

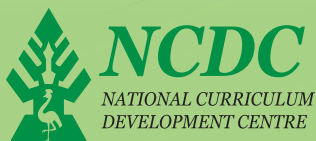


THE REPUBLIC OF UGANDA
Ministry of Education and Sports

ADVANCED SECONDARY CURRICULUM



AGRICULTURE ASSESSMENT GUIDELINES



2026

ADVANCED

SECONDARY CURRICULUM

AGRICULTURE

ASSESSMENT GUIDELINES

2026



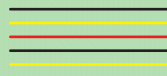
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National Curriculum Development Centre
P.O. Box 7002,
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www.ncdc.co.ug

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NCDC takes responsibility for any shortcomings that might be identified in this publication and welcomes suggestions for effectively addressing the inadequacies. Such comments and suggestions may be communicated to NCDC through P. O Box 7002, Kampala, or Email: admin@ncdc.go.ug or on the Website: www.ncdc.go.ug



Dr Bernadette Nambi Karuhanga

Director

National Curriculum Development Centre



1.0 INTRODUCTION

Agriculture in the Advanced Secondary Curriculum (ASC) is assessed at all opportunities available. This will include the formative assessment at school level and summative assessment at the end of cycle. End of the Cycle Assessment of Agriculture will be administered by the Uganda National Examinations Board (UNEB). The assessment will be guided by three assessment objectives drawn from the three assessment constructs. The assessment items will be set at the level of the construct allowing learners to integrate knowledge skills and values drawn from the topics within a construct in order to address a societal challenge or problem.

1.1 Assessment Objectives

The end of Cycle assessment for Agriculture will be guided by three assessment objectives focusing on the learner's ability to:

A01: design and implement a scientifically sound and sustainable farm animal production system that meets market requirements in order to earn profit.

A02: design and implement a scientific crop production system to earn profit

A03: develop and implement value-addition to animal and animal products to earn profit.

A04: implement biological principles to crops and animals for productivity.

1.2 Linkage Between Assessment Objectives, Constructs and Syllabus

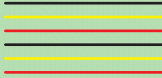
The table below shows a linkage between the assessment objectives, the constructs and the topics that contribute to the construct.

Assessment Objective	Construct	Construct Description	Topics in the syllabus
AO1: Design and implement a scientifically sound and sustainable farm animal production system that meets market requirements in order to earn profit	1) Animal production.	Produce farm animals scientifically, sustainably and profitably for the market.	1) Agricultural Biology in Crops and Animals 2) Anatomy, Morphology and Physiology 3) Livestock Management and Rearing Practices 4) Harvesting Farm Animals and Animal Products
AO 2 design and implement a scientific crop production system to earn profit	2) Crop production	Produce crops scientifically, sustainably and profitably for the market.	1) Land Policy 2) Soil Systems 3) Crop Production and Husbandry 4) Crop Harvesting and Handling

Assessment Objective	Construct	Construct Description	Topics in the syllabus
A03 develop and implement value-addition to animal and animal products to earn profit.	3) Value addition for the market	Transform animal and animal products scientifically and sustainably for the market.	1) Value addition to farm animal and animal products 2) Animal Product marketing, Crop and Crop Product Marketing
A04 Implement biological principles to crops and animals for productivity.	4) Agricultural biology of crops and animals	Apply biological principles to crop and animal production to manage agricultural resources sustainably.	1) Agricultural Biology in Crops and Animals 2) Anatomy, Morphology and Physiology

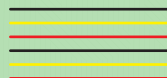
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Construct	Learning Outcomes The Learner Should Be Able To:	Abilities	Indicators Of Mastery	Level Of Complexity
Agricultural biology of crops and animals	1) i) explore the role of plant cells and animal cells in agriculture production. (k, u, s, v/a, gs)	a) Examine plant and animal cells scientifically b) apply knowledge of animal cells to improve farming techniques, including selective breeding, hydroponics, and pest control.	a) Analyses scientifically plant and animal cells b) Optimizes farming techniques such as selective breeding c) Exercised eco-friendly farming practices by applying knowledge of cell	High
Applying biological principles to crop and animal production to manage agricultural resources sustainably.				High



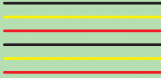
	ii) apply the knowledge of genetics and genes to address challenges in crop and animal production. (k, u, s, v/a, gs)	c) apply cell cytology, cell physiology, genetic modification for increased production sustainable farming, and animal health. d) make inquiry into or perform scientific investigation of agricultural challenges, such as disease outbreaks or poor animal yields, and find solutions	cytology, cell physiology and biotechnology d) Breeds animals with desirable traits like high milk production for the market usings genetics e) Pursues careers in farming, genetics, and biotechnology f) Develops innovative solutions for modern agricultural challenges, such as climate	High
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		e) perform or carry out agricultural research and innovation, such as developing disease-resistant animals through genetic engineering. f) promote or champion responsible farming and eco-friendly animal production practices g) show interest in joining or get attracted to enter careers in	adaptation, disease resistance, and food security by applying cell cytology, cell physiology and biotechnology g) Follows agricultural and biotech innovations through online courses, documentaries, and professional forums h) Communicates emerging trends in agricultural	
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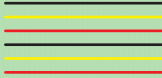
		agriculture, biotechnology, veterinary sciences, and food production h) Present or share emerging trends in sustainable animal or crop production, biotech and agricultural biology	biology, biotech and sustainable animal or crop production i) Increases animal and food production for the market	
2)	iii) examine the shape, form and appearance of an animal to determine the quality of the animal. (k, u, s, v/a, gs)	a) choose quality farm animals basing on desirable and undesirable traits to rear for the market	a) Interprets the physical characteristics of an animal when assessing its health, productivity and suitability rearing.	High

