

# Animal Systems: Animal Science (2020)

**Examine Career and FFA Opportunities associated with Animal Science.** 1

**1 Evaluate and implement the steps and requirements to pursue a career opportunity in Animal Science.** 1.1

- 1 Examine the educational, training and experiential requirements to pursue a career in Animal Science (e.g., degrees, certifications, training, internships, etc.). 1.1.1
- 2 Analyze personal skillset and create a plan for obtaining the required education, training and experiences to obtain a career in Animal Science. 1.1.2

**2 Assess the opportunities in Animal Science available through Career Development Events, Supervised Agricultural Experiences and other FFA activities.** 1.2

- 1 Examine the Livestock Evaluation, Horse Evaluation, Poultry Evaluation and Veterinary Science Career Development Events for opportunities to exhibit skills needed in Animal Science. 1.2.1
- 2 Research ways that Animal Science or the skills needed may be implemented as a Supervised Agricultural Experience, and other FFA activities that might involve Animal Science. 1.2.2

**Analyze historic and current trends impacting the animal systems industry.** 2

**1 Evaluate the development and implications of animal origin, domestication and distribution on production practices and the environment.** 2.1

- 1 Identify and summarize the origin, significance, distribution and domestication of different animal species. 2.1.1
- 2 Research and summarize major components of animal systems (e.g., livestock, companion animals, etc.). 2.1.2

**2 Assess and select animal production methods for use in animal systems based upon their effectiveness and impacts.** 2.2

- 1 Identify and categorize terms and methods related to animal production (e.g., sustainable, conventional, humanely raised, natural, organic, etc.) 2.2.1
- 2 Analyze the impact of animal production methods on end product qualities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.) 2.2.2
- 3 Research and examine marketing methods for animal products and services (e.g., conventional, niche markets, locally grown, etc.). 2.2.3

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### **3 Analyze and apply laws and sustainable practices to animal agriculture from a global perspective. 2.3**

- 1 Distinguish between the types of laws pertaining to animal systems. 2.3.1
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**Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare. 3**

#### **1 Demonstrate management techniques that ensure animal welfare. 3.1**

- 1 Explain the implications of animal welfare and animal rights for animal systems. 3.1.1
  - 2 Research and summarize the challenges involved in working with animals and resources available to overcome them (e.g., tools, technology, equipment, facilities, animal behavior signals, etc.). 3.1.2
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#### **2 Analyze procedures to ensure that animal products are safe for consumption (e.g., use in food systems, etc.). 3.2**

- 1 Identify and categorize tools, technology and equipment used in animal husbandry and welfare to help provide an abundant and safe food supply. 3.2.1
  - 2 Research and summarize animal production practices that may pose health risks. 3.2.2
  - 3 Evaluate the effectiveness of animal and/or premise identification programs for a given species. 3.2.3
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**Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production. 4**

#### **1 Analyze the nutritional needs of animals. 4.1**

- 1 Identify and summarize essential nutrients required for animal health and analyze each nutrient's role in growth and performance. 4.1.1
  - 2 Differentiate between nutritional needs of animals in different growth stages and production systems (e.g., maintenance, gestation, natural, organic, etc.). 4.1.2
  - 3 Differentiate between nutritional needs of animal species. 4.1.3
  - 4 Correlate a species' nutritional needs to feedstuffs that could meet those needs. 4.1.4
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#### **2 Analyze feed rations and assess if they meet the nutritional needs of animals. 4.2**

- 1 Compare and contrast common types of feedstuffs and the roles they play in the diets of animals. 4.2.1
- 2 Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition. 4.2.2
- 3 Examine the importance of a balanced ration for animals based on the animal's growth stage (e.g., maintenance, newborn, gestation, lactation, etc.). 4.2.3
- 4 Examine the purpose, impact and mode of action of feed additives and growth promotants in animal production. 4.2.4
- 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). 4.2.5

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### **3 Utilize industry tools to make animal nutrition decisions.** 4.3

- 1 Identify and categorize tools and equipment used to meet animal nutrition needs and ensure an abundant and safe food supply. 4.3.1
  - 2 Examine and summarize the meaning of various components of feed labels and feeding directions. 4.3.2
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### **Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.** 5

#### **1 Evaluate animals for breeding readiness and soundness.** 5.1

- 1 Identify and categorize the male and female reproductive organs of the major animal species. 5.1.1
  - 2 Analyze the functions of major organs in the male and female reproductive systems. 5.1.2
  - 3 Compare and contrast how age, size, life cycle, maturity level and health status affect the reproductive efficiency of male and female animals. 5.1.3
  - 4 Assess and describe factors that lead to reproductive maturity. 5.1.4
  - 5 Evaluate reproductive problems that occur in animals. 5.1.5
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#### **2 Apply scientific principles to select and care for breeding animals.** 5.2

