



ZIMBABWE

MINISTRY OF PRIMARY AND SECONDARY EDUCATION

ANIMAL SCIENCE (NON-FORMAL) SYLLABUS

LEVEL III

2015-2022

Curriculum Development Unit
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- UNICEF

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1.0 PREAMBLE

1.1 INTRODUCTION

Zimbabwe embarked on an agrarian Land Reform to correct colonial land imbalances and empower the previously marginalised Zimbabweans with access to land. In-order to safe-guard this important national heritage and ensure food security through sustainable land use, it is very important for learners of diverse backgrounds to acquire necessary animal science knowledge and skills. This syllabus is designed for Level III learners in Animal Science. It is a learning phase which covers concepts, principles and practices in animal science. The syllabus will provide learners with a rich experience in identifying, investigating, problem solving and assessing the viability of sustainable animal husbandry. Learners will be assessed through continuous and summative assessments.

1.2 RATIONALE

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

The Animal Science Non-Formal syllabus enables learners to develop the following skills:

- Research
- Production
- Value addition
- Marketing
- Enterprise development
- Technology and innovation
- Critical thinking
- Problem-solving
- Decision-making
- Conflict resolution
- Leadership and team-work
- Self-management
- Communication

1.3 SUMMARY OF CONTENT

The learning area will include the study of background to animal science, anatomy and physiology, nutrition, genetics and breeding, animal health, animal production and animal products and processing technology

1.4 ASSUMPTIONS

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

- livestock production
- sustainable use of agricultural resources
- e-learning
- marketing of animal products

1.5 CROSS- CUTTING ISSUES

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

- Disaster and risk reduction
- Enterprise skills
- Environmental issues
- Team work
- Sustainable resource utilisation
- ICT
- Inclusivity
- Safety and health

2.0 PRESENTATION OF SYLLABUS

The Animal Science Non-Formal syllabus is a single document covering Level III. The syllabus has a suggested list of resources to be used during teaching and learning.

3.0 AIMS

The syllabus aims to help learners to:

- 3.1 develop an appreciation of the socio-economic importance of animal science to agricultural development of the country
- 3.2 develop positive attitudes towards Animal Science as a learning area
- 3.3 apply competences in solving animal science related problems
- 3.4 appreciate innovativeness in the sustainable utilization of local resources in the efficient production of livestock and wildlife
- 3.5 apply value addition skills in the processing and marketing of livestock and wildlife products to meet food security standards
- 3.6 ensure learners demonstrate desirable literacy and numeracy skills including practical competences necessary for life
- 3.7 prepare learners for life and work in an indigenized economy and increasingly globalised and competitive environment

4.0 SYLLABUS OBJECTIVES

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

- 4.1 demonstrate an understanding of the importance of animal science in socio-economic development
- 4.2 apply scientific principles in livestock and wildlife production
- 4.3 evaluate resources necessary for the production of livestock and wildlife in animal science
- 4.4 demonstrate an understanding of livestock and wildlife protection principles
- 4.5 demonstrate the sustainable utilisation of local resources in animal production
- 4.6 efficiently produce and market livestock and wildlife
- 4.7 add value and market to livestock and wildlife products
- 4.8 design and carry-out research work on animal production for economic development of the nation
- 4.9 prepare and implement a sustainable livestock or wildlife project plan

5.0 METHODOLOGY AND TIME ALLOCATION

5.1 METHODOLOGY

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

The following are suggested methods of teaching and learning of Animal Science.

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

5.2 TIME ALLOCATION

Two hours per week should be allocated though more time can be created by students to adequately cover the syllabus. Learners should be engaged in at least two educational tours per year, one exhibition per year, one seminar per term and work related experience of two weeks in animal production industry.

6.0 TOPICS

1. Background to animal science
2. Anatomy and physiology
3. Nutrition
4. Genetics and breeding
5. Animal health
6. Animal production
7. Animal products and technology

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7.0 SCOPE AND SEQUENCE

7.1 TOPIC 1: BACKGROUND TO ANIMAL SCIENCE

TOPIC	LEVEL III
Livestock and wild animals	<ul style="list-style-type: none">• Socio-economic importance• Classification of animals

7.2 TOPIC 2: ANATOMY AND PHYSIOLOGY

TOPIC	LEVEL III
Animal cell Biology	<ul style="list-style-type: none">• Cell components<ul style="list-style-type: none">-structure-functions
Body structure	<ul style="list-style-type: none">• Endoskeletal system of mammals• Endoskeletal system of birds• Skeletal Joints• Muscles
Circulatory system and endocrinology	<ul style="list-style-type: none">• Circulatory organs• Circulatory Tissues• Lymph system• Hormonal system
Respiratory system	<ul style="list-style-type: none">• Structure• Function
Digestive system	<ul style="list-style-type: none">• Types• Structure• Functions• Absorption of nutrients in the body
Urinary system	<ul style="list-style-type: none">•• Structure

