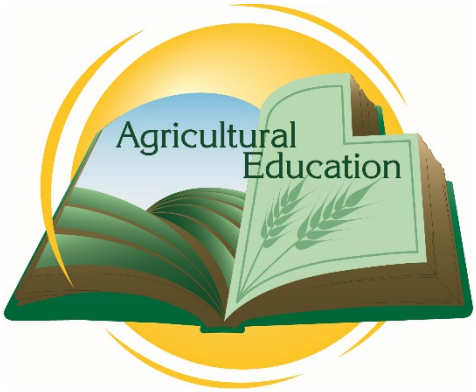
STRANDS AND STANDARDS
AGRICULTURAL SCIENCE 3



Course Description

Students will develop knowledge and skills in a wide range of advanced agricultural science studies. The scientific method is introduced and applied through experimentation and research. Selected animal and plant science principles are covered, such as genetics, health and well-being, diseases and pests, and management practices. Biotechnology and related applications are included, as are natural resources, the environment, and sustainability. The fundamentals of veterinary science are introduced. Career opportunities and needed educational preparation are examined. Learning activities are provided through classroom, laboratory, and supervised agricultural experience instruction.

Intended Grade Level	11-12
Units of Credit	1.0
Core Code	30.01.00.00.070
Concurrent Enrollment Core Code	N/A
Prerequisite	Agricultural Science 2
Skill Certification Test Number	185
Test Weight	1.0
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Agriculture (CTE/General)
Endorsement 2	N/A
Endorsement 3	N/A

STRAND 1

Students will describe the role of agricultural education in advanced agricultural science.

Standard 1

Discuss the importance and nature of agricultural education.

- Trace the development of agricultural education to include a science-based approach to instruction, including courses in agricultural science.
- Review program components in agricultural education, including classroom and laboratory instruction, supervised agricultural experience, and FFA.

Standard 2

Investigate the career and educational opportunities in agricultural science.

- List and explain major areas of agricultural science including agronomy horticulture, forestry, animal science, poultry science, range science, aquaculture, and power, structural, and technical systems.
- Identify and describe career opportunities in agricultural science.
- Identify educational opportunities and career requirements in agricultural science.

STRAND 2

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

Standard 1

Assess the role of FFA participation in developing personal and leadership skills.

- Identify important personal skills and the strategies to use in developing the skills.
- Identify important leadership skills and the role of FFA participation in developing the skills.
- Use principles of parliamentary procedure to carry out a meeting.

Standard 2

Use FFA participation to develop and enhance career skills.

- Review proficiency awards appropriate in agricultural science.
- Review career development events appropriate in agricultural science.
- Relate the importance of supervised agricultural experience to FFA advancement.
- Utilize FFA and supervised agricultural experience participation to gain advanced degrees of FFA membership.

Performance Objective

- Develop short and long range leadership and personal development goals.
- Attend an FFA meeting.

STRAND 3

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

Standard 1

Maintain and use SAE records.

- Explain how SAE records are maintained from year to year.
- Explain how to summarize and analyze SAE records.

Standard 2

Devise long-range plans for expanding SAE programs.

- Evaluate the overall quality of a current SAE, and determine how to make it more productive or profitable.
- Explain factors that should be considered in expanding an SAE program.
- Explain how directed laboratory, placement, and ownership SAE programs may be expanded.

Performance Objective

- Develop Short and Long-range SAE goals.
- In an approved record book, record all transactions and activities on a SAE.
- Make management decisions based on financial and production records.

STRAND 4

Students will apply natural resource principles in agricultural science.

Standard 1

Apply knowledge of natural resources.

- Define natural resources, and differentiate between renewable and nonrenewable resources.
- Explain ecosystems and the interdependence of organisms within an ecosystem.
- Discuss concepts of conservation and preservation as related to natural resources.

- Explain the meaning and importance of ecological succession in a community of organisms.
- Use natural resource enhancement methods with streams, forests, rangelands, habitats, aquatic areas, and recreation areas.

Standard 2

Apply environmental science in agricultural endeavors.

- Explain the meaning and major components of the environment.
- Describe the effects of pollution, including point and nonpoint pollution sources.
- Identify major environmental issues, including global warming.
- List and explain methods of waste disposal to protect the environment.
- Investigate the role of nutrient management plans in the disposal of agricultural wastes.

