SUBJECT: AGRICULTURAL SCIENCE **CLASS: SSS 2**

SCHEME OF WORK **3RD TERM LESSON NOTE**

WEEKS	TOPICS	Learning Objectives: By the end of the lessons, students should be able to:
1	Revision of last term's work / Common weeds found on farm	Explain weed, identify types of weed and botanical names, suggest possible ways of controlling weeds
2-3	Crop improvement [meaning, aims, genetic terms, method, process	Describe crop improvement, outlines aims, itemize processes/ method , compare advantages and disadvantages of crop improvement
4	Basic economic principles- principles of demand and supply	State the law of demand and supply, explain the effect on agricultural produce, examine the law of diminishing returns
5	Farm records – meaning and importance	Explain farm record, itemize various type of farm records, write short note on farm diary, farm inventory, cash book, receipt book
6	Agricultural pollution – meaning, causes, sources and effects of land\pond pollution	Describe agricultural pollution, identify causes, sources of pollution of agricultural land and fish pond, discuss the effects, proffer solution to the effects
7	Mid-term Break/ Test	Mid-term break , Mid-term Test , Open day
8-9	Farm Accounts – meaning and importance , types of farm account	Describe farm account, write short note on appreciation, depreciation, salvage value, opening and closing valuation, justify the importance of farm records
10	Animal Nutrition – meaning , classification of foodstuffs, sources and functions of food nutrients	Define animal nutrition, outline the components of a balanced ration, identify feeding equipment for various farm animals, classify
11	Revisions	Revisions and Final Examination

REFERENCES

UNIFIED SCHEME OF WORK

WEEK: 1 **DAY:** **SUBJECT:**
DATE: **TOPIC:**
SUBTOPIC: **PERIODS:** **DURATIONS:**

LEARNING OBJECTIVES: At the end of the lesson, students should be able to

1. Meaning of Weeds
2. Effects of weeds on crops and the Economy
3. Various types of weeds and their botanical names
4. Methods of weed control

KEY VOCABULARY WORDS:

INSTRUCTIONAL MATERIALS: Wall charts, Pictures, Related Online Video, Flash Cards

CONTENT: COMMON WEEDS ON FARM

MEANING OF WEEDS

A weed is any plant that grows in a place where it is not (expected to grow) wanted

ECONOMIC IMPORTANCE OF WEEDS

1. They compete with crops for space
2. Weeds compete with crops for sunlight
3. Weeds compete with crop for nutrient
4. Weeds habour crop pests and pathogens
5. Weeds compete with crop for soil moisture
6. It leads to loss in crop yields
7. Weeds compete with crop for soil oxygen
8. They reduce the quality of crops
9. They reduce the income of farmers
10. They cause reduction in the taste of some grasses
11. Some weeds are toxic to farm animals

BENEFITS OF WEEDS TO FARMERS

1. Weeds helps in checking soil erosion
2. Some weeds are useful as food for humans
3. Some weeds serve as food for animals
4. Certain weeds have medicinal values
5. They can be used as green manure
6. Some are used for making roots, mats and baskets
7. Weeds are used for mulching
8. Weeds are used for compost making

EVALUATION

1. What are weeds?
2. List five beneficial effects of weeds

CHARACTERISTICS AND GROWTH HABIT OF WEEDS

1. Production of large quantity of seeds
2. Some weeds reduced by seeds
3. Some weeds reduced by vegetative propagation
4. Growth of large leaves within a short time

5. Weeds growth is favoured during rainy season
6. Most weeds are wind pollinated
7. Production of large quantity of pollen grains

DISPERSAL OF WEED SEEDS AND FRUITS

Most seeds and fruits of weeds are generally dispersed by wind and animals. The mode of dispersal are;

1. Dispersal of seeds by wind
   Such weeds have feathery, winged or powdery seeds e.g. Tridax (pwd weed), goats weed, guinea grass, elephant grass and many other species of grasses.
2. Dispersal of seeds by Animal
   Animal dispersed weeds usually have sticky, hooked, edible or colourful fruits or seeds. The sticky and hooked types of fruits and seeds adhere to the coats of grazing animals and are carried from one place to another. Examples of such animals are; rabbits, rats squirrels, antelope and man. Pig weed and commelina spp are example of such weed.
3. Dispersal of seeds by water
   Water dispered weeds have water proof cuticles, air spaces within the fruit and a light weight
4. Dispersal of seeds by explosive mechanism
   Few plants and all leguminouns weeds are dispersed by explosive mechanism eg water leaf, centro, pueraria, calapo and mucuna.

COMMON WEEDS FOUND ON FARMS

S/N	COMMON NAME	BOTANICAL NAME
1.	Guinea grass	Panicum maximum
2.	Bahama grass	Cynodon dactylon
3.	Carpet grass	Axonopus compressus
4.	Cogon grass	Imperata cylindrica
5.	Spear grass	Heteropogon contortus
6.	Wild sun flower	Aspilia Africana
7.	Centro	Centrosema pubescens
8.	Water leaf	Talinum triangulare
9.	Wire/sida weed	Sida acuta
10.	Goat weed	Ageratum conyzoides
11.	Elephant grass	Pennisetum purpureum
12.	Giant star grass	Cynodon plectostachyum
13.	Pig weed	Amaranthus spinosus
14.	Tridax	Tridax procumbens
15.	Calapo	Calapogonium mucunoides
16.	Sunhemp	Crotalaria juncea
17.	Mucuna	Mucuna utilis
18.	Stylo	Stylosanthes gracilis
19.	Northern gamba	Andropogon gayanus
20.	Southern gamba	Andropogon tectorum
21.	Puero	Pueraria phaseoloides

EVALUATION

1. List and explain different weed dispersal method
2. List five weeds and their botanical names

GENERAL CONTROL OF WEEDS

1. Mechanical control: involves the use of machines such as bulldozer, tree puller, plough etc to get rid of unwanted plants.
2. Physical or manual control: This can be done in different ways which includes hand pulling, hoeing, slashing with cutlass etc.
3. Biological Control: This involves the introduction of some insects and herbivorous animals to farmland to eat up the leaves of the weed and even the entire plant in some cases.
4. Cultural control: This involves the use of farming system to get rid of wed. It can be achieved by practice of crop rotation and the growing of cover crops to suppress the growth of the weeds on the farm. Other types of cultural weed control methods are: flooding, bush burning, mulching
5. Chemical Control: This involves the use of chemical solution called herbicides to control weeds. Some herbicides are selective while some are non-selective or contact herbicide

