

# Animal Science (2015): Grades 9, 10, 11, 12, Higher Education

Adopted 2015

## Understand structure and significance of animal agriculture systems ANSC.01

### 01. Understand the history and global significance of animal systems ANSC.01.01

- a. Define major components of animal systems ANSC.01.01.A
- b. Define the major trends and relationship of animal systems to global agriculture production ANSC.01.01.B
- c. Identify various cultural perspectives in agriculture and the impact on animal systems ANSC.01.01.C
- d. Understand current cultural perspectives, global trade, and environmental impact of agriculture and the impact on animal systems ANSC.01.01.D

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### 02. Identify segments, and distribution channels of animal agriculture industry and relate these to the efficiencies of the agriculture production ANSC.01.02

- a. Define agriculture industry segments (producers, processors, consumers, etc) and distribution channels ANSC.01.02.A
- b. Explain the local, regional, national and global agriculture production and the role of animal systems at each level ANSC.01.02.B
- c. Describe the movement of agriculture products through industry segments and industry distribution channels ANSC.01.02.C
- d. Analyze the changes in animal systems management to the efficient production and distribution of agriculture products ANSC.01.02.D

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### 03. Describe the role of animal agriculture industry in society ANSC.01.03

- a. Define animal science and animal systems and determine the importance of the animal systems ANSC.01.03.A
- b. Explore local, regional, national and global animal production and define biosecurity, biotechnology ANSC.01.03.B
- c. Describe techniques to insure biosecurity in our animal production ANSC.01.03.C
- d. Integrate concepts of Animal Science into other agricultural pathways ANSC.01.03.D

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**04. Describe the process and movement of products from farm to table.** ANSC.01.04

- a. Define Distribution Channels (Wholesalers, Local Markets, Direct Markets, Retailers, Government, Institutions, Restaurants, Hotels, Catering) ANSC.01.04.A
  - b. Describe the movement of products through channels ANSC.01.04.B
  - c. Illustrate the impact of the distribution channels ANSC.01.04.C
  - d. Design a new distribution channel (vertical integration) ANSC.01.04.D
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**Integrate principles of classification and selection in the management practices of the animal industry** ANSC.02

**01. Understand the use of taxonomic principles in animal agriculture** ANSC.02.01

- a. Define common taxonomic terms and explain the importance of taxonomic classification ANSC.02.01.A
  - b. Demonstrate the correct use of scientific animal names ANSC.02.01.B
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**02. Understand and apply concepts of external animal anatomy** ANSC.02.02

- a. Identify body components ANSC.02.02.A
  - b. Relate body components to function & purpose ANSC.02.02.B
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**03. Evaluate breed characteristics and apply them in animal selection scenarios** ANSC.02.03

- a. Identify common breeds in agriculturally important animal species ANSC.02.03.A
  - b. Understand breed characteristics and purpose ANSC.02.03.B
  - c. Select an animal for a specific purpose and environment ANSC.02.03.C
  - d. Appraise & evaluate economic value of animals for various application in animal agriculture ANSC.02.03.D
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**04. Evaluate animals for a given production scenario** ANSC.02.04

- a. Describe procedure for evaluating animals ANSC.02.04.A
  - b. Evaluate market and breeding animals for a specific purpose ANSC.02.04.B
  - c. Develop rationale for evaluation of livestock for purpose ANSC.02.04.C
  - d. Evaluate production scenario and select livestock for practical application ANSC.02.04.D
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**Understand how animal growth, development and environmental interactions impact animal production** ANSC.03

**01. Understand the process of animal growth and development** ANSC.03.01

- a. Distinguish growth processes in animals ANSC.03.01.A
- b. Define life span and relate it to living condition; explain the stages of life ANSC.03.01.B
- c. Analyze the growth factors that affect production enterprises ANSC.03.01.C
- d. Explore the role that humans have in each of the life stages of agriculturally important animals ANSC.03.01.D

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**02. Explain cell structure and function** ANSC.03.02

- a. Describe the basics of an animal cell and describe the cellular organelles and their functions ANSC.03.02.A
- b. Identify and explain DNA structure and replication processes ANSC.03.02.B
- c. Diagram and label the cell cycle (mitosis and meiosis) and have understanding of each phase ANSC.03.02.C
- d. Select and use appropriate technologies to gather, process, and analyze data and to report information related to an investigation ANSC.03.02.D

