Agricultural Science II

Levels: Grades 10–12
Units of Credit: 1.00
CIP Code: 01.0321
Core Code: 30-01-00-00-060
Prerequisite: Agricultural Science I
Skill Test: # 183

COURSE DESCRIPTION
Students will develop knowledge and skills in a wide range of basic animal and plant science principles, such as genetics, anatomy, physiology/nutrition, disease, pests, and management practices. Basic agribusiness principles as they relate to plant and animal production will also be covered. Career opportunities and educational preparation are examined. Learning activities are varied, with classroom, laboratory, and field experiences emphasized.

CORE STANDARDS, OBJECTIVES, AND INDICATORS

STANDARD 1
Students will develop personal, leadership, and career skills through FFA participation.

Objective 1: Assess the role of FFA participation in developing personal and leadership skills.
a. Identify important personal skills and the strategies to use in developing the skills.
b. Identify important leadership skills and the role of FFA participation in developing the skills.

Objective 2: Assess the role of FFA participation in developing career skills.
a. List and describe proficiency awards appropriate in agricultural science.
b. List and describe career development events appropriate in agricultural science.
c. Relate the importance of supervised agricultural experience to FFA achievement.
d. Utilize FFA and supervised agricultural experience participation to gain advanced degrees of FFA membership.

STANDARD 2
Students will explain the maintenance and expansion of supervised agricultural experience (SAE) programs in agricultural education.

Objective 1: Maintain and use SAE records.
a. Explain how SAE records are maintained from year to year.
b. Explain how to summarize and analyze SAE records.

Objective 2: Devise long-range plans for expanding SAE programs.
a. Evaluate the overall quality of a current SAE, and determine how to make it more productive or profitable.
b. Explain factors that should be considered in expanding an SAE program.
c. Explain how placement SAE and ownership SAE programs may be expanded.

STANDARD 3
Students will identify career opportunities and current topics in agricultural science.

Objective 1: Appraise career opportunities in agricultural science.
a. Use available handbooks, career information, and computerized career information delivery

systems to formulate tentative career choices.
b. Match personal interests and aptitudes to an occupational area in agricultural science.
c. Identify career opportunities and the education needed in agricultural science**.**
d. Identify the skills, education, and preparation needed for an occupational area.
e. Interview agricultural science professionals to learn more about careers.

Objective 2: Identify current topics in agricultural science.
a. Identify legal and ethical aspects of animal well-being, animal welfare, and animal rights.
b. Examine regulatory issues and agencies associated with biotechnology.
c. Discuss ethical, legal, social, and cultural issues in modern biotechnology.

STANDARD 4
Students will explain principles of animal science.

Objective 1: Determine nutritional requirements of ruminant and nonruminant animals.
a. List essential nutrients, and describe the importance of each.
b. Compare and contrast common feedstuffs in the diets of ruminant and nonruminant animals.
c. Identify sources of nutrients and classes of feed.
d. Relate the role of nutrition to the age and condition of animals.
e. Formulate feed rations for specific species, ages, and conditions of animals.

Objective 2: Discuss genetic inheritance in agricultural animals.
a. Explain the uses of genetics in animal agriculture.
b. Explain the benefits of using genetically superior animals in the production of animals and animal products.
c. Identify common agricultural animals on the basis of breed.

Objective 3: Describe the anatomy and physiology of animal reproductive systems.
a. Describe the anatomy of animal reproductive systems.
b. Identify important factors in breeding readiness.
c. Describe natural and artificial breeding of agricultural animals.
d. Relate the reproduction cycle in female mammals to reproductive efficiency.
e. Explain current technologies in animal reproduction.

Objective 4: Identify animal diseases and methods of disease control, treatment, and prevention.
a. Identify common pathogens that cause disease.
b. Identify genetic disorders of domestic animals.
c. Recognize physiological disorders of animals.
d. Identify the vital signs of animals, and relate them to health condition.
e. Perform simple health checks on animals.
f. Prescribe and implement prevention and treatment for animal disease, parasites, and other disorders.

STANDARD 5
Students will discuss meat science.

Objective 1: Explain concepts related to meat grading.
a. Recognize signs of meat spoilage.
b. Describe the various characteristics that determine grade.
c. Describe the influence grade has on preparation procedures and retail price.
d. Identify and grade wholesale and retail cuts of beef and pork.