REASONS WHY WEEDS ARE DIFFICULT TO CONTROL

1. They have vigorous growth, they are aggressive and persistent
2. Weeds have high reproductive capacity
3. Their seeds have long period of viability
4. Weeds have efficient dispersal method
5. They have efficient means of propagation
6. They have long period of dormancy
7. They produce many seeds
8. They have short life cycle

GENERAL EVALUATION

1 a. What are weeds?
b. Discuss the methods of weed dispersal

2. List five economic importance of weeds
3. List five common weeds and state their botanical names
4. Discuss the four methods of weed control
5. Give three reasons why weeds are difficult to eradicate

READING ASSIGNMENT

- Essential Agricultural Science for senior Secondary School by O.A. Iwena Chapter 28 pages 249-260
- Answer the following questions from WAEC PAQ 2005 theory question 5

WEEKEND ASSIGNMENT

1. A cowpea growing in a maize plot is a _____ A. plant B. weed C. crop D. animal
2. Seed of centro, calapo are usually dispersed by _____ A. wind B. water C. explosive mechanism D. animals
3. Which of the following is not a cultural weed control methods A. flooding B. burning C. mulching D. hoeing
4. Which of the following is not a physical method of weed control? A. hand pulling B. mulching C. hoeing D. slashing

5. Weeds have a _____ lifecycle A. long B. medium C. short D. average

THEORY

1. a. What are weeds
   b. Describe four methods of weed control

2. a. List four benefits of weeds to farmers

b. State four reasons why weeds are difficult to control

WEEK: 2 – 3 **DAY:** **SUBJECT:**
DATE: **TOPIC:**
SUBTOPIC: **PERIODS:** **DURATIONS:**
LEARNING OBJECTIVES: At the end of the lesson, students should be able to

1. Meaning of crop improvement
2. Aims of crop improvement
3. Methods of crop improvement
4. Processes of crop improvement

KEY VOCABULARY WORDS:

INSTRUCTIONAL MATERIALS: Wall charts, Pictures, Related Online Video, Flash Cards

CONTENT: CROP IMPROVEMENT

MEANING OF CROP IMPROVEMENT

Crop improvement is defined as the science that deals with the development of new crop varieties with superior quality and quantity.

AIMS OF CROP IMPROVEMENT

1. To increase yield
2. To improve the quality of produce
3. To adapt to climatic conditions
4. To increase resistance to diseases
5. To increase resistance to pests
6. To meet the needs of growers
7. To produce crops with uniform agronomic characteristics
8. To breed crops with early maturity
9. To improve nutrient value of the produce
10. To meet the needs of consumers

EVALUATION

1. What is crop improvement?
2. State five aims of crop improvement

DEFINITION OF SOME GENETIC TERMS

i. Genes: These are hereditary unit or basic unit of inheritance
ii. Chromosomes: They are rod or thread like bodies found in the nucleus of a cell
iii. Character or Trait: These are the inheritance attributes or features possessed by an organism e.g. seed colour
iv. Gamete: It is a mature sex cell
v. Zygote: is a single cell formed as a result of the union of a male gamate with a female gamate

vi. Allelomorphs (allele): These are pairs of genes on the position of a chromosome that control a character
vii. Phenotype: is the sum total of all observable features of an organism i.e. physical, physiological and behavioural traits e.g. height, weight and skin colour
viii. Genotype: is the sum total of the genes inherited from parent.
ix. Dominant character: This is a trait or character that is expressed in an offspring when two individuals with contrasting character or traits are crossed
x. Recessive character: This is the character or trait which does not produce the effect in the presence of dominant character.
xi. Homozygous: An individual is said to be homozygous if it has two similar genes for the same character, i.e. the pair of gene controlling a given pair of contrasting characteristics are identical e.g TT for height T for Tall or tt for height t for short
xii. Heterozygous: An individual is said to be heterozygous if the two members of a pair of genes controlling a pair of contrasting characters are different. e.g Tt for height T for Tall and t for short
xiii. Filial generation: The offspring of parents make up the filial generation. The first, second and third filial generations are represented by F1, F2 and F3 respectively.
xiv. Hybrid: These are offsprings from a cross between parents that are genetically different but of the same species.
xv. Hybridization: This is the crossing of plants with contrasting characters. There are two major types of hybridization, this includes monohybridization and Dihybridization.
Dihybridization involves the crossing of plants with two pairs of contrasting characters.
Monohybridization involves the crossing of two pure traits.
xvi. Mutation: is a change in the genetic make-up of an organism resulting in a new characteristic that is inheritable.

EVALUATION

1. Define; A. Gene B. Chromosome C. Trait
2. Explain; A. Mutation B. Hybridization C. Genotype

MENDELIAN LAWS

1. The first law of Mendel is also called the **law of segregation** of genes states that; genes are responsible for the development of the individual and that they are independently transmitted from one generation to another without undergoing any alteration. This is clearly seen in monohybrid crossing.
2. The second law of Mendel which is also called the **law of independent assortment** of genes state that each character behaves as a separate unit and is inherited independently of any other character. This is clearly seen in the dihybrid crossing.

PROCESS OF CROP IMPROVEMENT

These includes; introduction, selection and breeding of hybridization.

A. **INTRODUCTION**: This involves the importation or introduction of some varieties of crops with desirable characteristics into areas where they have not existed before.

ADVANTAGES

1. It helps in bringing a new variety to a new areas
2. It may enhance greater productivity
3. It may perform better if there is a better climate condition
4. The past of the crop of the crops is usually absent in the new area

DISADVANTAGES

1. There is possibility of introducing a new diseases
2. The crop may not be able to adapt to climatic condition of the new environment
3. It may introduce now pests to the new environment
4. It may not be able to adapt to the soil condition of the area

B. **SELECTION:** This involves the picking of crops with desirable characteristics which are most favored by the environment. Selection could be natural or artificial.

Natural selection involves the ability of a crop to survive wide range of environmental conditions and still remain standing.

Artificial selection involves use of man's intelligence to retain crops with desired traits on the farm.