TOPIC	LEVEL III
	<ul style="list-style-type: none"> • Functions • Homeostasis
Reproductive system	<ul style="list-style-type: none"> • Structure <ul style="list-style-type: none"> - Male - Female • Functions

7.3 TOPIC 3: NUTRITION

TOPIC	LEVEL III
Feedstuffs	<ul style="list-style-type: none"> • Classification of feedstuffs • Uses of feedstuffs • Feed composition • Digestibility • Feed formulation
Nutrients	<ul style="list-style-type: none"> • Bio-chemistry of nutrients Energy metabolism •

7.4 TOPIC 4: GENETICS AND BREEDING

TOPIC	LEVEL III
Principles of genetics	<ul style="list-style-type: none"> • Chromosomes • DNA and replication • Mitosis • Meiosis • Genetic code • Mendelian laws • Gene expressions
Breeding	<ul style="list-style-type: none"> • Breeding objectives • Breeding approaches • Selection systems

TOPIC	LEVEL III
	<ul style="list-style-type: none"> - Natural - Artificial • Improvement programmes <ul style="list-style-type: none"> - Cross breeding - Out breeding - In-breeding - Upgrading - Genetic engineering • Mating systems <ul style="list-style-type: none"> - Natural - Artificial

7.5 TOPIC 5: ANIMAL HEALTH

TOPIC	LEVEL III
Health	<ul style="list-style-type: none"> • Environmental issues • Animal diseases • Animal parasites • Immunity • Legislation

7.6 TOPIC 6: ANIMAL PRODUCTION

TOPIC	LEVEL III
Livestock and wildlife	<ul style="list-style-type: none"> • Livestock and wildlife species • Importance of animals and animal products
Meat, Dairy and wild animal production	<ul style="list-style-type: none"> • Breeds • Production systems • Pasture and forage management

TOPIC	LEVEL III
	<ul style="list-style-type: none"> • Management practices • Handling facilities • Animal protection • Farm records

7.7 TOPIC 7: ANIMAL PRODUCTS AND TECHNOLOGY

TOPIC	LEVEL III
Value addition	<ul style="list-style-type: none"> • Importance of value addition • Processing of animal products • Preservation of animal products
Marketing	<ul style="list-style-type: none"> • Types of markets • Identification of markets • Marketing functions • Records

8 COMPETENCY MATRIX

LEVEL III SYLLABUS

TOPIC 1: BACKGROUND TO ANIMAL SCIENCE

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Livestock and wild animals	<ul style="list-style-type: none"> • discuss the socio- economic importance of livestock and wild animal species and breeds • classify livestock and wild animals • identify breeds and their adaptive features 	<ul style="list-style-type: none"> • Socio-economic importance • Species and breeds <ul style="list-style-type: none"> - Indigenous - Exotic • Adaptive features of breeds 	<ul style="list-style-type: none"> • Discussing the importance of livestock and wild animal species and breeds • Classifying livestock and wild animals • Identifying breeds and their adaptive features 	<ul style="list-style-type: none"> • Print and electronic media • ICT tools with JAWS software • Livestock and wild animals

TOPIC 2: ANATOMY AND PHYSIOLOGY

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Animal cell biology	<ul style="list-style-type: none"> • Identify the parts of an animal cell • describe the parts of an animal cell as seen under an electron microscope • explain the functions of the cell components 	<ul style="list-style-type: none"> • Structure of the animal cell • Functions of the cell components: <ul style="list-style-type: none"> - membrane - cytoplasm - nucleus - golgi body - endoplasmic reticulum - ribosomes - mitochondrion - lysosome 	<ul style="list-style-type: none"> • Drawing and labelling the animal cell • Viewing slides showing animal cells • Preparing animal cell slides • Identifying cell parts and structures • Describing functions of cell components 	<ul style="list-style-type: none"> • Print and electronic media • ICT tools with JAWS software • Slides • Animal tissues • Microscope • Bio-viewers

