

Animal Science: Recommended 9-12

Historic and Current Trends in the Animal Systems Industry

1 Students evaluate the implications of animal origin and analyze common animal production methods from both producer and global perspectives.

- 1 Evaluate and describe characteristics of animals that developed in response to the animal's environment and led to their domestication. [AS-1.1](#)
 - 2 Describe the historical and scientific developments of different animal industries and summarize the products, services and careers associated with each. [AS-1.2](#)
 - 3 Explain the role of animal agriculture within the food system in meeting food and nutritional security. [AS-1.3](#)
 - 4 Analyze the impact of animal production methods on end product qualities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.) [AS-1.4](#)
 - 5 Calculate costs of marketing versus predicted increases in sales [AS-1.5](#)
 - 6 Analyze and evaluate the accuracy and effectiveness of records used in an animal system business. [AS-1.6](#)
 - 7 Analyze the structure of laws governing animal industries, international trade and animal production policies. [AS-1.7](#)
 - 8 Analyze the local and global impact of sustainable animal agriculture practices on human and environmental systems. [AS-1.8](#)
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Animal Husbandry and Welfare

1 Students demonstrate management techniques that ensure animal welfare and analyze procedures to ensure animal safety while maintaining safe animal products.

- 1 Design production plans that assure the welfare of animals and prevent abuse or mistreatment. [AS-2.1](#)
 - 2 Analyze and document animal welfare procedures used to ensure safety and maintain low stress when moving and restraining animals. [AS-2.2](#)
 - 3 Analyze and document animal husbandry practices and their impact on animal welfare. [AS-2.3](#)
 - 4 Utilize tools, technology and equipment to perform animal husbandry and welfare tasks. [AS-2.4](#)
 - 5 Analyze consumer concerns with animal production practices relative to human health. [AS-2.5](#)
 - 6 Analyze and summarize the impact of animal trace-back capabilities on producers and consumers. [AS-2.6](#)
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Animal Nutrition

1 Students analyze the nutritional needs of animals and evaluate feed rations for effectiveness.

- 1 Differentiate between nutritional requirements of animals in different growth stages and production systems (e.g., growth, maintenance, gestation, natural, organic, etc.). [AS-3.1](#)
 - 2 Correlate a species' nutritional needs to feedstuffs that could meet those needs. [AS-3.2](#)
 - 3 Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition. [AS-3.3](#)
 - 4 Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements and performance. [AS-3.4](#)
 - 5 Compare and contrast methods that utilize feed additives and growth promotants with production practices that do not, (e.g., organic versus conventional production methods). [AS-3.5](#)
 - 6 Utilize tools and equipment to perform animal nutrition tasks. [AS-3.6](#)
 - 7 Analyze and apply information from a feed label and feeding directions to feed animals. [AS-3.7](#)
 - 8 Analyze technologies used to provide animal nutrition and summarize their potential benefits and consequences. [AS-3.8](#)
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Animal Reproduction

1 Students evaluate animals for reproduction readiness and soundness and apply scientific principles to breeding programs.

- 1 Analyze the functions of major organs in the male and female reproductive systems. [AS-4.1](#)
 - 2 Assess and describe factors that lead to reproductive maturity. [AS-4.2](#)
 - 3 Evaluate reproductive problems that occur in animals. [AS-4.3](#)
 - 4 Compare and contrast the use of genetically superior animals in the production of animals and animal products. [AS-4.4](#)
 - 5 Demonstrate how to determine probability trait inheritance in animals. [AS-4.5](#)
 - 6 Analyze how DNA analysis can detect genetic defects in breeding stock [AS-4.6](#)
 - 7 Analyze the care needs for breeding stock in each stage of growth. [AS-4.7](#)
 - 8 Calculate the potential economic benefits of natural versus artificial breeding methods. [AS-4.8](#)
 - 9 Develop an understanding of artificial insemination, embryo transfer, and cloning. [AS-4.9](#)
 - 10 Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer. [AS-4.10](#)
 - 11 Compare and contrast quantitative breeding value differences between genetically superior animals and animals of average genetic value. [AS-4.11](#)
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Environmental Considerations of Animals

1 Design animal housing, equipment and handling facilities for the major systems of animal production.

- 1 Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe, sustainable and efficient use of the facility. [AS-5.1](#)
 - 2 Analyze the use of modern equipment, technology and handling facility procedures and determine if they enhance the safe, economic and sustainable production of animals. [AS-5.2](#)
 - 3 Analyze animal facilities to determine if standards have been met. [AS-5.3](#)
 - 4 Analyze the structure of laws pertaining to animal systems. [AS-5.4](#)
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Anatomy and Physiology

1 Classify animals according to taxonomic classification systems and use (e.g. agricultural, companion, etc.).

- 1 Explain how animals are classified using a taxonomic classification system. [AS-6.1](#)
- 2 Appraise and evaluate the economic value of animals for various applications in the agriculture industry. [AS-6.2](#)
- 3 Analyze the visual characteristics of an animal or animal product and select correct classification terminology when referring to companion and production animals. [AS-6.3](#)