Methods of artificial selection includes;

1. **Mass Selection:** Crops with desirable characteristics are selected among others.
2. **Pure line Selection:** Only one crop plant with good characteristics is selected
3. **Pedigree Selection:** Crop plants are selected based on the performance of their ancestors
4. **Progeny Selection**: Crop plants are selected based on the performance of their offsprings

ADVANTAGES OF SELECTION

i. It ensures that only the best naturally available crop is grown
ii. Crops with desired qualities are selected
iii. Seeds from the best stands are multiplied for distribution
iv. It reduces the spread of diseases and pests

DISADVANTAGES OF SELECTION

i. Selection is tedious and time consuming
ii. It is very expensive in term of time and money
iii. It requires expertise
iv. It causes elimination of some desirable traits of the parent stick

C. BREEDING OR HYBRIDIZATION: is a method by which an offspring is produced through the crossing of two different plant varieties of the same spices

TYPES OF BREEDING

i. **Inbreeding:** This is the pollination and fertilization of closely related crop plants. This can lead to pure breed or pure line
ii. **Pure line:** It is obtained when a plant is being self-fertilized or crossed continuously with a closely related species for many generations so that the desirable qualities it possess does not change from one generation to another.
iii. **Cross Breeding:** This is the pollination and fertilization of unrelated crop plants belonging to different breeds. This results in production of hybrids

ADVANTAGES OF BREEDING

i. It can produce a superior offspring resulting in hybrid vigor or heterosis
ii. Progeny grow more rapidly in cross breeding
iii. Offsprings can withstand the variation of environment

DISADVANTAGES OF BREEDING

i. Inbreeding leads to depressing or loss in vigor and performance of offspring.
ii. There is drop in production of the crops in quantity and quality in inbreeding
iii. It may leads to poor or low resistance to disease attacks in inbreeding

METHODS OF IMPROVING CROP PRODUCTIVITY

1. By crop improvement (Introduction, selection and breeding)
2. Planting at the proper time
3. Adoption of better cultivation methods
4. Use of manures and fertilizers
5. Control of pests of crops
6. Control of diseases of crops
7. Use of Resistant varieties
8. Use of good crop varieties

GENERAL EVALUATION

1. State the Mendelian laws
2. What is crop improvement
3. List three aims of crop improvement
4. State two advantages of breeding
5. State two methods of improving crop productivity

READING ASSIGNMENT

- Essential Agricultural Science for senior Secondary School by O.A. Iwena Chapter 39 pages 366-376
- Answer the following questions from WAEC PAQ 2005 theory question 6, 2008 theory question 6, 2009 theory question 5 and 2011 theory question 6

WEEKEND ASSIGNMENT

1. The unit of inheritance is _____ A. chromosomes B. eggs C. genes D. gamates
2. __ are thread like bodies found in the nucleus of a cell A. chromosomes B. eggs C. genes D. gamates
3. The fusion of male and female gamate result in ____ A. embryo B. genes C. gamates D. zygote
4. An individual with pair of identical genes for the same character is called ____ individual. A. homozygous B. heterozygous C. gamates D. zygote
5. The character which express itself in the presence of the other is said to be ____ A. dominant B. recessive C. sexual D. asexual

THEORY

1. a. What is crop improvement?
   b. State two aims of crop improvement

2. a. State the Mendelian laws

b. State two methods of improving crop productivity

WEEK: 4 **DAY:** **SUBJECT:**
DATE: **TOPIC:**
SUBTOPIC: **PERIODS:** **DURATIONS:**

LEARNING OBJECTIVES: At the end of the lesson, students should be able to

1. Basic economic concepts
2. Principle of demand and supply
3. Effects of demand and supply
4. Law of diminishing return

KEY VOCABULARY WORDS:

INSTRUCTIONAL MATERIALS: Wall charts, Pictures, Related Online Video, Flash Cards

CONTENT: BASIC ECONOMIC PRINCIPLES

BASIC ECONOMIC CONCEPTS

The following economic concept explains the behavior of consumers of agricultural goods. These concepts or elements includes

1. Wants: this is the desire or needs of man to own goods and services that give satisfaction. These wants are insatiable because the resources needed to cater for them are limited (in short supply). The basic need or wants of man are food, clothing and shelter.
2. Scarcity: this refers to the limited supply of resources needed to meet (satisfy) wants.
3. Choice: this is the system employed in selecting one need to satisfy out of a number of alternatives.
4. Scale of preference: is a list of unsatisfied wants in order of importance. This is relative to the individual
5. Opportunity cost: is the satisfaction of one want or need at the expense of another. It is expressed in terms of the value or worth of forgone alternative. It is also referred to as the true or real cost while money cost is the amount spent in order to acquire a particular good or service.

PRINCIPLES OF DEMAND AND SUPPLY

Demand: Demand may be defined as the quality of goods a consumer is willing and ready to buy at a given price over a given period of time. Demand is effective when willingness to buy is backed with the ability to pay.

LAW OF DEMAND

The law of demand states that the higher the price, the lower the quantity of goods that will be demanded or the lower the price, the higher the quantity of goods that will be demanded.

DEMAND SCHEDULE

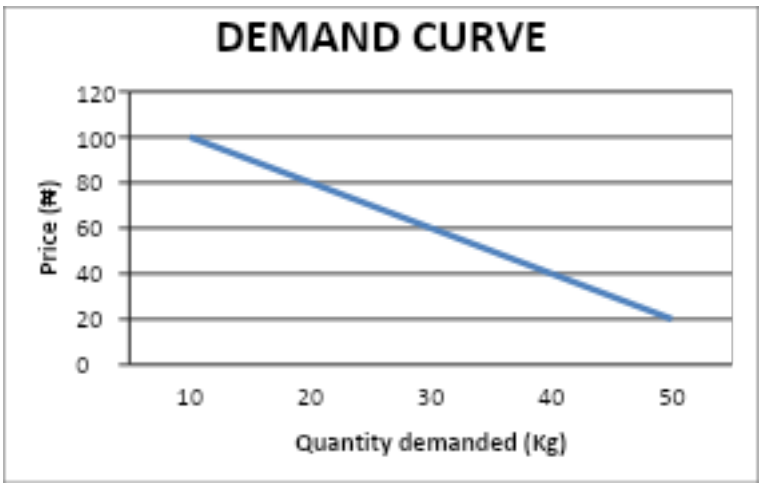
This is a table showing the relationship between the price and quantity of that commodity demanded. This table below obeys the law of demand.

Price ₦	Quantity Demanded (kg)
100	10
80	20
60	30
40	40
20	50

DEMAND CURVE

Demand Curve is a graph showing the relationship between price and quantity of that commodity demanded. This curve derived from demand schedule.

Demand Curve:



FACTORS AFFECTING DEMAND

1. Price of good
2. The price of other commodities
3. Income of the consumer
4. Changes in taste of consumer
5. Population
6. Periods of festivals
7. Expectation of changes in prices
8. Taxation

EVALUATION

1. What is demand?
2. List five factors affecting demand

SUPPLY

Supply may be defined as the quantity of goods which a producer is willing and ready to offer for sale at a given price over a given period of time. Quantity of goods offered for sale in the market is referred to as effective supply.

