

Agricultural Science I

Levels:	Grades 9–12
Units of Credit:	1.00
CIP Code:	01.0311
Core Code:	30-01-00-00-050
Prerequisite:	None
Skill Test:	# 180

COURSE DESCRIPTION

Students will develop knowledge and skills that will provide a foundation for courses in animal science, plant science, horticulture, natural resources, agricultural systems and technology, or Agricultural Science II. Topics covered will be basic animal, plant, and soil science; natural resources; food science technology; agribusiness; personal and leadership development; and agricultural career awareness. Through this course, students will develop agricultural literacy.

CORE STANDARDS, OBJECTIVES, AND INDICATORS

STANDARD 1

Students will explain the role of FFA in agricultural education.

Objective 1: Discuss the history and organization of FFA as it relates to the complete program of agricultural education.

- a. Explain the interrelationship of classroom and laboratory instruction, supervised agricultural experience, and FFA.
- b. Describe how, when, and why FFA was organized.
- c. Identify key FFA historical events.
- d. Identify the mission and strategies, colors, motto, emblem and parts of the emblem, and organizational structure of FFA.
- e. Recite and explain the meaning of the FFA Creed.
- f. Discuss the meaning and purpose of a program of activities and its committee structure.
- g. List FFA chapter officers, and discuss the role of each.

Objective 2: Identify opportunities in FFA.

- a. Describe FFA opportunities that develop leadership skills, personal growth, and career success.
- b. Summarize major state and national activities available to FFA members.

Objective 3: Describe FFA degrees, awards, and career development events (CDEs).

- a. List and explain the FFA degree areas.
- b. Identify FFA proficiency awards.
- c. List and discuss various team and individual CDEs.

STANDARD 2

Students will explain the role of supervised agricultural experience (SAE) programs in agricultural education.

Objective 1: Examine the responsibilities and benefits associated with an SAE.

- a. Explain the meaning and benefits of supervised agricultural experience.
- b. Explain the characteristics of an effective SAE program and the responsibilities of those involved.

Objective 2: Determine the types of SAE programs.

- a. Compare entrepreneurship SAEs and placement SAEs.
- b. Describe research/experimentation SAEs.
- c. Describe exploratory SAEs.

Objective 3: Plan an SAE program.

- a. Identify the steps in planning an SAE program.
- b. Describe the function of a business/training plan and/or agreement in an SAE program.
- c. Develop a short-range plan and a long-range plan for an SAE program.
- d. Relate classroom and laboratory instruction to an SAE program.

Objective 4: Maintain and use SAE records.

- a. Explain the importance of keeping records on an SAE program.
- b. Explain how SAE records are organized.
- c. Follow approved procedures to make entries in SAE records.

STANDARD 3

Students will describe the relationship of agricultural science to the sciences and the scientific method.

Objective 1: Describe how science is integral to agriculture.

- a. Describe how life science, including botany and zoology, is integral to agriculture.
- b. Describe how physical science, including earth science, chemistry, and physics, is integral to agriculture.
- c. Describe how mathematics, including calculation, measurement, and statistics, is integral to agriculture.
- d. Describe how the social sciences, including economics, geography, sociology, and psychology, is integral to agriculture.

Objective 2: Apply the scientific method in solving agricultural problems.

- a. Define the scientific method, and explain why it is used.
- b. List and explain the steps of the scientific method, including problem identification, information gathering, hypothesis formation, experimentation, and conclusion.
- c. Maintain laboratory logs, including detailed and precise records of events and observations.
- d. Use the scientific method to investigate a problem appropriate for entering the FFA Agriscience Fair and Awards Program.
- e. Explain the general guidelines for preparing a research report.

Objective 3: Explore the role of research, development, and technology in the agricultural industry.

- a. Explain the meaning and importance of research and development.
- b. Identify major providers of agricultural research, such as the USDA's Agricultural Research Service and the Utah Agricultural Experiment Station, and review examples of their research.
- c. Identify major areas of research in agriculture.
- d. Define biotechnology, and explore its impact on agriculture.
- e. Describe current applications of biotechnology in agriculture.
- f. Describe benefits and risks associated with biotechnology.
- g. Identify career opportunities in agricultural biotechnology.
- h. Determine the role of science and technology in agricultural production and processing.
- i. Describe the application of precision technologies in agriculture.