	iv) analyse the relationship between different animal body systems for increased production. (k, u, s, v/a, gs) v) apply the knowledge of morphology to select an animal to rear. (k, u, s, v/a, gs)	b) select farm animal to rear using shape, form and appearance c) use the significance of body structure (shape, form and appearance) and morphology in increasing production efficiency of selected animals d) explain how body animal systems interact such as digestive e) predict outcomes of changes in one system on the overall productivity.	b) Increases production efficiency of selected animals basing on desirable and undesirable traits c) Evaluates animal quality for the market using shape, form and appearance d) Increases animal productions basing on the desirable and undesirable traits or scientific reasoning for optimal health and yield	High
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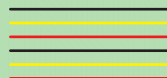
		f) assess the interactions between body systems and increased animal productions for optimal health and yield g) assess traits linked to health, fertility and adaptability basing on morphology. h) diagnose factors affecting production efficiency basing on anatomy (such as digestion, reproduction, metabolism).	e) Analyses how digestive and reproductive system interact in farm animals. f) Recommends feeding and management practices that could improve animal productivity. g) Selects animals basing on morphological indicators aligned with animal production goals.	
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Animal production. Producing farm animals scientifically, sustainably and profitably for the market.	1.(i) establish a farm animal enterprise for a selected animal to rear. (k, u, s, v/a, gs) ii) perform relevant animal husbandry practices for a selected animal for optimal production. (k, u, s, v/a, gs) iii) apply basic occupational health, safety and environmental	i) apply scientific reasoning of morphology in evaluating animal quality for the market	a) Set clear farming goals, predicts risks and uncertainties, estimates incomes and expenditures and keep records of farming activities. b) Constructed a suitable structure for a selected animal using the selected	High
	1.(i) establish a farm animal enterprise for a selected animal to rear. (k, u, s, v/a, gs) ii) perform relevant animal husbandry practices for a selected animal for optimal production. (k, u, s, v/a, gs) iii) apply basic occupational health, safety and environmental	i) apply scientific reasoning of morphology in evaluating animal quality for the market	a) Set clear farming goals, predicts risks and uncertainties, estimates incomes and expenditures and keep records of farming activities. b) Constructed a suitable structure for a selected animal using the selected	High



	protection practices in production of a selected animal. (k, u, s, v/a, gs)	d) Store the selected tools and equipment. e) Generate records for the selected tools and equipment. f) Maintain and repair the selected tools g) Design and take measurements for the appropriate building. h) Construct animal structure using the selected materials, tools and equipment following the design.	materials, tools and equipment while observing the OHSE.	High
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		i) Follow the Occupational Health, Safety and Environmental Protection practices (OHSE) when constructing animal structures. j) Carry out husbandry tasks such as feeding, deworming, cleaning k) Analyse considerations made when formulating and mixing feeds for a selected animal.	c) Executes each husbandry task using proper method and tools. d) Feeds the selected animal with balanced feeds for good health and increased production. e) Managed health of the selected animal by giving them the necessary veterinary attention for good health and production of high-quality products.	
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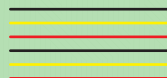


		l) Analyse different feed ingredients. m) Formulate and mix feed rations for a selected animal. n) Diagnose and manage parasite and disease incidences on the farm. o) Generate records on all relevant husbandry practices. p) Select, use and manage appropriate tools and equipment for a selected animal.	f) Used the selected tools to perform other routine husbandry practices for production of quality animal products. g) Handled, maintained and stored tools and equipment used on a livestock farm safely. h) Complies with animal husbandry protocols. i) Correctly select and use personal protective equipment.	High
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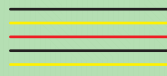
Value addition for the market Transform animal and animal products scientifically and sustainably for the market.	ii) harvest farm animals and animal products in compliance with local and international regulations to ensure product safety and animal welfare. (k, u, s, v/a, g s)	b) Select appropriate tools for harvesting animal and animal products. c) Analyse local and international regulations regarding farm animal and animal products harvesting. d) Harvest animal and animal products following OHSE.	b) Maintains harvesting tools and equipment. c) Applies correct procedures with precision and care. d) Harvests animals and animal products at a right stage adhering to local and international regulations regarding farm animal and animal products harvesting. e) animal products harvesting. f) Observes OHSE when harvesting animal and animal products.	High
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Crop production. Produce crops scientifically, sustainably and profitably for the market.	1(i) apply knowledge of land tenure systems to promote sustainable agricultural production within the community. (k, u, s, v, a g s) ii) demonstrate the impact of land reforms for sustainable crop production within the community. (k, u, s, v, a g s)	a) Gather and analyze information about land reforms, land tenure and land registration. b) Advocate for land rights and reforms that enhance sustainable crop production from appropriate authority. c) Recognizes the challenges and limitations of Land reforms in promoting sustainable crop production.	a) Used the cadastral maps to identify areas of potential for agriculture production and relate them to the areas physically being used. b) Identified rightful land owners to be able to invest in sustainable agriculture enterprises for increased agricultural production.	High High
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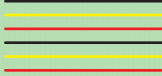
		d) Proposes potential solutions to the challenges of land reform	c) Demonstrates skills in land registration d) Analyses information to identify areas that have potential for land reforms. e) Engages stakeholders to discuss implications of land reform.	
2(i) demonstrate understanding of soil analysis and soil properties for crop production in their community. (k, u, s, v, a gs)	a) Perform scientific investigations on the different soil components like soil air, soil moisture, organic matter that	a) Collects soil samples using the appropriate techniques and equipment to investigate their properties for	High	

ii) evaluate the suitability of different soil types for growing the selected crops for a soil profile. (k, u, s, v, a gs) iii) apply strategies for sustainable soil management within their community and school for crop production. (k, u, s, v, a gs) iv) demonstrate the ability to prepare liquid and solid organic fertilisers using locally available materials for use in the selected crops to be grown. (k, u, s, v, a gs)	influence crop production. b) Perform scientific investigations on the different soil properties that influence crop production. c) Assess strategies used in maintaining soil health and prevention of soil erosion. d) make informed decisions about use of fertilizers, irrigation, and disease prevention	agricultural productivity b) Designs investigations formulate hypotheses, collects data, analyse information, makes conclusions and recommendations about soil properties, components and types for agriculture use. c) Practices soil and water conservation	High High
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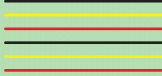
		e) Gather and use locally available organic materials to make manure to restore soil nutrients.	measures to maintain soil health for increased plant growth and productivity. d) Makes organic fertilizers using locally available materials to replenish the lost soil nutrients necessary for crop growth and productivity.	
	3(i) establishes a crop enterprise to demonstrate optimal production practices within the community. (k, u, s, v/a, gs)	a) Prepare a business model canvas for growing a selected crop	a) Sets clear farming goals, predicts risks and uncertainties, estimates incomes and	High