LAW OF SUPPLY

The law of supply states that the higher the price, the higher the quantity of produce that will be supplied or the lower the price, the lower the quantity of produce that will be offered for sale.\

SUPPLY SCHEDULE

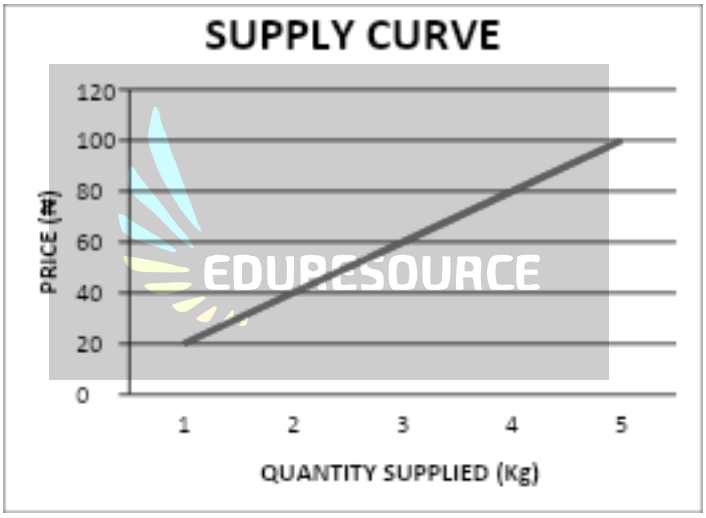
Supply Schedule is the table which shows the relationship between price and quality of commodity supplied. See the table below.

Price ₦	Quantity Supplied (kg)
100	50
80	40
60	30
40	20
20	10

SUPPLY CURVE

Supply Curve is a graph showing the relationship between price and quantity of goods supplied or offered for sale. The supply schedule is used to draw the supply curve as shown below.

Supply Curve:



FACTORS AFFECTING SUPPLY

1. Price of good
2. Level of Technology
3. Cost of production
4. Government Policy
5. Weather condition
6. Taxation
7. Price of other commodities
8. Number of producers
9. Natural disasters

EVALUATION

1. What is supply?
2. State the law of supply.

LAW OF DIMINISHING RETURN

The law states that as successive amount of a variable factor are applied to one or more fixed factors, output might increase a lot at first, but there comes a point at which the use of an additional amount of the variable factor will add less to output than the proceeding amount.

In other words, it state that as more and more units of a variable factor of a production are added to fixed factor, after a certain point, the marginal product diminishes or declines.

Diminishing returns is caused by poor/inexperienced management resulting in the use of more than required amount of one or more factors of production thereby making them less effective.

IMPORTANCE OF LAW OF DIMINISHING RETURNS IN AGRICULTURE

1. It enables managers effectively combine factors of production to attain optimal output.
2. It minimizes wastage on unproductive input.

DEFINITION OF TERMS

1. Fixed factors: these are assets or resources whose value does not change in the short run e.g Land
2. Variable factor: these are assets or resources whose value changes in the short run e.g capital, labour
3. Total product (TP or Q): is the overall quantity of output or yield produced by the farm.
4. Average product (AP): is the overall quantity of output or yield produced by the farm per variable input.

$$AP = \frac{TP}{x} \; or \; \frac{Q}{x}$$

5. Marginal product (MP): is the change in quantity produced resulting from change in variable input.

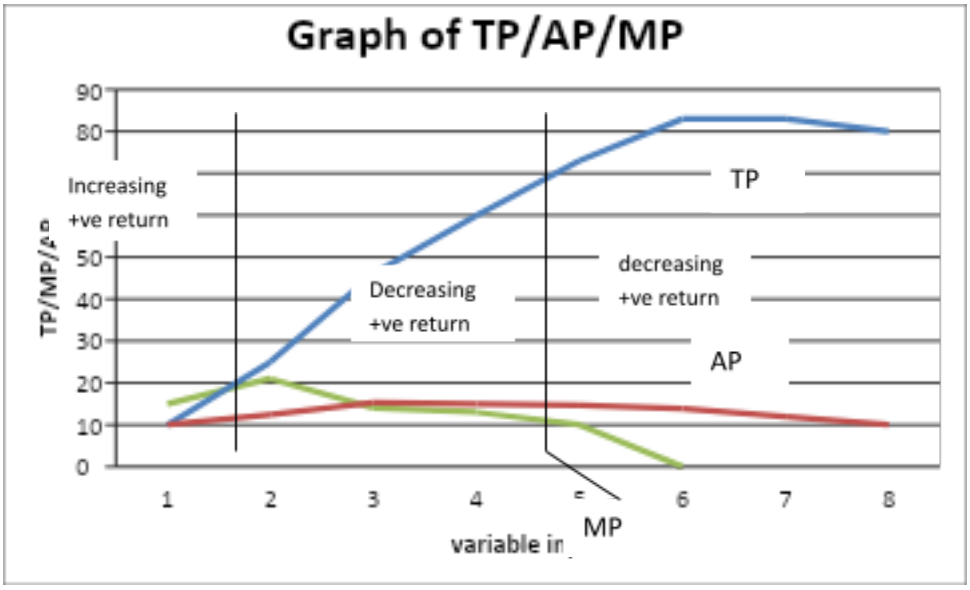
$$MP = \left[\frac{\Delta TP}{\Delta x} \; or \; \frac{\Delta Q}{\Delta x}\right] = \left[\frac{TP_2 - TP_1}{Q_2 - Q_1}\right] or \left[\frac{Q_2 - Q_1}{x_2 - x_1}\right]$$

This can be represented in the table below;

Fixed factor	Variable factor	Total output (kg)	Marginal product (kg)	Average product (kg)
10	1	10	-	10
10	2	25	15	12.5
10	3	46	21	15.3

10	4	60	14	15
10	5	73	13	14.6
10	6	83	10	13.8
10	7	83	0	11.9
10	8	80	-3	10

Graph demonstrating the law of diminishing return



CLASS ACTIVITY (WAEC PQ)

1. State the law of diminishing returns.
2. Using the table below, make an input-output graph and describe the relationship between fertilizer used and maize yield.

Quantity of fertilizer (bags)	0	4	8	12	16	20	24	28	32	36
Maize yield (Kg)	8	24	48	80	120	150	170	180	180	170

3. Explain the main cause of diminishing returns in agricultural production.

GENERAL EVALUATION

1. What is demand?
2. State the law of demand
3. What is supply?
4. State the law of supply
5. State the law of diminishing return
6. Differentiate between total product, marginal product and average product.