Objective 3: Apply mathematics skills used in the agricultural industry.

- a. Convert standard and metric measurements.
- b. Determine length, area, and volume measurements.
- c. Calculate interest rates.

Objective 4: Describe safety skills needed in the agricultural industry.

- a. Explain where accidents occur and identify agencies associated with workplace safety.
- b. Explain why accidents occur and how to prevent them.
- c. Demonstrate personal and laboratory safety, including correct use of personal protective equipment (PPE) and proper disposal of wastes.

STANDARD 4

Students will explain basic principles of agricultural science.

Objective 1: Examine basic soil science principles.

- a. Explain the components of soil.
- b. Investigate soil texture and structure.
- c. Explain soil profile.
- d. Explain what soil color indicates.
- e. Examine moisture-holding capacity and the characteristics of soil water.
- f. Explain soil pH.
- g. Describe the meaning and importance of soil fertility.
- h. Investigate soil degradation.
- i. Describe soil erosion and management practices.
- j. Identify careers in soil science and determine educational requirements, working conditions, and earning potential for those careers.

Objective 2: Investigate basic principles of the plant science industry.

- a. Explain plant classification and nomenclature.
- b. Examine plant structures and functions;
- c. Classify plants according to plant use; status as annual, biennial, and perennial, and status as monocotyledons or dicotyledons.
- d. Explain the basic process of photosynthesis and its importance to life on Earth.
- e. Explain cellular respiration and its importance to plant life.
- f. Identify careers in plant science and determine educational requirements, working conditions, and earning potential for those careers.

Objective 3: Investigate basic principles of the animal science industry.

- a. Compare differences between plants and animals.
- b. Identify basic characteristics of animal cells, tissues, organs, and organ systems.
- c. Describe the skeletal, muscular, nervous, respiratory, digestive, circulatory, excretory, and reproductive systems of animals.
- d. Describe the basic physiological functions of animal bodily systems.
- e. Compare and contrast ruminant and nonruminant digestive systems.
- f. Compare and contrast cattle, sheep and swine breeds, uses, and products.
- g. Compare and contrast nutritional needs of cattle, sheep, and swine.
- h. Identify careers in animal science and determine educational requirements, working conditions, and earning potential for those careers.

Objective 4: Explain the role of genetics in agricultural science.

- a. Define genetics, and discuss its importance.
- b. Identify and discuss the contents of a genome.
- c. Distinguish heredity type, including genotype and phenotype.
- d. Describe genetic trait expression and prediction.

Objective 5: Explore means of conserving natural resources.

- a. Identify types of natural resources.
- b. Describe components and processes in ecosystems.
- c. Determine sources of environmental pollution and describe methods for reducing pollution.

- d. Compare methods of waste disposal.
- e. Determine how to reduce agricultural pollution.
- f. Determine the importance and methods of natural resource conservation.
- g. Identify careers in natural resources and determine educational requirements, working conditions, and earning potential for those careers.

Objective 6: Describe food science technology.

- a. Research the scope of the food science industry and the world food supply.
- b. Explain food preservation methods.
- c. Describe food spoilage prevention.
- d. Describe food safety and sanitation.
- e. Identify careers in food science and determine educational requirements, working conditions, and earning potential for those careers.

STANDARD 5

Students will explain basic agribusiness principles and demonstrate employability skills.

Objective 1: Explore personal finance management.

- a. Investigate personal finances and goal making.
- b. Distinguish the pros and cons of borrowing money.
- c. Determine sources of credit.

Objective 2: Examine business structures and management.

- a. Describe basic principles of business management.
- b. Explain different types of business structures.
- c. Define and explain ethics in agribusiness.

Objective 3: Explain keeping and using records in agricultural occupations.

- a. Explain the purpose of record keeping.
- b. Describe net worth, cash flow, income statements, and computerized record keeping.
- c. Develop a budget for an agricultural enterprise.

Objective 4: Demonstrate communication skills needed for successful employment.

- a. Define communication and its components and processes.
- b. Describe effective communication techniques.
- c. Identify effective speaking techniques.
- d. Develop listening techniques.
- e. Organize and present a persuasive message.
- f. Demonstrate communication skills in appropriate situations.