseases. • Methods of preventing disease attack on the crop.	• Observing symptoms or signs of diseases for a named field crop. • Communicating methods of preventing and controlling diseases	• Seeking new ways of preventing diseases in crops. • Appreciating the prevention and control of diseases.
	9.3.13 Harvesting	9.3.13.1 Interpret the length of time it takes from planting or sowing up to maturity. 9.3.13.2 Identify the signs of readiness for harvesting the crop 9.3.13.4 Harvest the crop correctly.	• Maturity of crops • Signs of readiness for harvesting • Harvesting	• Interpreting the signs of readiness for harvesting the crop. • Demonstrating how to harvest the crop correctly.	• Cooperating in group activities • Being aware of the signs of readiness for harvesting the crop.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
	9.3.14 Yield	9.3.14.1 State the recommended yield of the crop per hectare. 9.3.14.2Compare the achieved yields with the recommended yields 9.3.14.3Suggest ways of improving yield.	• Recommended yield of crop per hectare. • Achieved and recommended yields.	• Comparing recommended and achieved yields. • Investigating ways of improving yield.	• Appreciating good yields. • Developing interest in improving yield.
	9.3.15 Storage	9.3.15.1 identify types of storage facilities 9.3.15.2 State the various methods of storing the crop. 9.3.15.3 Store the crop correctly.	• Types of storage facilities • Methods of storing the crop. • Storing the crop.	• Identifying different types of storage facilities. • Demonstrating methods of storing crop	• Appreciating different types of storage facilities.
	9.3.16 Handling and Marketing	9.3.16.1 Handle and market the crop effectively. 9.3.16.2 Project how much money can be realised from the sale of the crop.	• Handling and marketing the crop. • Income from sale of the crop.	• Marketing the crop effectively.	• Cooperating in class activities. • Appreciating entrepreneurship

Topic	Sub-topic	Specific Outcomes	• Content		
			Knowledge	**Skills**	**Values**
9.4 Forestry	9.4. 1 Soil and water conservation	9.4.1.1 Explain the role trees play in soil and water conservation.	• Roles of trees in soil and water conservation.	• Communicating the role of trees in soil and water conservation.	• Appreciating the role of trees in soil and water conservation.
	9.4. 2 Importance of trees in soil management	9.4.2.1 Identify leguminous plants that are used to improve soil fertility. 9.4.2.2 Explain how leguminous trees improve soil fertility.	• Leguminous trees that improve soil fertility. • Improving soil fertility using leguminous plants • Tree planting	• Investigating leguminous trees that improve soil fertility. • Demonstrating tree planting.	• Appreciating the importance of leguminous trees in soil improvement. • Caring for the forests.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
9.5 Conservation farming	9.5.1 Tillage	9.5.1.1 Describe Conservation tillage.	• Tillage • Conservation tillage	• Communicating the meaning of conservation farming.	• Appreciating conservation farming.
	9.5.2 Land clearing	9.5.2.1 Find out the importance of leaving the residues on the surface at the end of the dry season	• Importance of leaving residues: Refer to retention of nutrients and moisture	• Investigating the importance of leaving the residues on the surface of the soil.	• Appreciating the value of residues in soil conservation.
	9.5.3 Seedbed preparation	9.5.3.1 Explain the preparation of a seedbed using a suitable plough for conservation farming.	• Preparing a seed bed using a suitable plough. • Problems caused by	• Observing the use of a suitable plough for conservation	• Participating in class activities • Appreciating the use of a