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Endoskeletal system of birds	<ul style="list-style-type: none"> • identify endoskeletal parts of a bird • describe the functions of endoskeletal parts of a bird 	<ul style="list-style-type: none"> • Structure • Functions of parts 	<ul style="list-style-type: none"> • Identifying parts of a bird endoskeleton • Discussing the functions of endoskeletal parts of a bird 	<ul style="list-style-type: none"> • Bird skeleton • ICT tools • Models
Skeletal Joints	<ul style="list-style-type: none"> • describe the types of joints in mammalian endoskeleton • identify how joints are connected and the material connecting them • describe the functions of joints 	<ul style="list-style-type: none"> • Types: <ul style="list-style-type: none"> - Synovial joints - Fibrous joints - Amphiarthrosis • Functions 	<ul style="list-style-type: none"> • describing the types of joints in mammalian endoskeleton • identifying how joints are connected and the material connecting them • describing the functions of joints 	<ul style="list-style-type: none"> • ICT tools • Models • Samples of joints
Muscular system	<ul style="list-style-type: none"> • describe the structure of the muscle • identify muscles of a mammal and a bird • describe the functions of the muscles on a mammal and a bird 	<ul style="list-style-type: none"> • Structure of muscle • Types of muscles: <ul style="list-style-type: none"> - Fore and Hind quarter muscles - Head, Neck and vertebrae - Abdominal - Respiratory • Functions of muscles 	<ul style="list-style-type: none"> • Describing the structure of the muscle • Identifying muscles • Describing the functions of the muscles 	<ul style="list-style-type: none"> • Muscle samples • ICT tools • Models
Circulatory system	<ul style="list-style-type: none"> • describe the circulatory system in animals • relate the structure of organs and tissues of the circulatory system to their functions • describe the lymphatic system • discuss the integrated functions of the organs, tissues and lymphatic system 	<ul style="list-style-type: none"> • Circulatory organs • Circulatory tissues • Lymphatic system 	<ul style="list-style-type: none"> • Identifying the circulatory organs • Illustrating organs of the circulatory system • Describing the functions of the organs, tissues and the lymphatic systems • Discussing the integrated functions of the organs, tissues and lymphatic system 	<ul style="list-style-type: none"> • Samples of the circulatory organs • ICT tools • Models of circulatory system

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Respiratory system	<ul style="list-style-type: none"> • identify parts of the respiratory system • describe the structure of the respiratory system • discuss the functions of the respiratory system 	<ul style="list-style-type: none"> • Structure • Functions 	<ul style="list-style-type: none"> • Identifying parts of the respiratory system • Describing the structure of the respiratory system • Discussing the functions of the respiratory system 	<ul style="list-style-type: none"> • Samples of respiratory organs • ICT tools with JAWS software • Models of circulatory system
Digestive system	<ul style="list-style-type: none"> • describe the structure of the digestive systems • describe the function of each part of the digestive systems • explain the absorption of nutrients in the digestive systems • discuss factors affecting nutrient absorption 	<ul style="list-style-type: none"> • Digestive systems <ul style="list-style-type: none"> - Ruminant - Monogastric • Functions of the digestive parts • Absorption of nutrients • Factors affecting nutrient absorption 	<ul style="list-style-type: none"> • Describing the structure of the ruminant and monogastric digestive systems • Comparing the digestive systems • Describing the functions of parts of the digestive systems • Explaining the absorption process of nutrients in the digestive system • Discussing factors affecting nutrient absorption 	<ul style="list-style-type: none"> • Samples of digestive parts • ICT tools with JAWS software • Models of digestive systems
Urinary system	<ul style="list-style-type: none"> • describe the parts of the urinary system • explain the functions of the urinary system • explain the relationship between structure and functions of parts of the reproductive systems • describe how the urinary system maintains the internal body environment of the animal 	<ul style="list-style-type: none"> • Structure • Functions • homeostasis 	<ul style="list-style-type: none"> • Describing the parts of the urinary system • Explaining the functions of the urinary system • describing how the urinary system maintains water, pH, osmotic pressure and electrolyte concentrations 	<ul style="list-style-type: none"> • Samples of the urinary parts • ICT tools with JAWS software • Models

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Reproductive system	<ul style="list-style-type: none"> • Explain the relationship between structure and function of parts of the reproductive system • describe the function of the parts of the reproductive systems • discuss the role of hormones in reproduction • describe the disorders associated with the reproductive systems • discuss the causes of infertility in animals 	<ul style="list-style-type: none"> • Structure of: <ul style="list-style-type: none"> - Male reproductive system - Female reproductive system • Oogenesis • Spermatogenesis • Role of hormones • Fertilization and embryo development • Causes of infertility 	<ul style="list-style-type: none"> • Identifying the reproductive parts • Describing functions of the reproductive parts • Analysing urine and blood samples for hormonal changes • Describing fertilization and embryo development • Discussing the causes of infertility in animals 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Models of reproductive systems • Samples of reproductive systems, blood and urine

TOPIC 3: NUTRITION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Classification of feedstuffs	<ul style="list-style-type: none"> • classify feedstuffs according to: <ul style="list-style-type: none"> - use - nutritional composition 	<ul style="list-style-type: none"> • Classification: <ul style="list-style-type: none"> - Dry roughages - Forages and fodder - Silage and hay - High energy feed - Protein supplements - Mineral supplements - Vitamin supplements - Non-nutritive feed additives 	<ul style="list-style-type: none"> • Grouping feed samples according to: <ul style="list-style-type: none"> - use - nutritional composition 	<ul style="list-style-type: none"> • Recommended texts • ICT tools with JAWS software • Feed samples
Feed Composition	<ul style="list-style-type: none"> • determine nutrient composition of feedstuffs • describe factors that affect feed quality • examine the anti-nutritional factors in feeds 	<ul style="list-style-type: none"> • Composition • Feed quality <ul style="list-style-type: none"> - Anti-nutritional factors such as mycotoxins and tannins 	<ul style="list-style-type: none"> • Determining nutrient composition of feedstuffs through laboratory experiments • Describing the factors 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Feed samples • Feed