		b) plan and budget for a selected crop enterprise. c) Select appropriate materials, tools and equipment to be used when preparing land for production of a selected crop. d) Store the selected tools and equipment. e) Generate records for the selected tools and equipment.	expenditures and keep records of a crop farming enterprise. b) Clears land and prepares a suitable seedbed for a selected crop using the selected, tools and equipment while observing the OHSE. c) Designs investigations, formulates hypotheses, collects data, analyse information,	High
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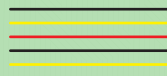
	ii) manage the selected crop to demonstrate optimal production practices within the community. (k, u, s, v/a, gs) iii) apply basic occupational health,	f) Maintain and repair the selected tools g) Follow the SOPs when using the selected tools and equipment. h) Use the selected tools and equipment to prepare an appropriate seedbed for a selected crop. i) Select appropriate planting materials for a selected crop.	makes conclusions and recommendations about the viability of the selected planting materials. d) Selects planting materials basing on the observable features. e) Uses the selected tools and methods to plant a selected crop f) Handles, maintains and stores tools and equipment used on a crop	High High
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	safety and environmental protection practices in production of a selected crop. (k, u, s, v/a, gs)	j) Determine the viability of the planting materials. k) Plant the selected materials using appropriate methods. l) Perform routine husbandry practices for a selected crop. m) promote responsible crop husbandry and eco-friendly practices.	production enterprise g) Performs eco-friendly crop husbandry practices for increased crop yields and environmental protection.	
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		n) Using personal protective gears appropriately o) Follows animal husbandry protocols	h) Complies with animal husbandry protocols. i) Correctly select and use personal protective equipment.	
Crop production	4(i) demonstrate understanding of various harvesting techniques for the selected crop for the market. (k, u, s, v/a, gs) ii) harvest the crop adhering to the local and international regulations for crop harvesting and product safety. (k, u, s, v/a, gs)	a) Select a suitable harvesting method and technique based on the crop type and product desired. b) Select appropriate tools for harvesting crop and crop products.	a) Uses the selected tools, equipment and appropriate techniques to harvest crop and crop products for the market. b) Maintains harvesting tools and equipment. c) Applies correct procedures with precision and care.	High High

	5(i) perform the required marketing functions on crop and crop products, adhering to the local and international regulations. (k, u, s, v/a, gs) ii) manage cash flows from crop enterprise for sustainability. (k, u, s, v/a, gs) iii) apply the cobweb theorem to predict market fluctuations and how to stabilize prices for farmers of crops in their community. (k, u, s, v/a, gs)	c) Analyse local and international regulations regarding crop and crop products harvesting. d) Harvest crop and crop products following OHSE. a) Conduct market research on crop and crop products to identify demand, pricing trends and consumer preference.	d) Harvests crops and crop products at a right stage adhering to local and international regulations regarding crop and crop products harvesting. e) Observes OHSE when harvesting crop and crop products. f) Navigates complex local and export rules with confidence to sale crop and crop products.	High High
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		b) Develop crop and crop product positioning that aligns with consumer needs and regulatory standards. c) Create and interpret cash flow projections to anticipate incomes and expenses from the crop enterprise. d) Track inflows and outflows accurately using digital tools or manual system.	g) Presents a marketing plan with farm production secrets to maintain competitive advantage h) Generates clear documents and reporting of incomes expenses and financial performance. i) Challenges or questions how the theorem applies to their local crop and crop products market.	High High
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		e) Collect and analyse crop and crop product market data including crop yields, input costs and price trends. f) Interpret supply and demand dynamics using cobweb model to understand how past prices influence future crop production decisions	j) Shows appreciation of how small changes in supply or demand can lead to large cyclic price swings. k) Develops marketing strategies for crop and crop products that enhance profit maximization.	
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4.0 STRUCTURE OF THE ASSESSMENT

There will be two examination papers for agriculture at advanced secondary level.

Paper 1 (theory) will contain three sections A, B and C. the items in the paper will be scenario based and will include support material or data. The paper will take 3 hours.

Section A

- 1) This will have two compulsory items with parts 1 and 11
- 2) Part 1 has item one which will be will come from construct three (value addition to farm animals and animal products) addressing assessment objective three
- 3) Part 11 has item two which will come from construct four (agriculture biology) knowledge and skill integration used in crop and animal production.
- 4) The items should assess knowledge integration use, application and transfer in new and unfamiliar situations.

Section B

- 5) This will have two test items
- 6) The two items will come from construct one (animal production) addressing assessment objective one
- 7) A learner will respond to one item from this construct.

Section C

- 8) This will have two test items
- 9) The two items will come from construct two (crop production) addressing assessment objective two
- 10) A learner will respond to one item from this construct.

Paper 2 (practical/scientific inquiry) will contain two compulsory items. The items in this paper will be presenting a phenomenon. The paper will take two hours

- 11) Items in this paper will come from any of the three constructs addressing their respective assessment objectives.
- 12) One item will require the use of scientific investigation to solve a challenge presented.
- 13) The second item will require the use of observational investigation to recommend actions to be taken to address the challenge.

Scores.

- i) Each of the item in sections A, B and C in **paper one** will attract 20 scores
- ii) Each item in **paper two** will attract 10 scores

Note;

The other assessment component in agriculture will involve learners being assessed through **project-based learning work**. The Project-Based Learning Scores need to be captured as a standalone. The project-based learning work will attract a total of **50 scores**.

Secondly the agriculture sample papers are appearing as separate documents.

Principles and Practices of
Agriculture

Paper 1(Theory)

November 2025

Time: 3 hours

UGANDA ADVANCED CERTIFICATE OF EDUCATION

Sample Examination Paper

Principles and Practices of Agriculture

Time: 3 hours

INSTRUCTIONS

This paper contains three sections A, B and C

Section A is compulsory.

In Section B and C, answer only **ONE** item from each section

Answers to the item must be written in the spaces provided

Turn Over

Section A:

PART 1: VALUE ADDITION TO FARM ANIMALS AND ANIMAL PRODUCTS

Item 1

Raw meat can be processed into various products, such as sausages, burgers, or cured meat, at a cottage unit.

On one occasion, pieces of raw meat packed in containers were seen peeping out of wooden transportation boxes as they were being transported from the slaughterhouse to the cottage unit on a bicycle for a distance of 20 km.

At the cottage unit, the worker inquired about the weight of the meat. Off head, the supplier reported the weights of the four pieces as 42 kg, 45 kg, 52 kg, and 54 kg. He demanded payment at UGX 15,000 per kilogram, which the worker paid along with a transportation cost of UGX 20,000.

Upon examining the meat with bare hands, the worker observed that the beef chunks were full of white fats and bones. The next stage involved chopping and grinding the meat as received from the supplier and, mixing it with ingredients to ensure consistency for sausages.

The sausages were packed in casings of 12 sausages per pack, and each pack weighed 0.5 kg. From 1 kg of meat, 1.5 kg of sausage could be produced. The worker used ingredients costing UGX 30,000 for every 15 kg of sausages made. The finished sausages were finally kept in an open bucket ready for sale.

The selling price per sausage pack is UGX 12,300.