		9.5.3.2 Explain the problems caused by ploughing when preparing seedbeds.	ploughing	farming.	suitable plough for conservation farming.
	9.5.4. Sowing and planting	9.5.4.1 Plant or Sow correctly under conservation farming.	Planting/Sowing	• Demonstrating the correct method of Sowing or planting	• Appreciating the correct methods of sowing or transplanting.
	9.5.5Manure and chemical fertilisers	9.5.5.1 Apply manure/chemical fertiliser correctly under conservation farming. 9.5.5.2 Explain the effects of monocropping and the use of acidified fertilisers on soil and crop yields.	• Applying manure/chemical fertiliser • Effects of monocropping and the use of acidified fertilisers.	• Demonstrating the correct methods of applying chemical fertilisers and manures. • Communicating the effects of monocropping and the use of acidified fertilisers.	• Asking questions to gain more knowledge. • Appreciating the use of manures and chemical fertilisers in conservation farming.
	9.5.6Weeding	9.5.6.1 State the importance of early and repeated weeding.	• Early and repeated weeding	• Communicating the importance of early and repeated weeding.	• Appreciating the importance of early and repeated weeding.
	9.5.7 Pest Control	9.5.7.1 Explain the importance of using organic materials/organisms to Control pests. 9.5.7.2 Demonstrate the preparation or organic	• Importance of using organic materials or organisms to control pests • Preparing organic pesticide.	• Communicating the importance of using organic materials/organisms to control pests.	• Cooperating in class activities. • Appreciating the importance of using organic

		pesticides from local materials. 9.5.7.3 Control pests using organic material /organisms.	• Controlling pests using organic material/organisms	• Demonstrating the preparation of organic pesticides from local materials and their use.	materials and organisms to control pests.
	9.5.8Crop Rotation in conservation farming	9.5.8.1 Plan a four year crop rotation. 9.5.8.2 Explain the importance of crop rotation in pest control. 9.5.8.3 Explain the importance of crop rotation on soil fertility.	• Four year crop rotation. • Crop rotation and pest control. • Crop rotation and soil fertility.	• Communicating the role of crop rotation in conservation farming.	• Making presentations • Appreciating the role of crop rotation in conservation farming.
	9.5.9 Manure	9.5.9.1 State the importance of manure in conservation farming. 9.5.9.2 Identify sources of organic manure 9.5.9.3 State the nutrient status of some manure. 9.5.9.4 Apply manure correctly.	• Importance of manure in conservation farming • Sources of organic manure. • Nutrient status of some manure. • Applying manure	• Demonstrating the correct way of applying manures • Evaluating the importance of manures in conservation farming.	• Being aware of the importance of manures in conservation farming.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
9.6 Livestock production	9.6.1 Importance of livestock	9.6.1.1 State the nutritive value of livestock studied. 9.6.1.2 Analyse the economic importance of livestock studied.	• Nutritive value of Livestock • Economic importance of livestock.	• Analysing the nutritive and economic importance of the livestock studied.	• Appreciating the nutritive and economic importance of livestock.
	9.6.2 Digestive system in live stock	9.6.2.1 Identify and label a diagram of the digestive system of a ruminant 9.6.2.2 Explain the difference between Ruminant and non-ruminant.	• Parts of the digestive system of a ruminant • Ruminants and non-ruminants	• Observing the digestive systems of a ruminant and non-ruminant. • Comparing the digestive systems of ruminants and non-ruminants.	• Appreciating the differences in ruminants and non-ruminants.
	9.6.3 Rations	9.6.3.1 Distinguish between maintenance and production rations. 9.6.3.2 Make a reasonably well balanced economic diet for at least one type of livestock from local food sources. 9.6.3.3 Compare the growth rates of animals fed on alternative diets and relate these to ration quality.	• Maintenance and production rations. • Making a balanced ration from local resources. • Growth rate of animals fed on alternative diets and recommend feed	• Comparing maintenance and production rations. • Demonstrating the formulation of rations. • Comparing the growth rates of animals fed on alternative diets.	• Being aware of the different rations for animals. • Cooperating in group activities
	9.6.4 Conversion ratio	9.6.4.1. Calculate food conversion ratio from the records of	• Food conversion ratio.	• Calculating food conversion	• Appreciating food conversion