READING ASSIGNMENT

- Essential Agricultural Science for senior Secondary School by O.A. Iwena Chapter 35 pages 343 – 347 and Chapter 37 pages 353 – 362,.
- Answer the following questions from WAEC PAQ 2007 theory question 9, 2008 theory question 9 & 10, 2012 theory question 9 & 10, 2014 theory question 5, 2017 theory question 6, 2000 theory question 9, 1994 theory question 9 and 1991 theory question 9

WEEKEND ASSIGNMENT

1. The higher the price, the ____ the quantity demanded A. higher B. lower C. up D. down
2. Increase in population will lead to _____ demand A. high B. low C. medium D. long

3. The real cost of an item is the ____ A. cost of forgone alternative B. amount spent to acquire the item C. cost of substitute item D. money cost of the item
4. Short run in production refers to ____ A. a period in which there is at least one fixed factor of production B. a period in which there is at least one variable factor of production C. a period in which there is no fixed factor of production D. a period in which there is variable factor of production
5. An example of variable input in poultry production is? A. Land B. Feed C. Fertilizer or manure D. Incubator

THEORY

Complete this table

Quantity of fertilizer (bags)	0	4	8	12	16	20	24	28	32	36
Maize yield (Kg)	8	24	48	80	120	150	170	180	180	170
Marginal product (Kg)										
Average product (Kg)										

WEEK: 6 **DAY:** **SUBJECT:**
DATE: **TOPIC:**
SUBTOPIC: **PERIODS:** **DURATIONS:**
LEARNING OBJECTIVES: At the end of the lesson, students should be able to

1. Meaning of Farm Records
2. Purpose of Keeping Farm Records
3. Types of Farm Records

KEY VOCABULARY WORDS:

INSTRUCTIONAL MATERIALS: Wall charts, Pictures, Related Online Video, Flash Cards

CONTENT: FARM RECORDS

Meaning of farm record

Farm record is the documentation of various events which happens on a farm.

Purpose of keeping a record

1. It is useful for future planning
2. It can be used as part of the collateral for a loan
3. It helps the farmer to know whether he is making a profit or loss
4. It helps the farmer to know the state of things on the farm
5. It helps to detect fraudulent acts
6. It helps in farm management decision making.

Evaluation

1. What is a farm record?
2. List two purpose of keeping farm records

Types of farm records

The types of farm records include; farm dairy, farm inventory, input records, production records, a sales record, and consumption records etc.

1. *The Farm Diary:*

This contains the record of day-to-day events on the farm. This includes the dates of planting, germination, flowering, the amount of farm input such as pesticides, fertilizer and so on, the date of birth of the young animals etc.

2. *The Farm Inventory:*

This is the record of all the property and resources in the farm which is owned by the farmer, these include the building, livestock, machines, equipment and so on.

3. *Input Records:*

This is the record of all inputs used for production in the farm during the year; these include the cost of seeds, cost of feeds, cost of drugs, cost of tools, cost of equipment etc.

4. *Production Records:*

This is the record of all items produced on the farm. Such items include crops and livestock.

5. *Consumption Records:*

This is the record of all farm products consumed by the owner of the farm.

6. *Sales Records:*

This is the record of the sales on the farm; it enables the farmer to know whether he is making profit or loss.

General evaluation

1. What is an advertisement?
2. List three purpose of advertisement
3. List three purpose of keeping farm records
4. List five types of farm records
5. State the uses of the following farm records:

- Inventory
- Farm diary
- Input
- Production record

- Sales record

Theory

1. What is an inventory record?
2. List five advantages of keeping farm records.

WEEK: 7 MID-TERM BREAK MID-TERM TEST OPEN DAY

WEEK: 8 – 9 **DAY:** **SUBJECT:**
DATE: **TOPIC:**
SUBTOPIC: **PERIODS:** **DURATIONS:**

LEARNING OBJECTIVES: At the end of the lesson, students should be able to

1. Meaning of Farm Accounts/Farm records
2. Importance of Farm Account / farm records
3. Types of Farm Record
4. Types of Farm Account

KEY VOCABULARY WORDS:

INSTRUCTIONAL MATERIALS: Wall charts, Pictures, Related Online Video, Flash Cards

CONTENT: FARM ACCOUNTS / FARM RECORDS

MEANING OF FARM ACCOUNTS AND RECORDS

FARM ACCOUNT

Farm Accounts are statements of money paid out or received for goods and services used in a farming business.

FARM RECORD

Farm Records are written documents, showing major activities going on in the farming business

IMPORTANCE OF FARM ACCOUNTS/RECORDS

1. It enables the farmer to monitor the changes in prices of product brought or sold.
2. It shows the financial position of the farm
3. It helps to determine profit
4. Detection fraudulent decisions
5. For taking informed management decision
6. For procurement of loans
7. For determination of annual tax
8. Determining the actual worth of the farm
9. For comparing management efficiency
10. To evaluate performance of an enterprise
11. To estimate future farm returns.
12. It provides basis for conducting research.
13. To monitor health status of crops and animals.

EVALUATION

1. What is farm record and account?

2. List five importance of keeping farm records and account.

TYPES OF FARM RECORD

1. Farm Diary: This is the record of daily activities
2. Farm Inventory: This is the list of all assets on the farm and their money worth or value
3. Sales and purchase record: record of revenue and expenses made by the farm business.
4. Yield or production record: it contain the information on output of crops and animal product
5. Payroll or labour record: It shows the amount and types of labour hired or employed to work on the farm and rate at which their wages are paid
6. Farm Input Utilization Record: It shows the input required, utilized and their level of input application.

TYPES OF FARM ACCOUNT

1. Sales Account: Sales Account is also known as sales and receipt account. This shows data of farm produce, the quantity, date sold, to whom and at what price.
2. Purchase Account: It is also known as purchased for use on the farm.
3. Farm Valuation: This is the value of the farm at the beginning and end of production. At the beginning it is called opening valuation while at the end, it is called closing valuation.
4. Cash Analysis Account: It shows the details of the income and expenditure of a farm over a given period of time
5. Farm Income Statement: It comprises of all the farm receipts (sales) and expenses came out on the farm over a period of time as shown below;

INCOME STATEMENT OF AKANDE FARMS FOR OCTOBER, 1995

EXPENSES	**₦**	**RECEIPT**	**₦**
Feeds	2000	Egg	5000
Drugs	400	Culled layer	3000
Water	100	Manure	200
Labour	500		
Fuel	200		
Net Income	5000		
Total	8,200		8,200

6. Balance Sheet or Networth Statement: The balance sheet shows the capital or financial position of the farm at the end of the accounting period usually a year.

7. Profit and Loss account: This is the type of account prepared at the end of the business period, usually a year. By farmer with the purpose of knowing weather his business is making profit or loss.
   In this account, all expenses and purchases are listed on the left hand side i.e. debit side and all receipts on sales are recorded on the right hand i.e. credit side. Closing valuation is also put on the right while opening valuation is put on the left.

IMPORTANCE OF PROFIT AND LOSS ACCOUNT

1. It helps to detect if the farm is making profit or a loss
2. It helps to determine the overall performance of the farm at the end of the account period
3. It aids future planning of the farm for better results.