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
			<ul style="list-style-type: none"> • affecting feed quality • Comparing composition of various feedstuffs • Educational touring of stock feed manufacturing company 	<ul style="list-style-type: none"> • composition tables
Digestibility	<ul style="list-style-type: none"> • differentiate true from apparent digestibility • describe factors affecting digestibility • demonstrate digestibility using in-vivo or in-vitro method • relate feed intake to live weight gain • calculate digestibility of feeds 	<ul style="list-style-type: none"> • Types of digestibility • Factors affecting digestibility • In-vivo and in-vitro techniques • Feed conversion efficiency • digestibility calculations 	<ul style="list-style-type: none"> • Discussing types of digestibility • Discussing factors affecting digestibility • Demonstrating digestibility using in-vivo in-vitro method • Showing relationship between feed intake and weight gain • Educational touring to a research station to observe in-vitro 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Ingesta samples • Feecal samples • Resource person from research station and feed formulation companies
Feed formulation	<ul style="list-style-type: none"> • discuss factors to consider when formulating feed • formulate feed for various animal groups using Pearson's Square method and feed formulation softwares • ensilage plants 	<ul style="list-style-type: none"> • Feed formulation factors • Pearson's square and feed formulating software • Silage making 	<ul style="list-style-type: none"> • Discussing factors to consider when formulating feeds • Formulating feeds using Pearson's square method and feed formulation software • Making silage using grasses or legumes 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Feed formulation software • Silage plants • Molasses • Resource person from feed formulation companies

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Bio-chemistry of nutrients	<ul style="list-style-type: none"> • describe the biochemical structures of carbohydrates, proteins and lipids • relate structure to function of carbohydrates, proteins and lipids • identify the effects of climate change on animal nutrient requirements 	<ul style="list-style-type: none"> • Nutrients <ul style="list-style-type: none"> – Carbohydrates – Proteins – lipids – Vitamins – Minerals – Feed additives • Effects of climate change 	<ul style="list-style-type: none"> • Drawing the biochemical structures of carbohydrates, proteins and lipids • Describing the biochemical structure of carbohydrates, proteins and lipids • Explaining the relationship between the structure and function of carbohydrates, proteins and lipids • Discussing the effects of climate change on animal nutrient requirements 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Print media • Simulation cards
Energy metabolism	<ul style="list-style-type: none"> • describe glycolysis • describe the importance of glycolysis to animal production • describe the Krebs cycle • examine the products and importance Krebs cycle interpret the diagrammatic representation of Krebs cycle • describe the importance of Krebs cycle to animal production • Compare glycolysis and Krebs cycle • Describe ATP synthesis through oxidative phosphorylation 	<ul style="list-style-type: none"> • Glycolytic pathway • Krebs cycle • Oxidative phosphorylation 	<ul style="list-style-type: none"> • describing the glycolytic pathway • examining the products and importance glycolysis • interpreting the diagrammatic representation of glycolysis • describing the importance of glycolysis to animal production • describing the Krebs cycle • examining the products and importance of the Krebs cycle interpret the diagrammatic representation of Krebs cycle • describing the importance of Krebs cycle to animal production • Comparing glycolysis and Krebs cycle 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Print media

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
			<ul style="list-style-type: none"> Describing the process of ATP synthesis through oxidative phosphorylation 	

TOPIC 4: GENETICS AND BREEDING

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Principles of genetics	<ul style="list-style-type: none"> describe the structure of a chromosome describe the structure of DNA explain DNA replication describe the process of mitosis explain the significance of mitosis in animal production describe the process of meiosis explain the significance of meiosis in animal reproduction compare and contrast mitosis and meiosis <ul style="list-style-type: none"> outline Mendelian laws of inheritance <ul style="list-style-type: none"> describe protein synthesis starting from DNA outline types of gene expression 	<ul style="list-style-type: none"> Chromosomes DNA and replication Mitosis: <ul style="list-style-type: none"> Phases Significance Meiosis: <ul style="list-style-type: none"> Phases Significance Comparison of mitosis and meiosis <ul style="list-style-type: none"> Mendelian laws <ul style="list-style-type: none"> Protein synthesis 	<ul style="list-style-type: none"> Discussing the structure of a chromosome. Constructing chromosome model. Explaining DNA replication Illustrating the structure of DNA Describing mitotic cell division Discussing significance of mitosis Describing meiotic cell division Outlining significance of meiosis in animal reproduction Outlining the differences between mitosis and meiosis Explaining the law of independent assortment Describing the law of segregation Identifying characteristics of sex-linked inheritance 	<ul style="list-style-type: none"> Print and electronic media Video clips ICT tools JAWS software Simulation cards Animal breeders Resource personnel