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
		farm animals.		ratios.	ratio.
	9.6.5 Reproductive systems	9.6.5.1 Describe the reproductive systems of male and female animals studied.	• Reproductive systems of male and female animals.	• Observing different parts of the reproductive systems of animals.	• Being aware of the functions of the reproductive organs.
	9.6.6 Fertility and Characteristics of common breeds	9.6.6.1 List the factors that affect the fertility of male and female animals studied. 9.6.6.2 Identify an animal on heat period. 9.6.6.3 Identify the best time for breeding animals. 9.6.6.4 Recall the gestation period of animals studied. 9.6.6.5 Given the date of mating, predict the date of parturition. 9.6.6.6 Describe the characteristics of common breeds of animals studied.	• Factors that affect fertility: E.g. Nutrition, health • Signs of an animal on heat. • Time for breeding. • Gestation period of animals. • Predicting date of parturition. • Characteristics of breeds studied.	• Communicating the factors that affect animal fertility. • Observing animals on heat. • Identifying the best time for breeding animals. • Predicting the date of parturition correctly. • Observing the characteristics of common breeds.	• Being aware of the signs of heat in animals • Appreciating different breeds of animals.
	9.6.7 Livestock improvement	9.6.7.1 Describe steps involved in a programme of livestock improvement.	Livestock improvement	• Analysing steps involved in livestock improvement.	• Appreciating the steps involved in livestock improvement.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
	9.6.8 Management practices on young animals	9.6.8.1 Carryout management practices required on young animals.	Managing young animals	• Observing the management practices required on young animals.	• Appreciating the management practices on young animals.
	9.6.9 Pastures	9.6.9.1 Compare the characteristics of natural pastures and improved pastures. 9.6.9.2 Explain the maintenance of a productive pasture. 9.6.9.3 Maintain a small productive pasture.	• Natural and improved pastures • Maintaining productive pasture. • Small productive pasture.	• Comparing the characteristics of natural pastures and improved pastures. • Demonstrating the maintenance of a productive pasture.	• Appreciating a productive pasture. • Developing innovations in improving pastures.
	9.6.10 Parasites and diseases	9.6.10.1 Identify various parasites of farm animals. 9.6.10.2 Suggest various methods of prevention or controlling parasites on farm animals. 9.6.10.3 Describe the common diseases of farm animals. 9.6.10.4 Suggest various methods of prevention and or controlling diseases.	• Parasites of animals. • Methods of prevention or controlling parasites. • Common diseases of farm animals. • Methods of preventing and or controlling diseases.	• Observing various diseases and parasites of farm animals • Communicating methods of preventing and controlling diseases and parasites.	• Being aware of various parasites and diseases of livestock. • Seeking new ways of improving animal health.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	Skills	Values
	9.6.11 Marketing	9.6.11.1 Prepare animals for marketing. 9.6.11.2 Prepare animals products for marketing. 9.6.11.3 Market animals and animal products.	• Preparing animals for marketing. • Preparing animal products for marketing • Marketing animals and animal products	• Demonstrating the preparation of animals for marketing.	• Cooperating in group activities. • Appreciating the market for animals and their products.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	Skills	Values
9.7 Farm structures	9.7.1 Storage for grains	9.7.1.1 Prepare grains for storage. 9.7.1.2 Describe an appropriate storage facility for grains. 9.7.1.3 Identify an appropriate storage facility for grains.	• Preparing grains for storage. • Storage facility for grains. • Appropriate storage facility for grains.	• Communicating appropriate facilities for storing grains. • Demonstrating the preparation of grains for storage.	• Being aware of the characteristics of a good storage facility for grains.
	9.7.2 Storage for fruits	9.7.2.1 Prepare fruits for storage. 9.7.2.2 Describe an appropriate facility for storing fruits. 9.7.6 Identify an appropriate Store for fruits.	• Preparing fruits for storage. • Appropriate facility for storing fruits. • Facility for storing fruits.	• Identifying appropriate facilities for fruits. • Demonstrating the preparation of fruits for storage.	• Appreciating the characteristics of a good storage facility for fruits.