Example

Prepare a profit and loss account for Segun Farms for the year which ended 31/12/17, using the following data;

i.	Cost of feed	₦500
ii.	Cost of drugs	₦ 200
iii.	Sales of Eggs	₦ 2000
iv.	Eggs for domestic use	₦ 200
v.	Loss due to mortality	₦ 300
vi.	Value of stick left	₦ 600
vii.	Farm wages	₦ 400
viii.	Sales of spent layers	₦ 1000
ix.	Transportation cost	₦ 300
x.	Depreciation	₦ 200
xi.	Electricity bill	₦ 300
xii.	Net profit	₦ 1600

SOLUTION

SEGUN FARMS PROFIT AND LOSS ACCOUNT AS AT 31ST DECEMBER, 2017

DEBIT			**CREDIT**		
S/N	**ITEMS**	**₦**	**S/N**	**ITEMS**	**₦**
1	Cost of feed	500	1	Sales of spent layers	2000
2	Cost of drugs	200	2	Eggs for domestic use	200
3	Loss due to mortality	300	3	Value of stick left	600
4	Farm wages	400	4	Sales of spent layers	1000

5	Transportation cost	300			
6	Depreciation	200			
7	Electricity bill	300			
8	Net profit	1600			
	Grand Total	3800		Grand Total	3800

EVALUATION

1. a. List five types of farm record
   b. Explain any two of record mentioned

2. a. List five types of farm account
   b. Explain profit and loss account

DEFINITION OF SOME ACCOUNTING TERMS

1. Farm Asset: This is anything of value in the possession of a farm business, There are two types;
   a. Fixed Assets: These are assets which are not used up during production. Examples are; landed property, farm building, motor vehicles, tools and implements, incubator and milking machine
   b. Current Assets: These are assets which are used up during the process of production eg water, feed, drugs, chemical, fertilizers, seeds and cash in bank.
2. Cost: these are expenses made during production. There are two types fixed and variable cost
   a. Fixed Cost: This is the component of the total of production cost which does not vary with the level of production e.g. cost of buildings, equipment, machineries, farm structures (Silo, barn e.t.c)
   b. Variable Cost: This is the other component of the total cost which varies directly with the level of production e.g wages, salaries, cost of seeds, cost of fertilizer, cost of agrochemical e.t.c
3. Liabilities: This is the money owed to external persons or corporate bodies e.g. loan to banks. The two types are;
   a. Current or short term liabilities: These are debts that must be paid back within one accounting year
   b. Long term liabilities: These are debts that cannot be paid within an accounting year
4. Net Capital, Net worth or owner equity: This is the total amount of money supplied by the owner of the farm business.
   Asset – Liability = Owner's Equity or Capital
5. Liquidity: is the ability of a farm business to meet its financial obligations as they fall due. It is the ease at which farm asset can be covered to cash.
6. Solvency: This is the ability of the farm business to cover its liquidation of the asset. A business is solvent if the sale of its assets would be sufficient to pay off all debts
7. Appreciation: This is the increase in the value or worth of an asset as the asset is being used over time. Examples of assets that can appreciate are; growing animals, cash crops, land etc.

8. Depreciation: Depreciation refers to the loss or reduction in the value or worth of an asset as the asset is being used over time
9. Salvage Value: This is the amount at which an asset is sold off when it is no longer economical to keep, or when the cost of maintenance is too high
10. Useful life Span: This means the number of years a piece of farm equipment can effectively serve the farmer.

EVALUATION

1. Define the following: (i) Appreciation (ii) Solvency (iii) Liquidity
2. Distinguish between fixed assets and variable assets.

Calculations of Depreciation and Salvage Value

The formula for calculating depreciation is as follows,

a. Total depreciation = cost price of asset – salvage value of asset
b. Annual depreciation = $\frac{cost\ price - salvage\ value}{No\ of\ years\ in\ use}$

Example: A plough was purchased in 1985 at the cost of ₦ 6000 and sold off in 1990 at the cost of ₦ 1000

Calculate;

i. The salvage value
ii. Total depreciation
iii. Annual depreciation
iv. Appreciation

Solution

- Cost price of the plough = ₦ 6000
- Salvage value = ₦ 1000
- Lifespan of useful life (1990 - 1985) = 5years

i. Salvage value = ₦ 1000 i.e the price at which it was sold off
ii. Total Depreciation
= Cost price – salvage value
= ₦ 6000 – ₦ 1000
= ₦5000
iii. Annual Depreciation
$= \frac{cost\ price - salvage\ value}{No\ of\ years\ in\ use}$
$= \frac{N6000 - N1000}{1990 - 1985}$
$= \frac{N5000}{5years}$
=₦1000 (annual depreciation)
iv. There is no appreciation

CLASS ACTIVITY

Answer questions 3, 4, 6 and 9 from Essential Agricultural science on Page 448.

GENERAL EVALUATION

1. What are farm records and account?
2. List five importance of keeping farm records and accounts.
3. List five types of farm account.
4. Distinguish between fixed and variable cost.

READING ASSIGNMENT

- Essential Agricultural Science for senior Secondary School by O.A. Iwena Chapter 48 pages 440-449
- Answer the following questions from WAEC PAQ 1989 theory question 10, 1993 theory question 10, 1996 theory question 10, 1997 theory question 10, 1998 theory question 10, 2013 theory question 9 & 10, 2009 theory question 9 & 10, 1999 theory question 9, 2006 theory question 9 and 2007 theory question 9

WEEKEND ASSIGNMENT

1. In profit and loss account, opening valuation is put on the _____ A. credit side B. debit side C. and side D. all sides
2. Ability of farm to meet its financial commitment as the falls due is _____ A. solvency B. liquidity C. depreciation D. appreciation
3. The amount at which an asset is sold off when the cost maintaining it is high is called ____ A. useful life B. lifespan C. salvage value D. asset
4. Day to day activities on the farm are recorded in _____ A. register B. diary C. payroll D. inventory
5. Farm assets are recorded in _____ A. diary B. register C. inventory D. labour

THEORY

1. a. What is profit and lost account
   b. List five types of farm records

2. a. What is farm asset

b. Distinguish between credit and subsidy

WEEK: 10 **DAY:** **SUBJECT:**
DATE: **TOPIC:**
SUBTOPIC: **PERIODS:** **DURATIONS:**

LEARNING OBJECTIVES: At the end of the lesson, students should be able to

1. Meaning of Animal Nutrition
2. Classification of livestock feeds
3. Food Nutrients of livestock

KEY VOCABULARY WORDS:

INSTRUCTIONAL MATERIALS: Wall charts, Pictures, Related Online Video, Flash Cards

CONTENT: ANIMAL NUTRITION

MEANING OF ANIMAL NUTRITION

Animal nutrition is the process by which an animal obtains nutrient necessary for its healthy growth and development.