Task;

What should the cottage operator do to sustain his business

Turn Over

PART 11: AGRICULTURAL BIOLOGY

Item 2

Maize is one of the most popular foods grown in Uganda contributing about 40% of the daily food. It is a widely grown cereal. It is grown in the districts of Kabarole, Mubende, Masindi, Jinja, Iganga, Kamuli, Mbale and Kasese. Movati is a young maize farmer in Masindi. Many of the people in this area grow maize for sale. Movati purchased the yellow-seeded maize that earns a premium price. This variety was known to produce short but high-yielding plants. During the last growing season all farmers like Movati planted maize. Each of these farmers had their own source of seeds but their gardens were adjacent to each other. Deep in the growing season the maize fields flowered at the same time. cobs were developed until they were ready for harvest. Movati field produced cobs bearing purely white grains. This harvest was dried and stored.

On the other hand, Movati selected and stored seeds from the best cobs for the next planting season. In the following season, Movati planted the selected seeds. As the plants were growing, some parts of the garden had short maize plants, others had tall ones. More to this was that in some areas, plants exhibited new characteristics including multiple cobs. while at harvest time some cobs had yellow grains, seedless with heavy silk while others had white grains.

Task

What would you advise Movati to do to maintain production of purchased the maize seed variety

Turn Over

Section B: ANIMAL PRODUCTION

Item 3

The climatic conditions of Sembabule district in the year 2023 were recorded as follows;

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Temperature (°C)	25.0	25.3	24.6	24.2	24.0	23.8	23.7	23.7	24.3	24.5	24.7	25.1
Rainfall (mm)	16	19	25	25	27	15	9	17	29	30	24	21

In this district cattle keeping is the most popular economic activity. Some cattle are reared on ranches. Recently, the Resident District Commissioner (RDC) conducted a follow-up meeting on service delivery and security in the cattle corridor. During the meeting, it was discovered that the large-scale farmers accessed more information and government services. The small-scale farmers narrated their story as follows: "We no longer sleep in our houses because we fear to be attacked by those who are trying to chase us from this land at night.

At first, I thought it was cattle, but later I realized there were people outside my house. I managed to escape with my animals but my house was reduced to ashes.” Amidst all this, the cattle corridor communities use the communal valley dams for both domestic water supply and watering animals. Furthermore, the livestock farmers in this community use communal grazing. They also turn to hand spraying of animals once year. On the other hand, most veterinary shops are stocked with oxytetracycline. Many times, when animals on treatment appear to have gained strength, they are culled.

Task;

Either How would you support profitable cattle production in this community?

Or How would you scientifically support profitable cattle production in this community?

Turn Over**Item 4**

A group of farmers stocked white fur rabbits as their enterprise. They were motivated by a local hotel and supermarket that preferred meat and skins from rabbits with white fur. The farmer group rearing rabbits allowed them to mate freely. Upon giving birth, majority of the offspring had white fur while a few had black fur. This raised concern. These rabbits were being reared in a structure that had unscreened floor. Further, young and adult rabbits were kept together in cramped spaces. With time, some rabbits began sneezing and showing thick nasal discharge. The farmers heaped rabbit waste in a place where it could be easily washed by rain water into nearby gardens and streams. To ease management, the farmers divided the rabbits into five groups (A-E) and each group was fed exclusively on one type of feed.

The average weight gain per rabbit after two months of feeding was recorded as follows:

Group	Feed provided	Average weight gain (grams per two months)
A	Commercial rabbit pellets	2100
B	Fresh lucerne	1800
C	Cabbage leaves	1320
D	Banana peels	1080
E	Maize bran mixed with fish meal	1500

The group would only slaughter the rabbits at the age of ten months and above. Before slaughter, they would feed the rabbits to total satisfaction to improve carcass size and quality. Their monthly supply of rabbit meat required them to source from other farmers.

Task;

Either What should the farmers do to fulfil the market demand for rabbit meat?

Or How would you handle profitability in this rabbit rearing project

Turn Over

Section C: CROP PRODUCTION

Item 5

From February 2021 to January 2022, Uganda's coffee exports totaled 6,600,000 tones, as reported by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). This impressive performance attracted several farmers in Rakai District to organize themselves into coffee farming groups, focusing on the KR10 coffee variety, which was reported to be high-yielding.

One of the farmer groups negotiated with a landlord to hire 10 acres of land under a *gentleman's agreement*. The land was located on a gentle slope. After the onset of the rainy season, the group prepared the land barefooted. Coffee holes were spaced at 3 meters by 1.5 meters and seedlings obtained from fellow coffee farmers were planted immediately after the holes were dug.

After six months, several other plants were observed growing vigorously in the garden. The farmers only applied urea fertilizer at a rate of 30 kilograms per acre for a full growing season. Upon close observation of the coffee plants, it was noted that some coffee twigs had holes and were drying off.

During harvesting, all coffee cherries were stripped off the twigs by hand. Records from the group indicated a total yield of 3.0 tons of unhulled harvested coffee per acre per growing season.

However, according to the National Coffee Research Institute (NaCORI), an acre of KR10 coffee variety is expected to yield approximately 4800 kilograms (4.8 tones) of coffee cherries per harvesting season.

Task;

What advice would you give these farmers to have improved coffee production?

Turn Over**Item 6**

In early March 2024, a newly formed farmer group in Luwero District, led by Mr. Muwonge, planted garlic on a 5-acre piece of land due to its high market demand.

The land they selected had not been cultivated for a long time and was infested with couch grass. Land preparation was done by spraying with a contact herbicide, and garlic was planted at a spacing of 45cm by 45cm.

For planting, the group used 40% certified garlic cloves purchased from the market, while the remaining 60% came from their previous harvests. During planting, they applied 50 kg of urea per acre. Irrigation was done manually using buckets, with water sourced from a nearby salty pond. By the sixth week, about 30% of the crop showed bluish mold on the cloves.

At harvest, bulb wrappers had started to split and cloves were sprouting from mature bulbs. Harvesting was carried out using hoes and pangas.

The nearby open water source had started to accumulate silt. The total harvest from the farm was 12,000 kg of garlic bulbs.

According to NARO (National Agriculture Research Organization), an acre of garlic is expected to yield about 4 tones per season.

Task;

How should the group manage their project to meet the NARO production standards?

End

Principles and Practices of
Agriculture

Paper 2 Scientific Inquiry skills

November 2025

Time: 2 hours

UGANDA ADVANCED CERTIFICATE OF EDUCATION

Sample Examination Paper

Principles and Practices of Agriculture

Time: 2 hours

INSTRUCTIONS

- 1) This paper consists of two examination items. Answer all the items in the spaces provided.
- 2) Drawings should be made in the spaces provided. Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.
- 3) No additional sheets of writing paper are to be inserted in the booklet.
- 4) Work on additional sheets will not be scored.