	9.7.3 Rabbit houses	9.7.4.1 List types of houses for rabbits. 9.7.4.2 Plan an appropriate house for a given group of rabbits.	• Types of house for rabbits. • Appropriate house for a group of rabbits.	• Classifying different types of rabbit houses. • Planning appropriate houses for a given group of rabbits.	• Cooperating in groups. • Appreciating different houses for rabbits.
	9.7.4 Pigsties	9.7.4.1 List the various types of shelter for pigs. 9.7.4.2 Describe an appropriate shelter for a given group of pigs. 9.7.4.3 Plan an appropriate shelter for a given group of pigs.	• Types of houses for pigs. • Appropriate house for a group of pigs. • Planning house for a group of pigs	• Classifying different types of houses for pigs. • Planning appropriate houses for a given group of pigs.	• Participating in group activities. • Appreciating different houses for goats.
	9.7.5 Goat houses	9.7.5.1 List types of goat shelters. 9.7.5.2 Prepare an appropriate shelter for a given class of goats.	• Types of goat shelter. • Preparing a shelter for goats	• Identifying different types of shelter for goats. • Planning appropriate shelter for a given group of goats.	• Appreciating different houses for goats. •
	9.7.6 Cattle houses	9.7.6.1 List appropriate types of shelters for cattle. 9.7.6.2 Prepare an appropriate shelter for a given class of cattle	• Types of shelter for cattle. • Preparing a shelter for a given class of cattle.	• Classifying different types of shelter for cattle. • Planning appropriate	• Cooperating in group activities • Appreciating different houses for cattle.

				shelter for a given group of cattle.	
	9.7.7 Drainage pen	9.7.7.1 State the dimensions of the collecting pen and the drainage pen. 9.7.7.2 Describe a dip tank	• Collecting and drainage pens. • Dip tank	• Analysing the correct dimensions for collecting and drainage pens	Participating actively in group work.
	9.7.8 Concrete mixtures	9.7.8.1 State the proportions of concrete mixtures suitable for various building purposes. 9.7.8.2 Demonstrate mixing concrete for various building purposes. 9.7.8.3 Name the various types of bricks and blocks. 9.7.8.4 Make bricks and blocks.	• Concrete mixtures. • Mixing concrete. • Types of bricks and blocks. • Making bricks and blocks.	• Demonstrating mixing concrete for various purposes. • Communicating the proportions of mixtures for various purposes.	• Appreciating concrete mixtures for various purposes. •

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
9.8 Farm Machinery	9.8.1 Power drawn implements for soil preparations	9.8.1.1 Identify tractor drawn implements for preparing soil	Tractor drawn implements for preparing soil: e.g. disc plough, Cultivator	• Identifying tractor drawn implements for preparing the soil.	• Being aware of types of tractor drawn implements. • Cooperating in group activities.
	9.8.2 Power drawn implements for sowing/planting	9.8.2.1Identify tractor drawn implements for planting 9.8.2.2 Describe the proper care of tractor drawn implements	• Tractor drawn implements for planting: E.g. planter • Care for tractor drawn implement (cleaning, oiling, painting and storage).	• Classifying tractor drawn implements for preparing the • Demonstrating proper care for tractor drawn implements.	• Being aware of types of tractor drawn implements. • Cooperating in group activities
	9.8.3 Storage for farm machinery	9.8.3.1 Prepare power drawn implements for storage. 9.8.3.2 Describe an appropriate facility for storing power implements.	• Preparing power drawn implements for storage. • Appropriate facility for storing power implements.	• Identifying appropriate facilities for storing power implements. • Demonstrating the preparation of power implements for storage.	• Being aware of the characteristics of a good storage facility for power implements.