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**03. Understand the role of the circulatory system its interactions and impact on animal health** ANSC.03.03

- a. Identify major parts and their functions ANSC.03.03.A
- b. Relate functions to other systems ANSC.03.03.B
- c. Determine how changes affect the individual systems and a healthy animal ANSC.03.03.C

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**04. Understand the role of the digestion system its interactions and impact on animal health** ANSC.03.04

- a. Identify major parts and their functions ANSC.03.04.A
- b. Relate functions to other systems ANSC.03.04.B
- c. Determine how changes affect the individual systems and a healthy animal ANSC.03.04.C

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**05. Understand the role of the endocrine system its interactions and impact on animal health** ANSC.03.05

- a. Identify major parts and their functions ANSC.03.05.A
- b. Relate functions to other systems ANSC.03.05.B
- c. Determine how changes affect the individual systems and a healthy animal ANSC.03.05.C

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**06. Understand the role of the excretory system its interactions and impact on animal health** ANSC.03.06

- a. Identify major parts and their functions ANSC.03.06.A
- b. Relate functions to other systems ANSC.03.06.B
- c. Determine how changes affect the individual systems and a healthy animal ANSC.03.06.C

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- 07. Understand the role of the immune system its interactions and impact on animal health** ANSC.03.07
- a. Identify major parts and their functions ANSC.03.07.A
  - b. Relate functions to other systems ANSC.03.07.B
  - c. Determine how changes affect the individual systems and a healthy animal ANSC.03.07.C
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- 08. Understand the role of the integumentary system, its interactions and impact on animal health** ANSC.03.08
- a. Identify major parts and their functions ANSC.03.08.A
  - b. Relate functions to other systems ANSC.03.08.B
  - c. Determine how changes affect the individual systems and a healthy animal ANSC.03.08.C
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- 09. Understand the role of the lymphatic system its interactions and impact on animal health** ANSC.03.09
- a. Identify major parts and their functions ANSC.03.09.A
  - b. Relate functions to other systems ANSC.03.09.B
  - c. Determine how changes affect the individual systems and a healthy animal ANSC.03.09.C
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- 10. Understand the role of the muscular system its interactions and impact on animal health** ANSC.03.10
- a. Identify major parts and their functions ANSC.03.10.A
  - b. Relate functions to other systems ANSC.03.10.B
  - c. Determine how changes affect the individual systems and a healthy animal ANSC.03.10.C
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- 11. Understand the role of the nervous system its interactions and impact on animal health** ANSC.03.11
- a. Identify major parts and their functions ANSC.03.11.A
  - b. Relate functions to other systems ANSC.03.11.B
  - c. Determine how changes affect the individual systems and a healthy animal ANSC.03.11.C
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- 12. Understand the role of the respiratory system its interactions and impact on animal health** ANSC.03.12
- a. Identify major parts and their functions ANSC.03.12.A
  - b. Relate functions to other systems ANSC.03.12.B
  - c. Determine how changes affect the individual systems and a healthy animal ANSC.03.12.C

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**13. Understand the role of the skeletal system its interactions and impact on animal health** ANSC.03.13

- a. Identify major parts and their functions ANSC.03.13.A
- b. Relate functions to other systems ANSC.03.13.B
- c. Determine how changes affect the individual systems and a healthy animal ANSC.03.13.C

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**14. Understand the role of the reproduction system its interactions and impact on animal health** ANSC.03.14

- a. Identify major parts and their functions ANSC.03.14.A
- b. Relate functions to other systems ANSC.03.14.B
- c. Determine how changes affect the individual systems and a healthy animal ANSC.03.14.C

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**Explain the role of genetics and reproductive management in animal systems** ANSC.04

**01. Understand the principles of sexual reproduction** ANSC.04.01

- a. Identify the parts of the male and female reproductive systems and describe gamete production, define fertilization, gestation, and parturition ANSC.04.01.A
- b. Describe the phases of the female reproductive cycle ANSC.04.01.B
- c. Compare hormone action involved in the reproductive cycle; identify their sources, effects, and purposes ANSC.04.01.C
- d. Evaluate the effects of manipulating the hormones in a reproductive system ANSC.04.01.D

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**02. Understand the fundamentals of inheritance and their application to livestock production** ANSC.04.02