Answers **ALL** items in this paper

Turn Over

Item 1

Mr. Barigye, a commercial dairy farmer in Mbarara District, reported a significant decline in milk production, stunted growth in calves, and general muscle wasting among his Friesian cattle to the District Production Officer. He noted that the animals were already receiving appropriate veterinary care. These symptoms raised suspicion of a possible nutrient deficiency. The District Production Officer recommended supplementary feeding, prompting the farmer to purchase two feed supplements labeled as samples A and B, which were new products on the market. However, the farmer was unsure which of the two supplements was appropriate for his animals.

Tasks: Conduct a scientific investigation on each of the samples to guide the farmer make informed decisions when providing animals with supplements.

Item 2

Fayat established a thriving tomato garden. When Fayat carried out a routine check of the fruiting plants, some organisms were seen flying away. While others were creeping, crawling, and others with their mouths sticking tightly on the leaves and fruits. Fayat collected from one part of the garden, three organisms labelled K, and M. Fayat put the organisms in a collecting jar. To inactivate the collected organism, a piece of paper tissue immersed in volatile liquid was added to the jar.

Task: Study the organism K and M to help Fayat make an informed decision.

Turn Over

AGRICULTURE PAPER 2 CONFIDENTIAL INFORMATION TO TEACHERS.

Always you and your candidates should wear laboratory aprons, masks and hand gloves

In addition, you and your candidates should handle chemicals with care while protecting yourself, others and environment

SET ONE.

Provide learners with the following;

- 1) 100g of a protein concentrate labelled **A**
- 2) 100g of a carbohydrate feed stuff labelled **B**
- 3) Aphids labelled **K**
- 4) White flies labelled **M**
- 5) Access to a hand lens, microscope, slides, distilled water, sodium hydroxide, copper (II) Sulphate, Million's reagent, water, mortar, pestle, petri dishes, beakers, measuring cylinders, test tubes, flasks, knives, scalpels, iodine solution, hydrochloric acid, Sulphuric acid, heat source, stop clock, white paper.

SCORING RUBRICS

PAPER ONE AGRICULTURE SCORING RUBRIC

Item 1 Value addition

Output	Basis of evaluation	Score 4	Score 3	Score 2	Score 1
Essay	Quality sausage production to meet market standards	Elaborates on the three areas of sausage making which include preparation, actual making and marketing of sausages	Elaborates some areas of sausage making which include preparation, actual making and marketing of sausages	Elaborates one area of sausage making which include preparation, actual making and marketing of sausages	States one or none of the three areas of sausage making which include preparation, actual making and marketing of sausages
	Analyzes, solves and justifies solutions to the issues or challenges in the scenario	Elaborates, proposes solutions and justifications to most of the challenges of sausage making with respect to	Elaborates, proposes solutions and justifications to some of the challenges of sausage making with respect to	Elaborates, proposes solutions and justifications to a few of the challenges of sausage making	Tries to elaborate one or none of the challenges of sausage making with respect to preparation, processing and marketing while

in respect to preparation, actual processing and marketing of sausages	preparation, processing and marketing while emphasizing analysis, solutions and justification to solutions provided in respect to all the challenges/issues in the scenario like; Meat transportation. Packaging. Generation of records. Ventilation of cottage unit. Failure to weigh meat.	preparation, processing and marketing while emphasizing analysis, solutions and justification to solutions provided in respect to some of the challenges/issues in the scenario like; Meat transportation. Packaging. Generation of records. Ventilation of cottage unit. Failure to weigh meat.	with respect to preparation, processing and marketing while emphasizing analysis, solutions and justification to solutions provided in respect to a few of the challenges/issues in the scenario like; Meat transportation. Packaging. Generation of records. Ventilation of cottage unit.	emphasizing analysis, solutions and justification to solutions provided in respect to one or none of the challenges/issues in the scenario like; Meat transportation. Packaging. Generation of records. Ventilation of cottage unit. Failure to weigh meat. Profitability of the business. (calculation of profitability) Pricing of sausages. Quality of meat received.
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		Profitability of the business. (calculation of profitability) Pricing of sausages. Quality of meat received.	Profitability of the business. (calculation of profitability) Pricing of sausages. Quality of meat received.	Failure to weigh meat. Profitability of the business. (calculation of profitability) Pricing of sausages. Quality of meat received.	
Conclusion/informed decision about sausage making	Makes an evidenced based and logically flowing conclusion and show full understanding of the sausage making process	Makes a conclusion but lack depth and justification of the sausage making process	Makes a conclusion but lacks depth coherence and justification of the sausage making process	Makes an unclear conclusion that lacks depth coherence and justification of the sausage making process or does not make any conclusion.	

Item 2: Agricultural biology

Output	Basis of evaluation	Score 4	Score 3	Score 2	Score 1
Essay	Scientific crop breeding to achieve market needs	Elaborates in the introduction of the three areas of the scientific crop breeding which include crop traits expression (phenotypes and genotypes), crop productivity efficiency and crop market-driven breeding	Elaborates in the introduction most areas of the scientific crop breeding which include crop traits expression (phenotypes and genotypes), crop productivity efficiency and crop market-driven breeding	Elaborates in the introduction one area of the scientific crop breeding which include crop traits expression (phenotypes and genotypes), crop productivity efficiency and crop market-driven breeding	Vaguely made an introduction with one or none of the scientific crop breeding about crop traits expression (phenotypes and genotypes), crop productivity efficiency and crop market-driven breeding

Analysis of text to address and justify scientific crop breeding issues which include crop traits expression (phenotypes and genotypes), crop productivity efficiency and crop market-driven breeding	Elaborates and proposes scientific processes with justifications to all the issues in crop breeding showing analysis of most of the activities about the cells, tissues, genes, filial generation, phenotypes, genotypes, seed viability, types of pollination, growth rate, maturity time, yield volumes, crop size, crop height, silk volumes, grain colour for the market	Elaborates and proposes scientific processes with justifications to most areas in crop breeding showing the activities about the cells, tissues, genes, filial generation, phenotypes, seed viability, types of pollination, growth rate, maturity time, yield volumes, crop size, crop height, silk volumes, grain colour for the market	Elaborates and proposes scientific processes with justifications to one area in crop breeding showing the activities about the cells, tissues, genes, filial generation, phenotypes, genotypes, seed viability, types of pollination, growth rate, maturity time, yield volumes, crop size, crop height, silk volumes, grain colour for the market	Outlines and proposes one or none of the scientific processes in crop breeding showing the activities about the cells, tissues, genes, filial generation, phenotypes, genotypes, seed viability, types of pollination, growth rate, maturity time, yield volumes, crop size, crop height, silk volumes, grain colour for the market
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Summarizing key evidence and taking an informed stand about scientific crop breeding to achieve market needs	Articulates an evidenced based and logically flowing conclusion and show full understanding of scientific crop breeding to achieve market needs	Articulates a conclusion depth but justification of scientific crop breeding to achieve market needs	Articulates a conclusion but lacks depth coherence and justification of scientific crop breeding to achieve market needs	Vaguely made unclear conclusion that lacks depth, coherence and justification of scientific crop breeding to achieve market needs conclusion or does not have.
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Item 3 Animal production

