

JAMB Agricultural Science Syllabus

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1. GENERAL AGRICULTURE

Definition of Agriculture and its branches

Content:

- Definition of Agriculture and its branches
- Types of Agriculture: Subsistence and Commercial

Learning Objectives:

1. use the definition of Agriculture in modern terms as it relates to production, processing and marketing.
2. differentiate between the various branches of Agriculture.
3. differentiate between the various types of Agriculture.

Agro-allied industries

Content:

- Agro-allied industries: Meaning and importance

Learning Objectives:

1. relate agro-allied industries to their respective raw materials
2. relate the various contributions of Agriculture to economic development in West Africa.

Ecological zones in West Africa

Content:

- Ecological zones in West Africa and their characteristics
- Abiotic and biotic factors affecting agricultural production

Learning Objectives:

1. differentiate between the features of the ecological zones in West Africa.
2. classify agricultural products according to each ecological zone.
3. differentiate abiotic from biotic factors affecting agricultural production.

Agricultural genetics

Content:

- Cell theory and cell division: mitosis and meiosis
- Mendel's laws of inheritance
- Monohybrid and dihybrid inheritance

- Chromosomal basis of inheritance

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
3. determine the outcome of genetic crossing involving homozygous and heterozygous traits.
4. compute simple probability ratios

Agricultural inputs

Content:

- Types of inputs used in agriculture: land, labor, capital and management
- Types and sources of agricultural inputs
- Importance of agricultural inputs

Learning Objectives:

1. classify different types of farm inputs and their uses.

Problems of Agricultural development

Content:

- Problems of Agricultural development e.g land tenure systems, inadequate infrastructures, finance for agriculture, pollution, etc.
- Establishment of national research institutes e.g. NCRI, IAR, IAR&T, CRIN, NIFOR, FRIN, RRI, NRCRI, NIHORT, LCRI, e.t.c. and international research institutes e.g. IITA, ILRI, ICRISAT, WARDA e.t.c., leading to increased application of science to the development of agriculture.
- Agricultural Development Projects (ADPs) e.g. RTEP, FADAMA, etc.
- Contribution of NGOs to agricultural development

Learning Objectives:

1. trace the history of research institutes from past to present.
2. assess their role in the development of agriculture.
3. give reasons for the establishment of ADPs.
4. evaluate the contributions of national agricultural programmes.

Agricultural Technology

Content:

- Smallness of farm holdings: biological limits of farm production and susceptibility of farm production to climate, seasonality of farm productions, price elasticity in demand and supply of agricultural produce.
- Labour Management: Labour relations, types of labor, national labor laws and regulations
- Farm Management: Qualities, functions, and problems of a farm manager, Records and record-keeping, Stock evaluation, Agricultural insurance

- Marketing of Agricultural Produce: Importance of Marketing, Marketing channels, Characteristic features of agricultural product affecting their marketing
- Agricultural Extension: Meaning and importance, The role of Agricultural Development programmes, universities, research institutes, and farmers' organizations (Cooperative societies), Extension methods including demonstration plots, use of visual aids, mass media, etc., Problems of agricultural extension in West Africa and possible solutions.

Learning Objectives:

1. examine the relevance of farm surveying to agriculture.
2. classify common surveying equipment, their uses, and care.
3. differentiate between the common survey methods.
4. apply survey principles to farmstead outlay.
5. identify simple farm tools.
6. use and maintain farm tools.
7. compare the advantages and disadvantages of simple farm tools.
8. identify common farm machinery and implements.
9. classify farm machinery according to their uses.
10. apply appropriate maintenance routines on farm machines and implements.
11. operate farm machines and implements.
12. use basic terms in biotechnology.
13. provide reasons for the importance and application of biotechnology.
14. identify the various components of a computer.
15. use the computer to enhance agricultural practices.
16. use communication gadgets to enhance agricultural production.
17. use basic concepts in agricultural experiments.
18. draw inferences from experimental results.
19. compute simple measures of central tendency

2. CROP PRODUCTION

Rocks and Soil formation

Content:

- Factors affecting rock weathering and soil formation
- Physical properties of soil: Soil profile, Soil texture and structure
- Chemical properties of soil: Soil acidity and alkalinity, Chemical component of soil e.g silicate.

Learning Objectives:

1. classify different types of farm inputs and their uses.