- 1 Summarize genetic inheritance in animals. 5.2.1
- 2 Compare and contrast the use of genetically superior animals in the production of animals and animal products. 5.2.2
- 3 Identify and summarize inheritance and terms related to inheritance in animal breeding (e.g., dominant, co-dominant, recessive, homozygous, heterozygous, etc.). 5.2.3
- 4 Demonstrate how to determine probability trait inheritance in animals. 5.2.4
- 5 Identify and summarize genetic defects that affect animal performance. 5.2.5
- 6 Identify and summarize different needs of breeding animals based on their growth stages (e.g., newborn, parturition, gestation, gestation lengths, etc.). 5.2.6
- 7 Analyze the care needs for breeding stock in each stage of growth. 5.2.7

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### **3 Apply scientific principles to breed animals.** 5.3

- 1 Identify and categorize natural and artificial breeding methods (e.g., natural breedings, artificial insemination, estrous synchronization, flushing, cloning, etc.) 5.3.1
  - 2 Analyze the materials, methods and processes of artificial insemination. 5.3.2
  - 3 Demonstrate artificial insemination techniques. 5.3.3
  - 4 Identify and summarize the advantages and disadvantages of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer (e.g., cost, labor, equipment, etc.) 5.3.4
  - 5 Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer. 5.3.5
  - 6 Examine the use of quantitative breeding values (e.g., EPDs, Performance records, pedigrees) in the selection of genetically superior stock. 5.3.6
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**Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.** 6

### **1 Design animal housing, equipment and handling facilities for the major systems of animal production.** 6.1

- 1 Differentiate between the types of facilities needed to house and produce animal species safely and efficiently. 6.1.1
  - 2 Identify and summarize equipment, technology and handling facility procedures used in modern animal production (e.g., climate control devices, sensors, automation, etc.) 6.1.2
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### **2 Comply with government regulations and safety standards for facilities used in animal production.** 6.2

- 1 Identify and summarize the general standards that must be met in facilities for animal production (e.g., environmental, zoning, construction, etc.). 6.2.1
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**Classify, evaluate and select animals based on anatomical and physiological characteristics.** 7

### **1 Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).** 7.1

- 1 Explain the importance of the binomial nomenclature system for classifying animals. 7.1.1
- 2 Compare and contrast major uses of different animal species (e.g., agricultural, companion, etc.). 7.1.2

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## **2 Apply principles of comparative anatomy and physiology to uses within various animal systems.** 7.2

- 1 Research and summarize characteristics of a typical animal cell and identify the organelles. 7.2.1
- 2 Analyze the functions of each animal cell structure. 7.2.2
- 3 Examine the basic functions of animal cells in animal growth and reproduction. 7.2.3
- 4 Identify and summarize the properties, locations, functions and types of animal cells, tissues, organs and body systems. 7.2.4
- 5 Compare and contrast animal cells, tissues, organs, body systems types and functions among animal species. 7.2.5

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## **3 Select and train animals for specific purposes and maximum performance based on anatomy and physiology.** 7.3

- 1 Identify and summarize how an animal's health can be affected by anatomical and physiological disorders. 7.3.1

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## **Apply principles of effective animal health care.** 8

### **1 Design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare.** 8.1

- 1 Identify and summarize specific tools and technology used in animal health management. 8.1.1
- 2 Explain methods of determining animal health and disorders. 8.1.2
- 3 List and summarize the characteristics of wounds, common diseases, parasites and physiological disorders that affect animals. 8.1.3
- 4 Identify and summarize characteristics of causal agents and vectors of diseases and disorders in animals. 8.1.4

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### **2 Analyze biosecurity measures utilized to protect the welfare of animals on a local, state, national and global level.** 8.2

- 1 Summarize the importance of biosecurity to the animal industry at multiple levels (e.g., local, state, national, global). 8.2.1
- 2 Analyze procedures at the local, state and national levels to ensure biosecurity of the animal industry. 8.2.2
- 3 Identify and describe zoonotic diseases including their historical significance and potential future implications. 8.2.3

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## **Analyze environmental factors associated with animal production.** 9

### **1 Design and implement methods to reduce the effects of animal production on the environment.** 9.1

- 1 Identify and summarize the effects of animal agriculture on the environment (e.g., waste disposal, carbon footprint, air quality, environmental efficiencies, etc.). 9.1.1

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**2 Evaluate the effects of environmental conditions on animals and create plans to ensure favorable environments for animals.** 9.2

- 1 Research and summarize environmental conditions that impact animals (e.g., weather, sources of water, food resources, etc.). 9.2.1
- 2 Identify and summarize methods for ensuring optimal environmental conditions for animals. 9.2.2