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	<ul style="list-style-type: none"> • describe effects of environment on gene expression • determine genotype and phenotype ratios • describe the importance of gene expression • describe types of mutation 	<ul style="list-style-type: none"> • Gene expression: <ul style="list-style-type: none"> - Dominance - Co-dominance - Partial dominance - Over dominance - Gene-environment interaction - Epistasis • Gene mutations • Chromosomal mutations 	<ul style="list-style-type: none"> • Describing protein synthesis starting from DNA • Comparing dominance and co-dominance • Determining genotype and phenotype using genetic diagrams • Describing the effects of environment on gene expression • Describing gene mutation • Describing types and effects of mutations • Designing and carrying out experiments on crossing different breeds of animals 	
Breeding	<ul style="list-style-type: none"> • discuss objectives of animal breeding • outline breeding approaches in animal production • describe selection systems in animal breeding • discuss merits and demerits of animal selection • discuss animal improvement programmes • discuss the implications of genetic engineering in livestock production • describe different mating systems in animal production 	<ul style="list-style-type: none"> • Breeding objectives • Breeding approaches • Selection systems: <ul style="list-style-type: none"> - Natural - Artificial • Improvement programmes: <ul style="list-style-type: none"> - Cross-breeding - Out-breeding - In-breeding 	<ul style="list-style-type: none"> • discussing objectives of animal breeding • outlining breeding approaches in animal production • describing selection systems in animal breeding • discussing merits and demerits of animal selection • discussing animal improvement programs • discussing the implications of genetic engineering in livestock production 	<ul style="list-style-type: none"> • Video clips • ICT tools and JAWS software • Simulation cards • Animal breeders

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
		<ul style="list-style-type: none"> - Up-grading - Back-crossing - Genetic engineering • Mating systems: <ul style="list-style-type: none"> - Natural - Artificial 	<ul style="list-style-type: none"> • describing different mating systems in animal production 	

TOPIC 5: ANIMAL HEALTH

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Factors that influence animal diseases	<ul style="list-style-type: none"> • outline the factors that cause diseases in animals • discuss strategies to combat spread of diseases 	<ul style="list-style-type: none"> • Environmental factors <ul style="list-style-type: none"> - Temperature - Humidity - Moisture • Hygiene • Pathogenic organisms: <ul style="list-style-type: none"> - Bacteria - Viruses - Protozoa - rickettsia • Nutritional deficiencies • Integrated disease management activities 	<ul style="list-style-type: none"> • Providing suitable structures to modify environmental factors • Measuring environmental factors to assess variation • discussing disease causing organisms • Describing nutritional deficiency diseases • Discussing strategies to combat disease out-break 	Thermometers ICT tools and JAWS software
Animal diseases	<ul style="list-style-type: none"> • discuss causes and transmission of diseases • describe signs and symptoms of diseases • describe prevention and control measures of notifiable diseases 	<ul style="list-style-type: none"> • Bacterial diseases <ul style="list-style-type: none"> - Anthrax - Infectious Bursal Disease (IBD) - Black leg - Contagious abortion • Viral diseases 	<ul style="list-style-type: none"> • Discussing causes and transmission of diseases • describing signs and symptoms of diseases • describing prevention and control measures of diseases • carrying-out disease diagnosis 	<ul style="list-style-type: none"> • Print and electronic media • Resource person • Veterinary reports

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
		New castle - Foot and mouth - Lumpy skin • Protozoan - Red water - Trypanosomiasis/ nagana - Coccidiosis • Rickettsia disease - Heart water <i>Learners should study one bacteria, one virus, one protozoa and one rickettsia</i>	and post-mortem	
Animal parasites	<ul style="list-style-type: none"> • describe external and internal parasites • relate parasites to the damage they cause • describe methods of controlling parasites 	<ul style="list-style-type: none"> • External parasites: Ticks - Fleas - Lice - Tampons • Internal parasites: - Round worms - Wire worms - Tape worms - Flukes 	<ul style="list-style-type: none"> • Collecting parasite specimens • Identifying the different types of parasites • Classifying parasites • Analysing the damage caused by parasites • Controlling parasites 	<ul style="list-style-type: none"> • Field work • Dung samples • Samples of parasites • Veterinary officer
Immunity	<ul style="list-style-type: none"> • Describe natural and artificial immunity • discuss the importance of immunity to animals • describe the role of lymph nodes in immunity • describe Immune cell types • 	<ul style="list-style-type: none"> • Types of immunity: Natural - Passive - Active Artificial - Passive - Active • Role of lymph nodes 	<ul style="list-style-type: none"> • Describing natural and artificial immunity • Discussing the importance of immunity to animals • Feeding colostrum to young animals • Vaccinating animals against various diseases 	<ul style="list-style-type: none"> • Print and electronic media • ICT tools with JAWS software • Vaccines • Veterinary