Soil Water and Soil Conservation

Content:

- Soil water: its importance, sources, movement, management and conservation.
- Soil conservation: meaning and importance, causes, effects, prevention and control of leaching, erosion, continuous cropping, burning and oxidation of organic matter.
- Irrigation and drainage methods

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
3. determine the outcome of genetic crossing involving homozygous and heterozygous traits.
4. compute simple probability ratios

Soil Fertility

Content:

- Macro and micro-nutrients and their roles in plant nutrition: carbon, water and nitrogen cycles
- The living population of the soil (flora and fauna), and their roles in soil fertility
- Maintenance of soil fertility. Methods of maintaining soil fertility e.g. use of cover crops, application of organic manures, e.t.c.
- Fertilization

Learning Objectives:

1. classify different types of farm inputs and their uses.

Land Preparation and Soil Tillage

Content:

- Types of soil tillage: Primary and secondary
- Methods of tillage
- Factors to consider when selecting tillage methods

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
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Plant Propagation Methods

Content:

- Sexual: the use of seeds, seed viability, viability test, seed rate and seed germination
- Asexual (vegetative propagation) e.g. cutting, budding, grafting, layering, e.t.c.
- Nursery and nursery management

Learning Objectives:

1. classify different types of farm inputs and their uses.

Cropping Systems, Planting Patterns and Plant Densities

Content:

- Cropping systems: Monocropping, mixed-, multiple-, inter-, relay-, strip- and rotational cropping
- Planting patterns: Broadcasting, row spacing, and drilling
- Plant densities and their effects on crop yield

Learning Objectives:

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Common Crops

Content:

- Group 1: Cereals e.g maize, guinea corn, rice, millet, wheat
- Group 2: Legumes e.g groundnut, cowpea, soybean, pigeon pea
- Group 3: Root and tuber crops e.g yam, cassava, sweet potato, cocoyam
- Group 4: Vegetables e.g tomato, pepper, okra, amaranthus
- Group 5: Fruits e.g citrus, pineapple, pawpaw
- Group 6: Beverages e.g cocoa, kola, coffee
- Group 7: Oils e.g oil palm, coconut, shea butter
- Group 8: Latex e.g para rubber, gum arabic
- Group 9: Fibers e.g jute, cotton, sisal hemp
- Group 10: Sugars e.g sugarcane, beet

Learning Objectives:

1. classify different types of farm inputs and their uses.

Pasture and Forage Crops

Content:

- Study of gross morphology, methods of propagation, and husbandry of common pasture grasses and legumes. Establishment, maintenance, conservation and uses of pastures and forage crops.
- Study of natural grasslands and their distribution in West Africa

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
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4. compute simple probability ratios

Plant diseases

Content:

- A simple account of diseases caused by fungi, bacteria, nematodes and viruses; the nature of the damage, methods of transmission and common methods of control.
- Side effects of application of preventive and control methods e.g pollution, poisoning, and distribution of ecosystems.

Learning Objectives:

1. classify different types of farm inputs and their uses.

Crop pests

Content:

- General account of pests of agricultural plants both in the field and in the store, their types, importance, principles and methods of prevention and control

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
3. determine the outcome of genetic crossing involving homozygous and heterozygous traits.
4. compute simple probability ratios

3. ANIMAL PRODUCTION

Forms and classification of major farm animals in West Africa

Content:

- Species, breeds and distribution
- External features of cattle, sheep, goat, pigs, rabbits and poultry

Learning Objectives:

1. classify different types of farm inputs and their uses.

General terminology in animal production

Content:

- Common terms used in animal husbandry, e.g. calving, kidding, castrate, capon, veal, mutton, e.t.c.

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
3. determine the outcome of genetic crossing involving homozygous and heterozygous traits.
4. compute simple probability ratios

Anatomy and physiology of farm animals

Content:

- Functions of tissues and organs of farm animals
- Animal body systems e.g. digestive (ruminants and non-ruminants), reproductive, respiratory, urinary (excretory), and nervous systems.
- Effect of environmental changes on physiological development of farm animals e.g climate change.

Learning Objectives:

1. classify different types of farm inputs and their uses.

Reproduction in farm animals

Content:

- Gametogenesis, oestrus cycle, signs of heat and heat periods, secondary sexual characters, gestation periods, parturition and the role of hormones in reproduction.