- a. Define terms associated with genetics ANSC.04.02.A
- b. Explain how genetics relates to improvement in livestock production ANSC.04.02.B
- c. Diagram and explain how characteristics are inherited ANSC.04.02.C
- d. Diagram and explain the role of genetics with sex determination, linkage, crossover, and mutation ANSC.04.02.D

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**03. Explain the process of animal selection, and the role selection plays in improving animal systems** ANSC.04.03

- a. Explain selection, goals for selection and why and how selection has been used in animal systems ANSC.04.03.A
- b. Select an animal for a specific purpose based on genotype and utilize the punnet square to project genetic outcomes ANSC.04.03.B
- c. Select an animal for a specific purpose based on genotype and phenotype ANSC.04.03.C
- d. Apply selection principles to a group of animals ANSC.04.03.D

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**04. Understand current reproductive technologies and their application in an animal breeding program** ANSC.04.04

- a. Identify technologies used in animal reproduction ANSC.04.04.A
- b. Explain the procedures used in artificial insemination, embryo transfer, and cloning ANSC.04.04.B
- c. Demonstrate the steps of artificial insemination and embryo transfer ANSC.04.04.C
- d. Develop a breeding system utilizing current ANSC.04.04.D

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**Understand the impact of disease, parasites and physiological disorders on animal health** ANSC.05

**01. Identify signs of diseases, parasites and physiological disorders and recommend appropriate treatment** ANSC.05.01

- a. Recognize signs of proper function of body systems ANSC.05.01.A
- b. Identify signs of illnesses and disorders for specific parasites, diseases & disorders of animals ANSC.05.01.B
- c. Describe treatment protocol and proper administration routes and techniques ANSC.05.01.C
- d. Determine treatment protocol including alternative methods of treatment (massage and acupuncture) ANSC.05.01.D

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**02. Identify routes of disease transmission and their impact on disease control** ANSC.05.02

- a. Recognize signs of good health & disease conditions ANSC.05.02.A
- b. Classify diseases, identify causative agents of transmission, including zoonotic diseases ANSC.05.02.B
- c. Recognize common management practices for disease prevention, including biosecurity issues ANSC.05.02.C
- d. Design a program of disease prevention including biosecurity plans for production operations ANSC.05.02.D

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**03. Explain the principle of immunity and it's role in maintaining animal health** ANSC.05.03

- a. Identify components of immune system & understand role in disease prevention ANSC.05.03.A
- b. Describe the outcomes of the immune response & common immunological disorders ANSC.05.03.B
- c. Understand the role of colostrum and the immune response in newborn animals ANSC.05.03.C
- d. Understand the principles of vaccination & design immunization protocol for all production animals ANSC.05.03.D

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**Describe the principles of nutrition and digestion and the role within an animal system** ANSC.06

**01. Analyze the digestive process it's impact on animal rations and feedstuffs** ANSC.06.01

- a. Compare the three types of digestive systems and the major species that have each ANSC.06.01.A
- b. Select feedstuffs that are appropriate for each system ANSC.06.01.B
- c. Trace the breakdown of feedstuffs through the digestive process ANSC.06.01.C
- d. Evaluate the chemical processes happening in the digestive cycle (organic acids, protein digestion) ANSC.06.01.D

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**02. Identify common nutrients and their role in animal growth and development** ANSC.06.02

- a. Identify common nutrients ANSC.06.02.A
- b. Discuss the importance of each nutrient and its function ANSC.06.02.B
- c. Determine the correct amounts of each nutrient needed for each species ANSC.06.02.C
- d. Compare the metabolic rate of each nutrient ANSC.06.02.D

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**03. Identify species nutritional requirements and the impact of stages of production and environmental condition** ANSC.06.03

- a. Identify compare and contrast common feeds for each species nutritional requirements ANSC.06.03.A
- b. Determine the specific nutritional needs for each species, environmental condition, and stages of production ANSC.06.03.B
- c. Evaluate symptoms of nutritional deficiencies ANSC.06.03.C
- d. Improve management system to correct nutritional deficiency ANSC.06.03.D

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**04. Describe feed classification and composition** ANSC.06.04

- a. Compare and contrast common types of feedstuffs (roughages and concentrates, additives, supplements) ANSC.06.04.A
- b. Determine the relative nutritional value of feedstuffs as a result of different processing methods ANSC.06.04.B
- c. Select appropriate feedstuffs for animals based on factors such as the environment and economy ANSC.06.04.C
- d. Determine ways to improve relative feed value in feedstuffs ANSC.06.04.D