Topic	Sub-topic	Specific Outcomes	Content		
			Knowledge	**Skills**	**Values**
9.9 Farm Management	9.9.1 The farm	9.9.1.1 Identify the resources the farm requires for production. 9.9.1.2 Explain the idea of the farm as a business.	• E.g. Capital, labour, equipment • A farm as a business unit	• Communicating farm resources needed for production • Analysing farming as a business.	• Appreciating farm resources. • Actively participating in class activities.
	9.9.2 Entrepreneurship	9.9.2.1 Describe an enterprise. 9.9.2.2 Describe entrepreneurship. 9.9.2.3 Explain how to find a Market for the farm products	Enterprise Entrepreneurship Finding a market	• Communicating components of an enterprise. • Researching the availability of market for farm produce.	• Appreciating farming as an enterprise. • Cooperating in group activities.

SCOPE AND SEQUENCE

Grade 8		Grade 9
Topic	**Subtopic**	**Subtopic**
Agriculture in Zambia	• Agriculture practice and industry • Agricultural activities in Zambia • Factors that influence Agricultural Development • Farmer Support • Types of farmers	• Agriculture practice and industry • Effects of human population on Agriculture. • Farming areas in Zambia
Soil Science	• Soil formation • Composition of soil • Soil profile • Soil texture • Types of soil • Organic and chemical fertilisers	• Characteristics of soils. • Soil structure • Plant nutrients • Manures and ashes • Soil reaction • Soil erosion
Crop Production	• Classes and varieties of vegetables • Site for Vegetable growing • Vegetable garden • Seedbed preparation • Planting vegetables • Weed Control • Pest Control • Disease Control • Harvesting and marketing	• Importance of the crop • Ecological requirements of the crop • Varieties and propagation • Site suitable for the crop • Crop rotation • Land preparation • Manure and fertiliser application • Sowing and planting materials • Plant population • Weed Control

		• Insect pests • Diseases • Harvesting • Yield • Storage • Handling and Marketing
Forestry	• Importance of trees in soil management • Selecting a site for growing trees	• Soil and water conservation • Importance of trees in soil management
Conservation farming	• Mixed cropping • Inter cropping • Mixed farming • Land clearing and preparation • Chemical fertiliser and manure application • Planting and weed control • Soil Erosion Control	• Tillage • Land clearing • Seedbed preparation • Sowing and planting • Manure and chemical fertilisers • Weeding • Pest Control • Crop Rotation in conservation farming • Manure
Livestock production	• Importance of livestock • Parts of Digestive systems • Parts of the reproductive systems • Breeds • Brooder house • Incubation of eggs and Brooding • Pests and diseases • Records and Marketing	• Importance of livestock • Digestive system in live stock • Rations Conversion ratio • Reproductive systems • Fertility and Characteristics of common breeds • Livestock improvement • Management practices on young animals

		• Pastures • Parasites and diseases • Marketing
Farm structures	• Storage of vegetables • Poultry houses	• Storage for grains • Storage for fruits
Farm Machinery	• Hand tools • Sprayer • Animal drawn implements • Storage for farm machinery	• Power drawn implements for soil preparations • Power drawn implements for sowing/planting • Storage for farm machinery
Farm Management	• Farm management • Agricultural economics • Opportunity cost and production decision • Types of credit • Interest • Records • Enterprise • Grading and Standardisation	• The farm • Entrepreneurship

Project Work

Some requirements for Project Work

Some requirements for Project work at school level are:

1. Each pupil is required to maintain and submit at the end of the course a file or folder or A4 exercise book containing two project reports to the teacher.

2. The projects chosen by each pupil must be from the list on livestock, crops or general topics studied.

3. Teachers should ensure that projects are marked (assessed) as soon as they are submitted and marks stored safely in an official file known by the Head of Agricultural Science Section in the school and possibly the Head of the school.