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
3. determine the outcome of genetic crossing involving homozygous and heterozygous traits.
4. compute simple probability ratios

Feeds and Feeding

Content:

- Nutrient requirements of farm animals
- Types of feed and feed formulation
- Deficiency symptoms and remedies

Learning Objectives:

1. classify different types of farm inputs and their uses.

Animal management

Content:

- Housing systems
- Routine management practices
- Selection and breeding

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.
3. determine the outcome of genetic crossing involving homozygous and heterozygous traits.
4. compute simple probability ratios

Animal diseases

Content:

- Causes, symptoms and control measures of common diseases of farm animals
- Parasites (parasitology): Life cycles and economic importance of livestock parasites e.g. endoparasites, ectoparasites, and disease vectors. Prevention and control: dipping, spraying, deworming, sanitation

Learning Objectives:

1. classify different types of farm inputs and their uses.

Fisheries and Wildlife

Content:

- Fish culture systems; Common types of fishes e. g Tilapia, Catfish, etc.
- i. Extensive systems: inland and deep-sea fishing, lakes and rivers.
- ii. Semi-intensive systems: dams
- iii. Intensive systems: fish ponds – Factors to consider in ponds establishment and pond management e.g. pond fertilization, liming, and desilting.
- Fish harvesting and processing methods
- i. Use of drag nets, hook and line, etc.
- ii. Curing, sun-drying, and smoking.
- iii. Fishery regulations
- Wildlife management: Habitat conservation, feeding, domestication, harvesting, processing and wildlife regulations

Learning Objectives:

1. apply the first and second laws of Mendel to genetics.
2. differentiate between the types of cell division.

3. determine the outcome of genetic crossing involving homozygous and heterozygous traits.
4. compute simple probability ratios

Bee-keeping (Apiculture)

Content:

- Meaning and importance of apiculture
- Types of bees e.g exotic and indigenous bees

Learning Objectives:

1. classify different types of farm inputs and their uses.

4. AGRICULTURAL TECHNOLOGY

Farm surveying and farmstead planning

Content:

- Meaning and importance
- Common surveying equipment, their uses, and care
- Common survey methods
- Principles of farmstead outlay.

Learning Objectives:

1. examine the relevance of farm surveying to agriculture.
2. classify common surveying equipment, their uses, and care.
3. differentiate between the common survey methods.
4. apply survey principles to farmstead outlay.

Simple Farm Tools

Content:

- Types of farm tools
- Uses and maintenance

Learning Objectives:

1. identify simple farm tools.
2. use and maintain farm tools.
3. compare the advantages and disadvantages of simple farm tools.

Farm machinery and implements

Content:

- Types and uses
- Maintenance and operation

Learning Objectives:

1. identify common farm machinery and implements.
2. classify farm machinery according to their uses.
3. apply appropriate maintenance routines on farm machines and implements.
4. operate farm machines and implements.

Farm power and energy

Content:

- Sources of farm power
- Energy conversion
- Application of power in agricultural operations

Learning Objectives:

1. identify common farm machinery and implements.
2. classify farm machinery according to their uses.
3. apply appropriate maintenance routines on farm machines and implements.
4. operate farm machines and implements.

Processing and storage

Content:

- Traditional and modern methods of food processing
- Storage methods and preservation

Learning Objectives:

1. identify common farm machinery and implements.
2. classify farm machinery according to their uses.
3. apply appropriate maintenance routines on farm machines and implements.
4. operate farm machines and implements.

Introduction to biotechnology

Content:

- Basic terms, e.g. tissue and another culture in vitro fertilization and genetic engineering.

Learning Objectives:

1. use basic terms in biotechnology.

2. provide reasons for the importance and application of biotechnology.

Application of ICT in agriculture

Content:

- Features of computers
- Uses of computers in agriculture: disease and weather forecasting, ration formulation, database and simulation studies, etc.
- Use of communication gadgets to enhance agricultural production e.g mobile phone, internet, etc.

Learning Objectives:

1. identify the various components of a computer.
2. use the computer to enhance agricultural practices.
3. use communication gadgets to enhance agricultural production.

Introduction to agricultural research and statistics

Content:

- Basic concepts in planning agricultural experiments e.g hypothesis, treatment, and control, etc
- Interpretation of results, e.g. measures of central tendency and experimental errors.

Learning Objectives:

1. use basic concepts in agricultural experiments.
2. draw inferences from experimental results.
3. compute simple measures of central tendency