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
		<ul style="list-style-type: none"> Immune cell types 	<ul style="list-style-type: none"> Drawing and labelling lymph nodes Describing the role of lymph nodes in immunity Discussing types of immune cell 	officer
Legislation	<ul style="list-style-type: none"> discuss legal responsibilities of livestock owners outline notifiable disease regulations 	<ul style="list-style-type: none"> Animal Health ACT 	<ul style="list-style-type: none"> Discussing regulations governing notifiable diseases (transferable from animals to human beings) Touring veterinary department 	<ul style="list-style-type: none"> Print and electronic media ICT tools and JAWS software Animal Health ACT

TOPIC 6: ANIMAL PRODUCTION

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Livestock and wild animals	<ul style="list-style-type: none"> describe livestock and wild animal species explain the importance of animals and animal products 	<ul style="list-style-type: none"> Breeds used in agriculture End products Socio-economic importance 	<ul style="list-style-type: none"> Describing livestock and wild animal species Explaining the importance of animals and animal products 	<ul style="list-style-type: none"> animal products such as meat, milk, hides, trophy, horns
Meat, dairy and wild animal production	<ul style="list-style-type: none"> describe characteristics of meat, dairy and wild animals select livestock breeds which suit the local environment describe the suitable habitat for wild animals 	<ul style="list-style-type: none"> characteristics: <ul style="list-style-type: none"> -livestock breeds -Wild animals 	<ul style="list-style-type: none"> Describing characteristics of meat, dairy and wild animals Viewing multimedia showing different breeds of animals describing the suitable habitat for wild animals 	<ul style="list-style-type: none"> ICT tools with JAWS software Farm and wild animals

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
		<i>Learners should study one animal from the following groups :group 1 meat - cattle, sheep, goats and pigs; group 2: dairy - cattle, sheep and goats group 3: wild animals – big five</i>	<ul style="list-style-type: none"> • Conducting educational tours to farms, exhibition parks and national parks 	
Production systems	<ul style="list-style-type: none"> • describe production systems • discuss factors that influence the choice of a production system 	<ul style="list-style-type: none"> • Production systems: <ul style="list-style-type: none"> - Intensive - Extensive • Factors to consider in choosing production system 	<ul style="list-style-type: none"> • Describing production systems • Discussing factors that influence the choice of a production system • Conducting educational tours to farms 	<ul style="list-style-type: none"> • ICT tools with JAWS software
Pasture management	<ul style="list-style-type: none"> • describe pasture management practices • explain measures of improving pastures 	<ul style="list-style-type: none"> • Pasture management practices • Methods of improving pastures 	<ul style="list-style-type: none"> • Describing pasture management • Explaining measures of improving pastures • Planting pasture grasses and fodder legumes • Conducting educational tours on pastures • Carrying out veld assessment 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Pasture lands • Pasture grasses and legume fodder seeds
Management Practices	<ul style="list-style-type: none"> • describe management practices of beef ,dairy and wild animals • justify feed requirements for different classes of animals • describe the management practices of 	<ul style="list-style-type: none"> • Management Practices: <ul style="list-style-type: none"> – Dehorning – Weaning – Castration – Vaccination – Culling – Naval dipping – Iron injection 	<ul style="list-style-type: none"> • Describing management practices of beef , dairy and wild animals • Justifying feed requirements for different classes of animals • Describing the management practices of different classes of animals 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Farm animals • Milking parlours

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	<ul style="list-style-type: none"> • different classes of animals • choose proper milking facilities • explain milk handling and storage facilities • discuss factors that affect milk let down • identify factors that affect product quality • 	<ul style="list-style-type: none"> - Pregnancy diagnosis - Eye tooth removal - Provision of warmth • Classes from birth to marketing • Milking facilities • Factors influencing milk production and quality: <ul style="list-style-type: none"> - Hormones - Stimuli - Diet - Frequency - Diseases - Hygiene 	<ul style="list-style-type: none"> • Educational touring to livestock farms and game parks • Observing the milking process • Explaining milk handling and storage facilities • Discussing factors that affect milk let-down • Identifying factors that affect product quality • Carrying-out the milking process • 	
Handling facilities	<ul style="list-style-type: none"> • describe the structure of animal handling facilities • relate the structure and design to purpose of handling facilities • maintain the handling facilities 	<ul style="list-style-type: none"> • Handling facilities: <ul style="list-style-type: none"> - paddocks - crush pens - spray races - farrowing racks - loading ramp 	<ul style="list-style-type: none"> • Constructing handling facilities such as: <ul style="list-style-type: none"> - crush pens - paddocks - farrowing racks • Relating the structure to purpose • maintaining the handling facilities • Educational touring of local handling facilities 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Handling facilities
Farm records	<ul style="list-style-type: none"> • prepare farm records • maintain farm records • evaluate farm records 	<ul style="list-style-type: none"> • Physical records • Financial records 	<ul style="list-style-type: none"> • Compiling physical and financial records • Maintaining physical and financial records • Evaluating farm records • Debating on the viability of school or community based enterprises 	<ul style="list-style-type: none"> • Farm records