STANDARD 6
Students will explain soil science concepts.

Objective 1: Describe basic biological, physical, and chemical properties of soil.

a. Explain the roles of parent material, topography, organisms, time, weathering, and climate in soil-formation.
b. Diagram biogeochemical cycles, and explain the processes.
c. Describe the biodiversity found in soil and the contribution of biodiversity to the physical and chemical characteristics of soil.
d. Explain the roles of organic matter, soil depth, surface slope, soil organisms, and nutrient balance in soil productivity.

STANDARD 7
Students will explain principles of plant science.

Objective 1: Describe the anatomical structures of a plant and their functions.

a. Describe the structures of a typical plant cell and their functions.
b. Describe the structures of a seed, the types of seeds, and the function of seeds.
c. Describe the components of a root, the types of roots, and the functions of roots.
d. Relate the active and passive transport of minerals into and through the root system.
e. Describe the structures of a stem, the types of stems, and the functions of stems.
f. Describe the processes of translocation.
g. Describe the structures of a leaf, the types of leaves, and the functions of leaves.
h. Describe the major parts of a flower, their functions, and the types of flowers and flower forms.
i. Describe the structures of fruit, the types of fruit, and the purposes of fruit.

Objective 2: Determine the influence of environmental factors on plant growth.

a. Describe the functions of water in plant growth.
b. Explain plant responses to a shortage or excess of water.
c. Explain the qualities of light that affect plant growth, including color, intensity, and duration.
d. Explain plant responses to light.
e. Describe the effects of temperature on plant growth.
f. Describe the functions of plant nutrition (e.g., nitrogen, phosphorus, potassium, micronutrients) on plant growth.
g. Describe plant responses to temperature extremes.

Objective 3: Explain plant reproduction.

a. Compare and contrast sexual and asexual reproduction.
b. Explain pollination, cross-pollination, and self-pollination of flowering plants.
c. Diagram the process of plant fertilization.
d. Describe the process of seed germination.
e. Explain the conditions required for seed germination.
f. Explain the importance of seed viability and vigor.
g. Describe optimal conditions for asexual propagation.
h. Demonstrate techniques used to propagate plants asexually.

Objective 4: Explain the control of plant growth and development.

a. Identify the five groups of naturally occurring plant hormones, and explain their functions.
b. Explain plant tropisms.
c. Describe synthetic growth regulators.
d. Describe commercial uses of plant growth regulators.

STANDARD 8
Students will describe agronomy practices.

Objective 1: Demonstrate skills related to crop production.

a. Explain the reasons for preparing the soil before planting.
b. Describe crop scheduling.
c. Describe proper planting procedures and post-planting care.
d. Describe stages of crop development.
e. Explain proper techniques to control and manage plant growth through mechanical, cultural, or chemical means.
f. Explain harvesting methods.
g. Determine storage methods for crops.

STANDARD 9
Students will explain basic agricultural business management practices.

Objective 1: Examine agricultural credit.
a. Explain credit and its role in agribusiness.
b. Analyze and compare credit sources and types, calculate repayment ability, and figure costs of credit.

Objective 2: Maintain agricultural records.
a. Describe record-keeping procedures, including accounting and bookkeeping systems.
b. Explain inventory and depreciation procedures commonly used in production agriculture and agribusiness.
c. Maintain and complete a set of financial records based on an SAE project or a simulated class activity.

Objective 3: Interpret cash-flow statements, planning, and analysis.
a. Explain agricultural budgeting, cash-flow analysis, and the use of records for planning and analysis.
b. Prepare an enterprise budget and a cash-flow statement.
c. Determine how to make management decisions based on financial and production records.

STANDARD 10
Students will investigate marketing, sales, and purchasing.

Objective 1: Explain commodities and marketing.
a. Explain marketing functions and concepts in agribusiness management.
b. Identify and describe the major legal and insurance concerns of an agribusiness.
c. Design a marketing plan for an agricultural product or service.

Objective 2: Ascertain purchasing options.
a. Explain purchasing and leasing options involved in agriculture.
b. Analyze and compare costs of options, such as leasing versus purchasing, new versus used, and volume buying.

STANDARD 11
Students will demonstrate computer application skills.

Objective 1: Apply computer operations in agricultural science.
a. Demonstrate the use of computers in agribusiness for decision-making and office management.
b. Perform business operations using database, word-processing, and spreadsheet software.