Output	Basis of evaluation	Score 4	Score 3	Score 2	Score 1
Essay	Profitable cattle production	Elaborates on profitable cattle production in Sembabule while emphasizing all the key aspects of establishment, management and harvesting of a cattle enterprise.	Elaborates on profitable cattle production as in Sembabule while emphasizing most of the key aspects of establishment, management and harvesting of a cattle enterprise.	Tries to elaborate on profitable cattle production as in Sembabule with a some or limited understanding the key aspects of establishment, management and harvesting of a cattle enterprise.	States one or none of the three key aspects of a cattle enterprise eg establishment, management and harvesting of animals.
	Analyzes, solves and justifies solutions to the issues or challenges in	Elaborates the key concepts of a cattle enterprise which include establishment, management and	Elaborates the key concepts of a cattle enterprise which include establishment, management and	Elaborates the key concepts of a cattle enterprise which include establishment, management and	Tries elaborates one or none of the key concepts of a cattle enterprise which include establishment,

the scenario in respect to establishment , management and harvesting of a cattle enterprise for a profit.	harvesting with a clear analysis, propose solutions and justifications to all of the challenges/issues in the scenario which include Watter scarcity, feeds availability, grazing system, land conflicts, security issues, stocking density, disease management, occupational health, safety and environmental protection practices, inequity	harvesting with a clear analysis, propose solutions and justifications to most of the challenges/issues in the scenario which include Watter scarcity, feeds availability, grazing system, land conflicts, security issues, stocking density, disease management, occupational health, safety and environmental protection practices, inequity	harvesting with a clear analysis, propose solutions and justifications to some of the challenges/issues in the scenario which include Watter scarcity, feeds availability, grazing system, land conflicts, security issues, stocking density, disease management, occupational health, safety and environmental protection practices, inequity	management and harvesting with a clear analysis, propose solutions and justifications to one or none of the challenges/issues in the scenario which include Watter scarcity, feeds availability, grazing system, land conflicts, security issues, stocking density, disease management, occupational health, safety and environmental protection practices,
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		in access to government services.	in access to government services received.	in access to government services.	inequity in access to government services.
Conclusion/informed decision about profitable cattle production in the area.	Makes an evidenced based and logically flowing conclusion and show full understanding of all the key aspects of cattle production	Makes an evidenced based and logically flowing conclusion but with less depth and the key aspects of cattle production	Makes a conclusion in depth but lack coherence and justification of the key aspects of cattle production or does not make any conclusion.	Makes an unclear conclusion that lacks depth coherence and justification of the key aspects of cattle production or does not make any conclusion.	

Item 4 Animal production

Output	Basis of evaluation	Score 4	Score 3	Score 2	Score 1
Essay	Rabbit production for the market	Elaborates on profitable rabbit production while emphasizing all the key aspects of establishment, management and harvesting of rabbits.	Elaborates on profitable rabbit production while emphasizing most of the key aspects of establishment, management and harvesting of rabbits.	Tries to elaborate on profitable rabbit production with some understanding the key aspects of establishment, management and harvesting of rabbits.	States one or none of the three key aspects of a rabbit enterprise with eg establishment, management and harvesting of rabbits.
	Analyzes, solves and justifies solutions to the issues or challenges in the scenario in respect to	Elaborates the key concepts of a rabbit enterprise which include establishment, management and harvesting with a clear analysis,	Elaborates the key concepts of a rabbit enterprise which include establishment, management and harvesting with a clear analysis,	Elaborates the key concepts of a rabbit enterprise which include establishment, management and harvesting with a clear analysis,	Tries elaborates one or none of the key concepts of a rabbit enterprise which include establishment, management and harvesting with a

establishment , management and harvesting of rabbits for the market.	propose solutions and justifications to all of the challenges/issues in the scenario which include Genetics Breeding and selection Housing Stocking Disease management Feeding Waste management Harvesting	propose solutions and justifications to most of the challenges/issues in the scenario which include Genetics Breeding and selection Housing Stocking Disease management Feeding Waste management Harvesting	propose solutions and justifications to some of the challenges/issues in the scenario which include Genetics Breeding and selection Housing Stocking Disease management Feeding Waste management Harvesting	clear analysis, propose solutions and justifications to one or none of the challenges/issues in the scenario which include Genetics Breeding and selection Housing Stocking Disease management Feeding Waste management Harvesting
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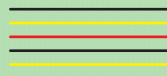
Conclusion/ informed decision about rabbit production for the market.	Makes an evidenced based and logically flowing conclusion show full understanding of all the key aspects of rabbit production	Makes an evidence conclusion depth and justification with less depth of the key aspects of rabbit production	Makes a conclusion with depth but lacks coherence and justification of the key aspects of rabbit production	Makes an unclear conclusion that lacks depth coherence and justification of the key aspects of rabbit production or does not make any conclusion.
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Item 5 Crop production

Output	Basis of evaluation	Score 4	Score 3	Score 2	Score 1
Essay	Improved coffee production for the market.	Elaborates improved coffee production while emphasizing all the key aspects of establishment, management and harvesting of coffee.	Elaborates improved coffee production while emphasizing most of the key aspects of establishment, management and harvesting of coffee.	Tries to elaborate improved coffee production with some or limited understanding the key aspects of establishment, management and harvesting of coffee.	States one or none of the three key aspects of a coffee enterprise eg establishment, management and harvesting of coffee.