TOPIC 7: ANIMAL PRODUCTS AND TECHNOLOGY

KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
Value addition	<ul style="list-style-type: none"> • describe the processes of value addition in animal products • Identify value addition mechanisms • discuss the importance of value addition in animal products 	<ul style="list-style-type: none"> • Value addition • Importance of value addition 	<ul style="list-style-type: none"> • Discussing value addition processes • Identifying value addition mechanisms • Discussing the importance of value addition 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Animal products • Print and electronic media
Processing of Animal products	<ul style="list-style-type: none"> • identify meat, dairy and wildlife products • describe the historical view of production, trade and consumption of meat, dairy and wildlife products • demonstrate the processing of meat, dairy and wildlife products • evaluate food safety and the Hazard Analysis and Critical Control points (HACC) 	<ul style="list-style-type: none"> • meat products • dairy products • wildlife products • historical concept of food processing in Zimbabwe • Food processing technology • Non-food processing technology 	<ul style="list-style-type: none"> • Identifying animal products • Discussing the impact of major technological innovations in the history of food and non-food processing • Designing technology for processing animal products • Processing animal products 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Animal products • Dairy Zimbabwe • Abattoirs wildlife
Preservation of animal products	<ul style="list-style-type: none"> • discuss the importance of preservation • Identify preservation methods of animal products • demonstrate preservation of animal products • evaluate the preservation methods in their local area 	<ul style="list-style-type: none"> • Preservation <ul style="list-style-type: none"> - Importance - Methods 	<ul style="list-style-type: none"> • Discussing the importance of preservation • Identifying preservation methods of animal products • Demonstrating preservation of animal products • Evaluating the preservation methods in their locality 	<ul style="list-style-type: none"> • ICT tools with JAWS software • Animal products
Types of markets	<ul style="list-style-type: none"> • describe types of markets for livestock and wildlife products 	<ul style="list-style-type: none"> • Markets for livestock and wildlife and their products: 	<ul style="list-style-type: none"> • Describing markets of livestock and wildlife and 	<ul style="list-style-type: none"> • ICT tools with JAWS