4. Heads of Agricultural Science Sections in each school should ensure that a full list of pupils and their practical mark schedules are accompanied as follows:

    i) One best project files with its mark scheme;
    ii) One average project files with its marking scheme;
    iii) One worst project files with its marking scheme.

5. Heads of schools should ensure that pupils going or coming on transfer are accompanied by their Agricultural Science Project Work file(s).

Planning

Project work requires planning and execution in a logical sequence. Pupils should be guided through questions and suggestions by subject teachers in order to arrive at a result, that can be analysed and conclusion drawn.

Although it is better for pupils to do the projects individually, certain projects may be carried out in pairs or groups of 3 to 5 to gather data; except, that the analysis of the data collected must be done individually.

Each pupil is expected to maintain records of Project Work in an exercise book or file provided for this purpose. These records should be available for inspection and assessment mid-way and at the end of the project by Head teacher and Standards Officers examinations at District level.

The pupils are allowed:

i) to choose their own project for investigation

ii) select the topic for investigation from the list of possible projects displayed by the teacher.

Projects may consist of:

i) an investigation of growth, management and marketing of a particular animal(s), bird(s), or crop(s);

ii) an investigation of a particular aspect of the local agricultural practice.

Suggested crops to be studied include:

i) Cereal crops
- Maize
- Millets
- Rice
- Sorghum
- wheat

ii) Leaf crops
- cabbage
- chomoulier
- rape

iii) Legumes
- beans
- groundnuts
- peas

iv) Root crops
- cassava
- sweet potatoes
- carrots

v) Solanaceous
- potatoes
- tomatoes

vi) Fruits
- bananas
- guavas
- mangoes
- paw paws
- pineapples

vii) Oil crops

cotton
sunflower

The suggested animals to be studied are:

i)	Ruminants	ii)	Non-ruminants	iii)	Poultry
	cattle; beef or dairy		pigs		chicken; broilers
	goats		rabbits		or layers
	sheep				ducks
					geese

It is suggested that:

i) The two projects are spaced so that one project is completed before the other begins. It may be a good idea to start the first project in grade 8 in the third term. Projects should involve at least one term of work.

ii) Project Work should be carried out to some extent during the pupil's own time, but regular checks on progress should be made and in case of negligence, every effort should be made to motivate pupils. Teachers should expect a high standard of work from their pupils at all times and the quality of pupils' work should be commented upon from time to time.

iii) The organisation and supervision of project work should be the collective responsibility of agricultural Science teachers in the school.

iv) In organising the requirements of the project, the use of worksheets is recommended, but care must be taken not to take away the initiative from pupils.

Some topics for Project Work

Some examples of projects that can be done are:

Crops:

i) Effect of weeds

ii) Effect of pests

iii) Effect of manure

iv) Soil erosion

v) Growth rate in plants

vi) Crop sales

vii) Marketing ability of crops

Live stock

i) Compare the effectiveness of feeds from different manufacturers

ii) Effect of livestock population in a given locality

iii) Investigate the effect of taboos on livestock rearing

Others

i) Investigate the effectiveness of marketing policies

ii) Investigate the effect of certain farming systems on the locality

iii) Tracing the history of Agriculture in a given area.

Assessing Project

Each project is marked out of 100 marks and the total marks obtained are divided by 10 to give a mark out of 10. The marks for the two projects are then added to give a mark out of 20. This is the mark that is entered on the official mark sheet.

Evaluation Sheet

Name of Pupil:

Name of School:

School Code:

Category of Assessment	Maximum Marks	Project	
		1	2
Topic and title	2		
Aim(s)	3		
Hypothesis	5		
Method/Procedure	25		
Observation and recording	20		
Analysis	25		
Problems and limitations	5		
Conclusion	10		
Recommendations	5		
Interest and Commitment	5		
Total Score	100	X	X
Actual Score out of 10=$\frac{x}{10}$	10		

Supervisor's comments: Provide information on cases of extreme poor performance resulting from inability to do or conclude a project or failure to hand in a project report.