IMPORTANCE OF ANIMAL FEEDS

1. Animal feeds are needed for growth
2. Useful for repair or worn out tissue
3. It provides energy
4. It is useful for the general well-being of the animal.
5. It aids animal's resistance to diseases.
6. It influences maturity in animals.
7. It aids optimal production in animals.

DEFINITION OF FEED

Feed refers to the food given to animals. They contain nutrient element either alone or in combination with other substances which supports the healthy growth and development of livestock.

CLASIFICATION OF LIVESTOCK FEEDS

Animal feeds can be classified into four main groups according to the digestibility, quantity of fibre, quantity required and moisture in the feed. The four groups of feeds are;

1. **Concentrates**: They are fee with a low proportion of fibre and water content. They are easily digested by farm animals. Concentrates can be further be subdivided into two groups: Those containing a high proportion of carbohydrates are called carbohydrate concentrates/basal feed/energy feed e.g maize, guinea corn, cassava e.t.c while those with a high proportion of proteins are called protein concentrates e.g beans, peas, cotton seed, sunflower seeds and heads, groundnuts, palm kernel and animal products such as meat, blood meal, bone meal, fishmeal and milk.
2. **Roughages**: Roughages are very low in protein and carbohydrate but high in fibre. They are not easily digested by animals, therefore are fed together with concentrate foods for young animals and those kept for milk and meat production. Examples are hay, groundnut hulls, straw, bean pods and maize stover.
3. **Succulents**: These have high water content. They are easy to digest. Examples are freshly cut/lush grass and legume plants (soilage), pumpkin, silage, melons and most green crops.
4. **Supplements (minerals and vitamins)**: they are required in small quantities, low in energy, protein and fibre but high in vitamins and minerals. They aid digestion and increase animals resistance to diseases. They are available in basal and protein concentrate feeds. Other sources are bone meal, oyster shell, salt licks etc.

A. Basal/Energy Feed or Carbonhydrate Concentrates

Characteristics

i. They are fed with crude fibre content less than 18%
ii. They are high in energy and starchy food e.g. maize and cassava
iii. It is high in carbohydrates or fats

iv. It is low in proteins
v. Low in fibre
vi. It is highly digestible
vii. It is low in minerals

B. Protein Concentrate

Characteristics

i. They crude fibre content is less than18%
ii. Protein concentrate is high in protein
iii. They are low in carbohydrates and fats
iv. They are low in fibre
v. They are highly digestible
vi. They are low in minerals

C. Mineral and Vitamin Supplements

Characteristics

i. They are required in small quantities in feeds
ii. They supplement basal and protein concentrates
iii. They are low in energy
iv. Low in protein
v. Low in fibre
vi. High is vitamin and minerals
vii. Necessary for growth and development
viii. They aid food digestion
ix. They aid resistance to diseases

D. Roughages

Characteristics

i. They are feeds which contain crude fibre that is greater than 18%
ii. They are high in fibre
iii. They are low in digestible carbohydrates
iv. They are low in protein
v. They have poor or low digestibility
vi. Pasture grasses and legumes form roughages
vii. Roughages exist in different forms which are; hay, straw, soilage and salvage.

Hay: It refer to the aerial part of a young and succulent grass or herbage cut and dried for feeding animals

Straw: This is the aerial part of grass or harvested crops cut and store for future use. They are difficult to digest. Both hay and straw are called dry roughages

Soilage: This refer to the process of cutting fresh or succulent grass or legumes from the field and taking them to the animals in their pens. It is also called zero grazing

Silage: This refers to the preservation of green and succulent forage crops under anaerobic conition.

ACTIVITY

Describe the preparation of silage.

EVALUATION

1. What is animal nutrition?
2. State the classes of animal feed

ANIMAL FEED INGREDIENTS

These are the raw materials used in production of animal feeds. These includes; blood meal, fish meal, groundnut cake, palm kernel cake, cotton seed meal, bone meal, maize, guinea corn etc.

ACTIVITY

Explain the method of preparing the ingredients mentioned above.

FOOD NUTRIENTS OF LIVESTOCK

There are six classes of food nutrients. These are;

1. **CARBOHYDRATE:** It is made up of carbon, hydrogen and oxygen.

Sources: Maize, guinea corn, cassava, grasses, wheat, potato, rice, millet, yam, hay, silage, potato, rice millet, yam, hay, silage potatoes etc

FUNCTIONS OF CARBOHYDRATES

Provides energy to farm animal for growth, reproduction, milk production and other activities.

2. **PROTEIN:** It is composed of carbon, hydrogen, oxygen and sometimes sulphur, nitrogen and phosphorus

Sources: The sources of animal proteins are; fish meal, blood meal, meat meal, milk, earthworms, eggs e.t.c. Plant proteins sources are; soyabeans meal, groundnut cake, palm kernel cake, cotton seed meal, sunflower seed meal, cashewnut meal and leguminous forage. Synthetic sources of proterins are; methionine, lysine, cysteine

FUNCTIONS OF PROTEIN

i. Essential for the growth of young animal tissue
ii. They are used to repair worn out tissue

iii. They are used in the formation of gamates in reproduction
iv. They are needed for the production of enzymes
v. They are necessary for flesh built-up
vi. Essential for sustenance of life
vii. Help to provide raw materials for building protective covering such as hair, nails roof, wool feather e.t.c.
viii. They are useful in the production of

3. FATS AND OIL

Fat are composed of carbon, hydrogen, and oxygen

Sources: These are palm oil, palm kernel cake, groundnut cake, coconut meal, cotton seed cake, milk, lard and fallow.

FUNCTIONS OF FATS AND OIL

i. Fats provide more energy than carbohydrates
ii. Fat supply essential fatty acids and fat build-up
iii. They provide fat soluble vitamins
iv. They improve the diet
v. They help in the maintenance of body temperature

4. **MINERALS:** these are essential elements needed by the body but which the body cannot produce. They are grouped into two major classes:
    1. Structural mineral elements: Carbon, Hydrogen, Oxygen and Nitrogen
    2. Mineral elements is further divided into
        a. Macro-elements or mineral: These are required by animals in large quantity e.g. calcium, photophorus, magnesium, potassium, sulphur, sodium and chlorine
        b. Trace Elements or micro elements: These are required by animals in small quantity e.g. iodine, cobalt, copper, manganese, zinc and fluorine.