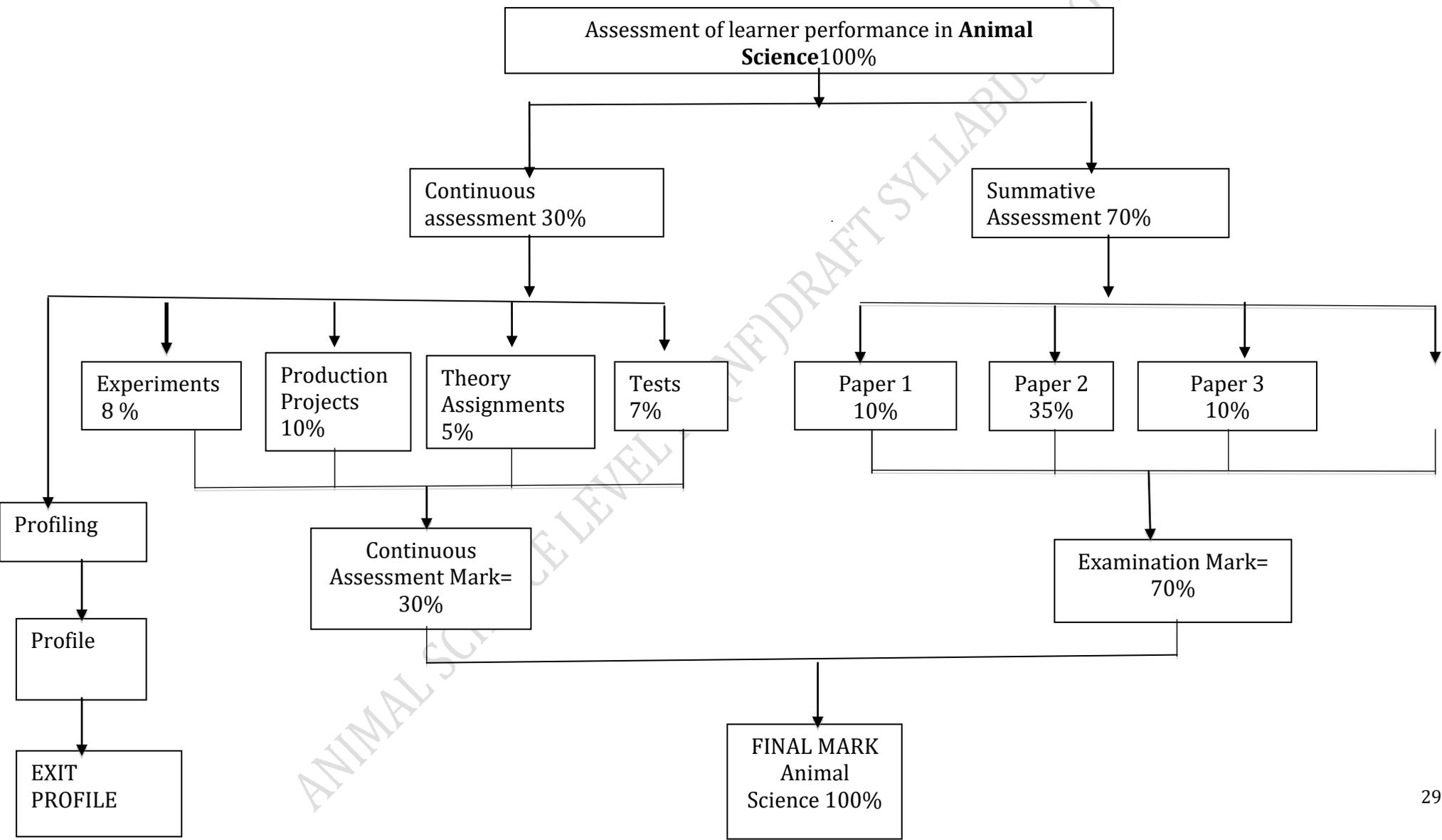
KEY CONCEPT	LEARNING OBJECTIVES Learners should be able to:	CONTENT	SUGGESTED ACTIVITIES AND NOTES	SUGGESTED RESOURCES
	<ul style="list-style-type: none"> • compare the markets of livestock and wildlife products 	<ul style="list-style-type: none"> • Processing companies <ul style="list-style-type: none"> -Private - Abattoirs -Auctions -On Farm 	<ul style="list-style-type: none"> their products • Comparing the markets for livestock and wildlife products • Touring market centres 	<ul style="list-style-type: none"> software
Market functions	<ul style="list-style-type: none"> • describe the factors for price determination • determine the factors that influence quality of products • describe the different promotion methods for livestock and wildlife products • conduct market survey for, livestock and wildlife products 	<ul style="list-style-type: none"> • Marketing mix: <ul style="list-style-type: none"> - Price - Product - Promotion - Place - Processes - people 	<ul style="list-style-type: none"> • Describing the factors for price determination • Determining the factors that influence quality of livestock and wildlife products • Describing the different promotion methods for livestock and wildlife products • Conducting market survey for livestock and wildlife products • Educational touring to exhibition parks 	<ul style="list-style-type: none"> • livestock and wildlife products • ICT tools with JAWS software

ANIMAL SCIENCE LEVEL III (NF) DRAFT SYLLABUS 2019

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9 ASSESSMENT MODEL

Animal Science learning area will be assessed through continuous and summative assessment



ASSESSMENT OBJECTIVES

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

Knowledge and understanding

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

Application of knowledge

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

Experimental skills

- design and develop experimental activities in animal science
- report, illustrate and interpret observations correctly
- assess and justify methods of production employed in animal science
- compose, construct and organise given animal science facts into diagrams, tables and graphs
- analyse, interpret and evaluate results from any given animal science activity

Skills Specification Grid

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

ASSESSMENT

ASSESSMENT COMPONENT	WEIGHTING
Continuous assessment	30%
Summative assessment	70%

CONTINUOUS ASSESSMENT

Assessment will be done through

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

ASSESSMENT MODE	LEVEL III WEIGHTING
Theory assignment	5%
Tests	7%
Production Project	10%
Experimental tests	8%

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

SUMMATIVE ASSESSMENT 70%

Learners are required to take papers 1 to 3.

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

PAPER 1

Consists of multiple choice questions from the whole syllabus. Candidates will be required to answer all 40 questions. Total marks (40)

PAPER 2

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

SECTION A

Candidates are required to answer all questions in this section. Six questions will be set, each question carries 10 marks
Section total 60 marks

SECTION B

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

Section total (40)
Paper total (100)

PAPER 3

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

Paper total (40)

10 APPENDICES

For a learning centre to take up this subject the following should be available:

- One the animals being studied
- Equipment- dehorning, castration, detoother
- Animal handling facilities
- E-learning facilities
- Models of animal anatomy
- Skeletal systems
- Protective clothing
- Health equipment – dosing gun, injection needles and syringes, sprayers.

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