Analyzes, solves and justifies solutions to the issues or challenges in the scenario in respect to establishment, management and harvesting of a productive coffee enterprise.	Elaborates the key concepts of a coffee enterprise which include establishment, management and harvesting with a clear analysis, propose solutions and justifications to all of the challenges/issues in the scenario which include Land ownership/land acquisition Soil and water management Personal protective equipment (PPE)	Elaborates the key concepts of a coffee enterprise which include establishment, management and harvesting with a clear analysis, propose solutions and justifications to most of the challenges/issues in the scenario which include Land ownership/land acquisition Soil and water management Personal protective equipment (PPE)	Elaborates the key concepts of a coffee enterprise which include establishment, management and harvesting with a clear analysis, propose solutions and justifications to some of the challenges/issues in the scenario which include Land ownership/land acquisition Soil and water management Personal protective equipment (PPE)	Tries elaborates one or none of the key concepts of a coffee enterprise which include establishment, management and harvesting with a clear analysis, propose solutions and justifications to one or none of the challenges/issues in the scenario which include Land ownership/land acquisition Soil and water management Personal protective equipment (PPE)
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		Recommended spacing Land preparation Weed management Pest management Planting method Time of planting Harvesting technique	Recommended spacing Land preparation Weed management Pest management Planting method Time of planting Harvesting technique	Personal protective equipment (PPE) Recommended spacing Land preparation Weed management Pest management Planting method Time of planting Harvesting technique	Recommended spacing Land preparation Weed management Pest management Planting method Time of planting Harvesting technique
Conclusion/informed decision about improved coffee production for the market.	Makes an evidenced based and logically flowing conclusion and show full understanding of all the key aspects of coffee production	Makes an evidence based and logically flowing conclusion with less justification of the key aspects of coffee production	Makes a conclusion but lacks depth and justification of the key aspects of coffee production	Makes an unclear conclusion that lacks depth coherence and justification of the key aspects of coffee production or does not make any conclusion.	



Item 6: Crop production

Output	Basis of evaluation	Score 4	Score 3	Score 2	Score 1
Essay	Proper management of the garlic production project to meet the NARO standard output per acre.	Elaborates improved garlic production while emphasizing all the key aspects of establishment, management and harvesting of garlic.	Elaborates improved garlic production while emphasizing most of the key aspects of establishment, management and harvesting of garlic.	Elaborate improved garlic production with some or limited understanding the key aspects of establishment, management and harvesting of garlic.	States one or none of the three key aspects of a garlic enterprise eg establishment, management and harvesting of garlic.
	Analyzes, solves and justifies solutions to the issues or challenges in the scenario in	Elaborates the key concepts of a garlic enterprise which include establishment, management and harvesting with a	Elaborates the key concepts of a garlic enterprise which include establishment, management and harvesting with a	Elaborates the key concepts of a garlic enterprise which include establishment, management and harvesting with a clear analysis,	Tries elaborates one or none of the key concepts of a garlic enterprise which include establishment, management and harvesting with a

respect to establishment , management and harvesting of a productive garlic enterprise that meets the NARO standards.	clear analysis, propose solutions and justifications to all of the challenges/issues in the scenario which include Land preparation Sourcing of planting materials Planting/spacing Fertilizer use Nature of irrigation water Soil erosion management Weed management Pest management Tools used for harvesting Harvesting time	clear analysis, propose solutions and justifications to most of the challenges/issues in the scenario which include Land preparation Sourcing of planting materials Planting/spacing Fertilizer use Nature of irrigation water Soil erosion management Weed management Pest management Tools used for harvesting Harvesting time	clear analysis, propose solutions and justifications to one or none of the challenges/issues in the scenario which include Land preparation Sourcing of planting materials Planting/spacing Fertilizer use Nature of irrigation water Soil erosion management Weed management Pest management Tools used for harvesting Harvesting time
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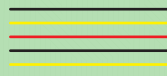
	Conclusion/informed decision about improved garlic production to meet NARO standards.	Makes an evidenced based and logically flowing conclusion but with all most depth and the key aspects of garlic production	Makes a conclusion with most depth and justification of the key aspects of garlic production	Makes a conclusion with less depth and justification of the key aspects of garlic production	Makes an unclear conclusion that lacks depth coherence and justification of the key aspects of garlic production or does not make any conclusion.
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PAPER 2 AGRICULTURE SCIENTIFIC INQUIRY RUBRIC

Output	Basis of evaluation	Scores 4	Scores 3	Scores 2	Score 1
A report	Preparation and planning to carry out a scientific investigation/inquiry on 1) Proteins, reducing sugar and non-reducing sugars. 2) Management of aphids and whiteflies in tomatoes	Develops a complex hypothesis, with good scientific reasoning Produces a detailed plan using a good level of scientific knowledge Identifies equipment/apparatus and a practical technique that will produce accurate results	Develops a detailed satisfactory hypothesis, with scientific reasoning Produces a satisfactory plan, using appropriate scientific knowledge. Identifies apparatus/equipment and an appropriate technique that will obtain a range of results	Develops a basic hypothesis based on the topic that states simply what they wish to find out. Produces a simple plan using limited scientific knowledge Identifies a limited list of apparatus/equipment requirements and a suitable practical technique with limited detail	Develops an unclear basic hypothesis that is out of context and simply states what they wish to find out. Produces an uncoordinated plan using limited scientific knowledge. Identifies a limited list of apparatus/equipment requirements and a suitable practical

		Provides detailed justification for the choice of research methods Carries out detailed risk assessment, and identify how to minimize risks and what to do in the event of an incident Spelling, punctuation and grammar are used with almost faultless accuracy so that the meaning is clear	Provides a satisfactory justification for the choice of research methods Carries out a satisfactory risk assessment by identifying two hazards. Spelling, punctuation and grammar are used with reasonable accuracy so that the meaning is reasonably clear	Provides a basic justification for the choice of research methods Carries out a basic risk assessment by identifying at least one hazard Spelling, punctuation and grammar (future tense) are used with some accuracy so that the meaning is sometimes clear	technique with limited detail Provides no justification for the choice of research methods. Does not carry out a basic risk assessment
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Data collection	i) Carries out all parts of the investigation independently displaying good practical skills	ii) Demonstrates a high level of understanding of health and safety issues including at times identifying potential risks and taking appropriate precautions	i) Carries out most parts of the investigation displaying satisfactory practical skills ii) Demonstrates satisfactory understanding of health and safety issues iii) Obtains and records a satisfactory number of measurements and/or observations of variable quality	i) Carries out some parts of the investigation while displaying limited practical skills ii) Shows limited understanding of health and safety issues iii) Obtains and records limited data that may not be accurate iv) Records at least three readings, that may not be accurate	i) Carries out some parts of the investigation while displaying no practical skills ii) Shows no understanding of health and safety issues iii) Obtains and records limited data that may not be accurate iv) Records at one or no reading, that may not be accurate