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**05. Explain feed additives and growth promoters role in animal production** ANSC.06.05

- a. Explain the purpose and benefits of feed additives and growth promoters ANSC.06.05.A
- b. Discuss how feed additives and growth promoters are administered ANSC.06.05.B
- c. Explain how feed additives and growth promoters impact the growth process ANSC.06.05.C
- d. Research the benefits and precautions that should be used with feed additives and growth promoters ANSC.06.05.D

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**Apply understanding of animal behavior to animal care and use** ANSC.07

**01. Understand animal behavior** ANSC.07.01

- a. List and describe types of animal behavior ANSC.07.01.A
- b. Explain through examples the nine major behavior patterns and how they are interrelated ANSC.07.01.B
- c. Summarize how behavioral activities affect animal well-being, productivity, and profitability ANSC.07.01.C
- d. Evaluate management system's affect on animal behavior ANSC.07.01.D

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**02. Observe and recognize signs of health in animals** ANSC.07.02

- a. Compare the observable signs of healthy animals to the observable signs of unhealthy animals ANSC.07.02.A
- b. Explain the benefit to producers of content and healthy animals ANSC.07.02.B
- c. Perform simple health-check evaluations on animals ANSC.07.02.C
- d. Design a health maintenance and disease prevention plan for animals in confined environments ANSC.07.02.D

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**03. Analyze the impact of environmental conditions on animal production** ANSC.07.03

- a. Identify the environmental influences on livestock, intensive management systems, and extensive management systems ANSC.07.03.A
- b. Describe how animals adapt to environments and how that affects management practices ANSC.07.03.B
- c. Describe how genetics, nervous system functions, and behavior systems affect an animal's ability to adapt to an environment ANSC.07.03.C
- d. Explain how producers may assist animals' adaptations to the environment ANSC.07.03.D

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**04. Understand proper techniques for handling and restraint of animals** ANSC.07.04

- a. Identify proper animal handling and restraining principles ANSC.07.04.A
- b. Outline safety procedures for working with animals by species ANSC.07.04.B
- c. Design an animal facility that allows for easy and safe handling and restraint ANSC.07.04.C

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**05. Understand the need for safe and efficient handling of animals through facility design and management** ANSC.07.05

- a. Identify types of facilities for given production scenarios ANSC.07.05.A
- b. Analyze facilities for functionality and safety ANSC.07.05.B
- c. Make recommendations for improvements; analyze current laws relating to facilities and management ANSC.07.05.C
- d. Design a facility incorporating all phases of production (from processing to waste management) ANSC.07.05.D

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**Understand principles of carcass evaluation and grading** ANSC.08

**01. Evaluate carcasses for industry and consumer demands** ANSC.08.01

- a. Use visual appraisal to predict the quality and yield grade of a carcass ANSC.08.01.A
- b. Define measurement tools to predict the quality and yield grade of a carcass ANSC.08.01.B
- c. Use measurement tools to predict the quality and yield grade of a carcass ANSC.08.01.C
- d. Predict carcass quality based on live animal evaluation and husbandry practices ANSC.08.01.D

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**02. Understand yield grade calculations and the impact of percent yield on industry production standards** ANSC.08.02

- a. Define yield grade and calculate dressing percentages ANSC.08.02.A
- b. Explain yield grade factors ANSC.08.02.B
- c. Evaluate carcass indicators to determine yield grade ANSC.08.02.C
- d. Analyze production of percent yield of meat products and the impact on the goals of the animal industry ANSC.08.02.D

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**03. Identify commercial cuts of meat** ANSC.08.03

- a. Identify wholesale cuts ANSC.08.03.A
- b. Identify retail cuts ANSC.08.03.B
- c. Explain the importance of cut identification ANSC it relates to animal production ANSC.08.03.C

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**04. Quality grade animals and determine the importance of quality in the animal/meat production process** ANSC.08.04

- a. Define quality grade ANSC.08.04.A
- b. Explain quality grade factors ANSC.08.04.B
- c. Evaluate carcass indicators to determine quality grades ANSC.08.04.C
- d. Analyze impact of quality grades on production and the goals of the animal industry ANSC.08.04.D