Standard 3

Apply sustainable approaches in agricultural science.

- Discuss the meaning and importance of sustainability.
- Identify agricultural practices that promote sustainability.
- Relate the role of wildlife management to sustainability.

Performance Objective

- Evaluate range management systems, economics, and improvement techniques.
- Establish a range transect and use it to evaluate a specific location.
- Prepare plant and soil samples for analysis.

STRAND 5

Students will apply genetics and biotechnology principles in agricultural science.

Standard 1

Explain the role and potential of nucleic science in agricultural science.

- Compare and contrast the structures and functions of DNA and RNA.
- Demonstrate the isolation of DNA.
- Discuss the meaning and importance of DNA profiling.

Standard 2

Describe the potential application of biotechnology to agricultural plants.

- Identify approaches that use genetics to improve organisms, including controlled breeding, genetic manipulation, and stem cells.
- Explain electrophoretic techniques, and interpret electrophoresis fragmentation patterns.
- Describe the potential benefits of recombinant DNA.
- Relate the importance of biotechnology processes in agriculture, including cloning, superovulation, embryo transfer, gender pre-selection, transgenic organisms, and disease- and frost-resistant plants.

- Identify and discuss ethical issues with applications of genetic engineering.

Performance Objective

- Design and conduct experiments to support known principles of genetics.
- Research and debate ethical issues in modern biotechnology.

STRAND 6

Students will utilize methods of integrated pest management.

Standard 1

Relate the importance of plant and animal health in gaining productivity.

- Identify losses as a result of pest activity among plants and animals.
- List the kinds of plant pests and how they are identified, including insects, nematodes, weeds, and diseases.
- Discuss conditions that must be present for pest damage to occur, including the presence of a pest, a susceptible plant, and an environment that promotes pest activity.

Standard 2

Use integrated pest management (IPM) in plant production.

- Describe the meaning and use of IPM.
- List and explain cultural practices that help reduce pest problems, including resistant seed, scouting and trapping, plant nutrition, equipment disinfection, diseased plant destruction, proper chemical use, and good irrigation water.
- List and explain methods of reducing pest populations, including mechanical methods; cultural practices, including pesticide application; biological methods; and genetic methods.
- Demonstrate personal and environmental safety with pesticides.

Performance Objective

- Develop an Integrated Pest Management Plan.
- Identify plant pests, diseases and their causes.

STRAND 7

Students will use methods that provide for the well-being of animals.

Standard 1

Apply husbandry practices in animal production.

- Identify and explain important husbandry practices with animals.
- Use husbandry practices to promote animal well-being.
- Discuss legal aspects of animal care and well-being.

Standard 2

Use quality assurance programs in animal production.

- Explain the meaning and importance of quality assurance programs.
- List animal species and products covered by quality assurance programs.
- Describe the general guidelines of quality assurance programs.

Performance Objective

- Evaluate and select livestock depending on intended use.
- Demonstrate methods of handling animals safely.
- Plan and design an animal waste disposal system.
- Identify the external anatomy of each species of livestock.
- Identify parts of the excretory system, nervous system, and reproductive system on each species of livestock.

STRAND 8

Students will relate the role of veterinary science in animal care and production.

Standard 1

Describe the practice of veterinary animal care.

- Explain the meaning and importance of veterinary medicine and associated career areas, including veterinarians, veterinary technologists, veterinary technicians, and veterinary assistants.
- List and discuss the major functions in a veterinary clinic in examining animals and providing for their care and treatment.
- Identify the common instruments and equipment used in veterinary animal care.
- List and explain common practices in veterinary medicine, including checking vital signs, listening to internal sounds, conducting laboratory tests, administering medications, and using imaging technology.
- Discuss the role of personal and animal safety, including the meaning of zoonosis and the precautions to follow to assure personal protection.
- Explain asepsis and how aseptic techniques are followed in veterinary medicine.

Standard 2

Use appropriate methods of animal restraint.

- Explain the meaning and importance of proper restraint.
- List and describe methods of restraint.

Skill Certificate Test Points by Strand

Example table below. Refer to instructions for specifics.

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		
Agricultural Science 3	185	4	12	5	8	13	8	9	9	12		80	80