Sources are born meal, oyster shell, limestone and salt licks

FUNCTIONS OF MINERAL

a. It helps to ensure good health and productivity
b. Present in muscles for muscle contractions
c. Constituent of milk, egg and meat
d. Help in the formation of hormones.
e. Maintain PH balance of body fluids
f. They prevent diseases
g. Regulate blood clothing
h. Help in bone and teeth formation
i. Prevent tooth decay

MINERALS	SOURCES	FUNCTIONS	DEFICIENCY SYMPTOMS

Calcium	Bone meal, oyster shell, limestone, milk rock calcium phosphate	Bone and teeth formation Egg shell formation Blood clotting	Ricket, osteomalacia, soft egg shell. Retarded growth
Phosphorus	Bone meal, Dicalcium phosphate, fish meal	Bone and teeth formation; Acid-base balance; Egg shell formation	Ricket, Lack of appetite. Osteomalcia
Magnesium	Salt licks, wheat germs, forage, grasses	Aid functioning of the nervous system. Activation of enzymes	Hyper-irritability, Nervous disorder Called tetany
Sodium and Chlorine	Common salt, salt licks, fish meal	Regulates acid-base balance; Maintenance of osmotic pressure, constituents of Hcl Improves pleasant taste of feed.	Reduced growth and weight; decline in appetite.
Sulphur	Salt licks, fish meal	Constituent of protein and amino acids like cysteine, methione	Poor growth
Iron	Yeast, iron injection, salt licks	Constituent of haemoglobin in red blood cell. Constituent of protein called myoglobuline	Anaemia e.g. baby pig anaemia of piglets.
Iodine	Iodined salts, fish meal	Constituent of hormone called thyroxine	Goitre
Cobalt	Salt licks, Activate some enzymes	Constituents of vitamins B12	General malnutrition
Copper	Salt licks	Aids formation of haemoglobin & Iron absorption	Anaemia
Flourine	Salt licks, fluorinated water	Prevents tooth decay	Tooth decay.

5. **VITAMINS:** are organic substances also required by animals for proper growth and bosy development. The types are;
    a. Fat Soluble Vitamins: These are vitamins which are soluble in fat e.g. A,D,E and K

b. Water Soluble Vitamins C and B-Complex. Examples of vitamin B-Complex are; cobalamine, pantothenic acid and folic acid.

MINERALS	SOURCES	FUNCTIONS	DEFICIENCY SYMPTOMS
Vitamin A (retinol)	Fish meal, grasses, yellow maize	Proper eye sight (or vision), Epithelical cell formation, Aid reproduction.	Nightblindness
Vitamin C (Ascorbic) acid	Grasses, vegetables and fruits.	Formation of connective tissues, bone and dentine	Scurvy
Vitamin D (Calciferol)	Bone meal, fish meal and sunlight	Aids bone and teeth formation, egg shell formation	Ricket, Osteomalacia, soft shell egg.
Vitamin E (Tocopherol)	Vegetables, grasses, synthetic vitamin E	Aids reproduction. As an antioxidant.	Reproductive failure like sterility and premature
Vitamin K (phylloquinone)	Fish meal, vegetables	Aids blood clotting. Prothrombin	Haemorrhages i.e inability of the blood to clot in time.
Vitamin B_1 (Thiamine)	Yeast, cereals, green plants	Co-enzyme in energy metabolism	Poor appetite, Bere-beri
Vitamin B_2 (Riboflavin)	Green herbage and milk products	Co-enzyme in protein and fat metabolism	Slow growth, Dermatitis
Vitamin B_{12} (Cobalamin)	Fish meal, milk products	As co-enzyme in several biochemical reactions. Red blood cell formation	Pernicious anaemia.
Vitamin B_3 Niacin (Nicotinic acid)	Yeast, cereals, grasses	Carbohydrate oxidation	Pellagra

6. WATER

Sources of water; tap, feed, rain, rivers, pond and fresh fodder.

FUNCTION OF WATER

1. Water is provided for drinking purposes
2. It is used for metabolic and digestion of food
3. For dipping/drenching animal against ectoparasites
4. For washing or cleaning of animals
5. For sanitation, cleaning of floor and pens
6. For processing animal products
7. For maintenance of body temperature

8. For irrigation of pasture
9. It helps to get rid of waste products in the body
10. Helps to maintain body turgidity

FUNCTIONS OF ANTIBIOTICS

1. Helps to fight against pathogen
2. Helps to heal sore and wounds in animals
3. They increase absorption of nutrient from digestive tract

EVALUATION

1. State five functions of proteins.
2. What are macronutrient?

TYPES OF RATION/DIET AND THEIR USES

Diet: is defined as the feed formulated to meet specific needs of an animal. It is also referred to as the amount of feed regularly given to or consumed by animal. It is formulated to meet specific metabolic or physiological functions such as growth, location, maintenance of pregnancy, reproduction or egg laying.

Ration: is the total supply of food given to animals in a twenty four hour period.

Balanced Ration: A balanced ration is the feed containing all essential nutrients in the correct quantity and in adequate proportion for feeding animals.

Types of balanced ration

1. **Maintenance Ration:** This is given to farm animals just to maintain normal functioning of the body system.
2. **Production Ration:** This is the type of ration given to farm animals to enable them to produce.

Factor to be considered when deciding the type of Ration to feed an Animal

1. The purpose for which the animal is kept
2. Age of the animal
3. Animal's condition of health
4. Management System
5. Physiological state of the animal

Categories of farm animals that require production ration are;

a. Lactating animals
b. Weaned animals
c. Pregnant animals
d. Fattening animals
e. Broiler
f. Layers
g. Steaming up or flushing

GENERAL EVALUATION

1. What is balanced ration?
2. Distinguished between production and maintenance ration
3. State five functions of vitamins

4. State five functions of water

READING ASSIGNMENT

- Essential Agricultural Science for senior Secondary School by O.A. Iwena Chapter 33, pages 329-338
- Answer the following questions from WAEC PAQ 1995 theory question 7, 2012 theory question 8 and 2014 theory question 4

WEEKEND ASSIGNMENT

1. ____ is essential for bone formation A. iron B. calcium C. carbon D. lodine
2. Night blindness is as a result of lack of vitamin ____ A. A B. B C. C D. D
3. Ricket is as a result of deficiency of vitamin ____ A. A B. B C. C D. D
4. Which of these is a micronutrient A. calcium B. manganese C. magnesium D. sulphur
5. Goitre is as a result of deficiency of ____ A. iron B. cobalt C. copper D. lodine

THEORY

1. a. What is a nutrient?
   b. List five characteristics of roughages.

2. a. Define (i) Diet (i) nutrition (iii) production ration
   b. State five functions of proteins.

WEEK: 11 **REVISIONS**

WEEK: 12 – 13 **EXAMINATIONS**