2 Apply principles of comparative anatomy and physiology to uses within various animal systems.

- 1 Analyze the functions of each animal cell structure. [AS-7.1](#)
- 2 Analyze the processes of meiosis and mitosis in animal growth, development, health and reproduction. [AS-7.2](#)
- 3 Compare and contrast animal cells, tissues, organs, body systems types and functions among animal species. [AS-7.3](#)

3 Select and train animals for specific purposes and maximum performance based on anatomy and physiology.

- 1 Compare and contrast desirable anatomical and physiological characteristics of animals within and between species. [AS-8.1](#)
- 2 Compare and contrast procedures to sustainably and efficiently develop an animal to reach its highest performance potential with respect to its anatomical and physiological characteristics. [AS-8.2](#)
- 3 Evaluate and select products from animals based on industry standards. [AS-8.3](#)

Animal Health and Safety

1 Students design programs to prevent animal diseases, parasites and other disorders and analyze biosecurity measures utilized to ensure animal welfare.

- 1 Describe and demonstrate the proper use and function of specific tools and technology related to animal health management. [AS-9.1](#)
 - 2 Perform simple health-check evaluations on animals and practice basic emergency response procedures related to animals. [AS-9.2](#)
 - 3 Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites and physiological disorders. [AS-9.3](#)
 - 4 Research and analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites and disorders among animals. [AS-9.4](#)
 - 5 Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures. [AS-9.5](#)
 - 6 Analyze procedures at the local, state and national levels to ensure biosecurity of the animal industry. [AS-9.6](#)
 - 7 Analyze the health risk of different zoonotic diseases to humans and identify prevention methods. [AS-9.7](#)
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Environmental Impacts of Animal Agriculture

1 Students design and evaluate environments for animals to promote animal health and husbandry.

- 1 Assess the effectiveness of methods of reducing the effects of animal agriculture on the environment. [AS-10.1](#)
 - 2 Critique the reliability and validity of evidence presented to support claims regarding the effects of environmental conditions on animal populations and performance (e.g., population changes, emerging species, extinction, etc.). [AS-10.2](#)
 - 3 Implement and evaluate the effectiveness of methods to ensure optimal environmental conditions for animals. [AS-10.3](#)
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Biotechnology in Animal Agriculture

1 Investigate and explain the roles and issues of biotechnology in animal agriculture.

- 1 Research and summarize the evolution of biotechnology in animal agriculture. [AS-11.1](#)
 - 2 Assess and summarize current work in biotechnology being done to add value to animal agriculture and society. [AS-11.2](#)
 - 3 Distinguish between current and emerging applications of biotechnology in agriculture. [AS-11.3](#)
 - 4 Compare and contrast the benefits and risks of biotechnology compared with alternative approaches to improving agriculture. [AS-11.4](#)
 - 5 Assess and summarize the role and scope of agencies that regulate biotechnology. [AS-11.5](#)
 - 6 Research and summarize public perceptions of biotechnology in agriculture. [AS-11.6](#)
 - 7 Assess and argue the pros and cons of transgenic species. [AS-11.7](#)
 - 8 Research genetic engineering and CRISPR procedures used in production of animal species. [AS-11.8](#)
 - 9 Assess the benefits, risks, and opportunities associated with using biotechnology to promote animal health. [AS-11.9](#)
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Careers

1 Students examine the scope of career opportunities in and the importance of agriculture to the economy.

- 1 Evaluate the nature and scope of animal sciences in agriculture, society, and the economy. [AS-12.1](#)
 - 2 Describe career opportunities and means to achieve those opportunities in animal sciences. [AS-12.2](#)
 - 3 Identify how key organizational structures and processes affect organizational performance and the quality of products and services. [AS-12.3](#)
 - 4 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society. [AS-12.4](#)
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Leadership

- 1 Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.**
 - 1 Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings. [AS-13.1](#)
 - 2 Recognize and explain the role of the FFA in the development of leadership, education, employability, communications and human relations skills. [AS-13.2](#)
 - 3 Examine roles within teams, work units, departments, organizations, interorganizational systems, and the larger environment. [AS-13.3](#)
 - 4 Acquire the skills necessary to positively influence others. [AS-13.4](#)
 - 5 Develop a skill set to enhance the positive evolution of the whole person. [AS-13.5](#)
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Supervised Agriculture Experience

- 1 Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.**
 - 1 Explain the nature of and become familiar with those terms related to an SAE program. [AS-14.1](#)
 - 2 Explore the numerous possibilities for an SAE program which a student might develop. [AS-14.2](#)
 - 3 Develop an individual SAE program and implementation plan for record keeping skills. [AS-14.3](#)