		iv) Obtains and records a complete set of accurate measurements and/or observations using appropriate precision v) Spelling, punctuation and grammar are used with considerable accuracy so that the meaning is clear	iv) Records at least four readings and/or observations of variable quality v) Spelling, punctuation and grammar are used with reasonable accuracy so that the meaning is reasonably clear	v) Spelling, punctuation and grammar are used with some accuracy so that the meaning is sometimes clear	
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Analysis and conclusion.	i) Produces a comprehensive and accurate set of results presented in a table with appropriate headings and units and use of one form of mathematical technique to process the data ii) Identifies appropriate trends in their results	i) Produces a satisfactory set of results presented in an appropriate table and identifies at least one trend in their results ii) Uses an appropriate graph/chart, with labelled axes, to display the data obtained iii) Gives a satisfactory conclusion linked to their graph, data or hypothesis, but using data to support their conclusion	i) Produces a basic set of results presented using an appropriate statistical method like in a table and identifies a trend in their results ii) Uses a simple graph/chart to display data iii) Produces a basic conclusion that may not be linked to the data or hypothesis	i) Produces a basic set of results presented using inappropriate statistical method like in a table and hardly identifies a trend in their results ii) Produces a basic conclusion that may not be linked to the data or hypothesis
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		iii) Uses a range of graph/chart with appropriate labels, units and headings to display data iv) Displays data in a graphical form with labelled axes including units and headings v) Displays data in at least two graphical forms with labelled axes including units and headings	iv) Produces a conclusion that is linked to the data or hypothesis v) Spelling, punctuation and grammar are used with reasonable accuracy so that the meaning is reasonably clear	iv) Spelling, punctuation and grammar are used with some accuracy so that the meaning is sometimes clear
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		vi) Spelling, punctuation and grammar are used with almost faultless accuracy so that the meaning is clear	i) Provides a brief evaluation of the investigation, including some reference to the reliability of the results ii) Gives a suggestion as to how they could improve the methodology.	i) Provides a brief evaluation of the investigation, making limited or no reference to the reliability of the results ii) Gives a simple suggestion as to how they could improve the methodology	i) Provides a brief evaluation of the investigation, making no reference to the reliability of the results ii) Gives a simple suggestion as to how they could improve the methodology
	Evaluation and recommendation	i) Provides a detailed and thorough evaluation that considers the processes, techniques and risk assessment used and identifies anomalous results and consider the reliability of the data obtained			

	ii) Provides detailed suggestions as to how they could improve the methodology provides detailed suggestions for further research that are relevant to their investigation iv) Spelling, punctuation and grammar are used with almost faultless accuracy so that the meaning is clear	iii) Gives an appropriate suggestion for further research that is relevant to the investigation iv) Spelling, punctuation and grammar are used with considerable accuracy so that the meaning is reasonably clear	iii) Gives a basic suggestion for further research that may be relevant to the investigation iv) Spelling, punctuation and grammar are used with some accuracy so that the meaning is not clear	iii) Gives a basic suggestion for further research that may be relevant to the investigation iv) Spelling, punctuation and grammar are used with reasonable accuracy so that the meaning is sometimes clear
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AGRICULTURE ACHIEVEMENT DESCRIPTION RUBRICS

The candidates' overall performance per construct will be **described in details** according to the exhibited and achieved learning.

Construct	Performance level	Descriptors
Value addition for the market Transform animal and animal products scientifically and sustainably for the market.	Exceptional	Demonstrate complete knowledge of value addition for the market with reasonably detailed clear explanations about preparation, transforming the inputs and marketing
	Outstanding	Demonstrate good (strong grasp) knowledge of value addition for the market with reasonably clear explanations about preparation, transforming the inputs and marketing
	Satisfactory	Demonstrate satisfactory (understands the essential) knowledge of value addition for the market with reasonably limited clear explanations about preparation, transforming the inputs and marketing
	Basic	Demonstrate basic (surface level) knowledge of value addition for the market with little explanation about preparation, transforming the inputs and marketing
	Elementary	Demonstrate limited (narrow and fragmented) knowledge of value addition for the market in light of preparation, transforming the inputs and marketing

Construct	Performance level	Descriptors
Animal production Produce farm animals scientifically, sustainably and profitably for the market.	Exceptional	Demonstrate complete knowledge of animal production with reasonably detailed clear explanations about establishment of animal enterprise, management and harvesting of animal and animal products
	Outstanding	Demonstrate good (strong grasp) knowledge of animal production with reasonably clear explanations about establishment of animal enterprise, management and harvesting of animal and animal products
	Satisfactory	Demonstrate satisfactory (understands the essential) knowledge of animal production with reasonably limited clear explanations about establishment of animal enterprise, management and harvesting of animal and animal products
	Basic	Demonstrate basic (surface level) knowledge of animal production with reasonably little clear explanations about establishment of animal enterprise, management and harvesting of animal and animal products
	Elementary	Demonstrate limited (narrow and fragmented) knowledge of animal production in light of establishment of animal enterprise, management and harvesting of animal and animal products

Construct	Performance level	Descriptors
Crop production Produce crops scientifically, sustainably and profitably for the market	Exceptional	Demonstrate complete knowledge of crop production with reasonably detailed clear explanations about establishment of crop garden, management and harvesting of crops and crop products
	Outstanding	Demonstrate good (strong grasp) knowledge of crop production with reasonably clear explanations about establishment of crop garden, management and harvesting of crops and crop products
	Satisfactory	Demonstrate satisfactory (understands the essential) knowledge of crop production with reasonably limited clear explanations about establishment of crop garden, management and harvesting of crops and crop products
	Basic	Demonstrate basic (surface level) knowledge of crop production with reasonably little explanations about establishment of crop garden, management and harvesting of crops and crop products
	Elementary	Demonstrate limited (narrow and fragmented) knowledge of crop production with reasonably in light of establishment of crop garden, management and harvesting of crops and crop products

Basic integration outcome	Performance level	Descriptors
Integrate or link, use and apply biological concepts to design, analyze and address contextualized real-world agricultural challenges	Exceptional	Demonstrate complete knowledge integration in agricultural biology with reasonably detailed clear explanation about traits expression, productivity efficiency and market-driven production
	Outstanding	Demonstrate good (strong grasp) knowledge integration in agricultural biology with reasonably clear explanation about traits expression, productivity efficiency and market-driven production
	Satisfactory	Demonstrate satisfactory (understands the essential) knowledge integration in agricultural biology with reasonably limited explanation about traits expression, productivity efficiency and market-driven production
	Basic	Demonstrate basic (surface level) knowledge integration in agricultural biology with reasonably little explanation about traits expression, productivity efficiency and market-driven production
	Elementary	Demonstrate limited (narrow and fragmented) knowledge integration in agricultural biology in light of traits expression, productivity efficiency and market-driven production



CONTACT US:



National Curriculum Development Centre
Plot M838, Kyambogo.
P.O.Box 7002 Kampala, Uganda
+256-393-112-088
www.ncdc.go.ug



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