Animal Science and Management Pathway

This document contains information about one Career-Technical Articulation Number (CTAN) for the Animal Science and Management Career-Technical Assurance Guide (CTAG).

Introduction to Animal Science

1. Introduction to Animal Science: This course represents a CTAN alignment with the Animal Science and Management Pathway in the Agriculture and Environmental Systems Career Field Technical Content Standards of the Ohio Department of Education.

General Course Description: An introductory course in animal sciences designed to provide students with a basic understanding of the biological principles and production practices used in animal production. Students will gain a basic understanding of anatomy, genetics, reproduction, nutrition, and behavior as they apply to domesticated animals. Students will also gain an appreciation for intensive and extensive production environments, resulting food and fiber products, and be familiar with the social issues such as animal welfare and environmental impacts.

Advising Notes:
Student must access credit within 3 years of program completion.
Semester Credit Hours: 3.0

Essential Outcomes are indicated by an asterisk.

Learning Outcomes The student will be able to:	Competencies from the Animal Science and Management Pathway of the Agriculture and Environmental Systems Career Field Technical Content Standards
1. Understand historical trends associated with size and scale of animal production, marketing systems, and their economic impact on the U.S. and global economy.	**Outcome 1.6: Business Literacy** 1.6.7. Identify the effect of supply and demand on products and services. **Outcome 1.11: Principles of Business Economics** 1.11.3. Use economic indicators to identify economic trends and conditions (e.g., inflation, interest rate fluctuations, unemployment rates). 1.11.4. Determine how the quality, quantity and pricing of goods and services are affected by domestic and international competition in a market economy. 1.11.8. Identify the relationships between economy, society and environment that lead to sustainability.
2. * Recognize general equipment and understand general terminology used in the animal industry.	**Outcome 2.2: Body Systems** 2.2.1 Describe external anatomical parts and their functions. 2.2.2 Identify the anatomical parts of the digestive system and describe their physiology. 2.2.12. Differentiate between the male and female reproductive system, structures, and functions. **Outcome 2.3: Care and Management** 2.3.1. Identify species-specific terminology based on gender and age. 2.3.5. Perform species-specific animal identification techniques (e.g., chipping, tagging, branding, notching, tattooing) **Outcome 4.1: Tool, Stationary and Mobile Equipment Maintenance** 4.1.1. Identify the types of hand tools, power tools, and stationary equipment and describe their function.
3. * Identify common and alternate species and breeds used for food and fiber production and/or companionship and methods of identification.	**Outcome 2.3: Care and Management** 2.3.1. Identify species-specific terminology based on gender and age. 2.3.5. Perform species-specific animal identification techniques (e.g., chipping, tagging, branding, notching, tattooing)
4. * Understand housing, animal handling, behavior, and common health & disease issues of various animal species.	**Outcome 2.3: Care and Management** 2.3.3. Determine the biotic and abiotic factors (e.g., air, ventilation) that impact the animals' environment. 2.3.10 Monitor and evaluate the quality of an animal's habitat and implement corrective methods as needed.

5. Understand basic skeletal structure and growth patterns as they relate to the form and function of animals.	**Outcome 2.2: Body Systems** 2.2.1. Describe external anatomical parts and their functions. 2.2.4. Identify the anatomical components of the skeletal system, including the types and forms of bones, and describe their physiology. 2.2.5. Identify the anatomy of the musculature systems, including striated, cardiac and smooth muscle, and describe their physiology. 2.2.6. Compare and contrast bone growth, muscle growth, and fat deposition in relation to developmental patterns. 2.2.15. Identify the anatomy and describe the physiology of the mammary system.
6. * Understand basic principles and concepts of genetics and its application in animal selection.	**Outcome 2.6: Population Management** 2.6.2. Compare and select superior individuals based on phenotype. **Outcome 3.4: Molecular-Genetics Technology** 3.4.1. Use a Punnet square to predict and explain Mendel's Laws, genotype and phenotype. 3.4.4. Model the Central Dogma Theory (e.g., replication, transcription, translation).
7. * Understand the basic differences in anatomy, physiology, and cycles associated with the reproductive systems among animal species.	**Outcome 2.2: Body Systems** 2.2.1. Describe external anatomical parts and their functions. 2.2.12. Differentiate between the male and female reproductive system, structures, and functions. 2.2.13. Describe the endocrine system, its structures, and the role of hormones. **Outcome 2.6: Population Management** 2.6.1. Identify factors that lead to reproductive maturity and select animals for reproductive readiness. 2.6.4. Determine the factors that influence estrus, gestation and parturition and employ appropriate management practices. 2.6.5. Manipulate an animal's reproductive processes to support breeding (e.g., sex-sorted semen, heat synchronization, nutritional flushing, light cycling). 2.6.6. Evaluate and employ breeding methods (e.g., artificial insemination, embryo transfer, natural selection, selective breeding, invitro fertilization, cloning).
8. * Understand the basic differences in: a) anatomy and physiology of digestive systems, b) nutrient categories, requirements, and c) feedstuffs.	**Outcome 2.1: Nutrition** 2.1.1. Identify the traditional and alternative types, compositions, quality, and compatibility of feeds, feed additives, and feed byproducts. 2.1.2. Determine the role of nutrients and the nutritional requirements of different animal life processes and species. 2.1.3. Analyze the nutritional content and quality of feeds. 2.1.6. Determine feed efficiency and value in relation to the cost, quality and availability of feeds. **Outcome 2.2: Body Systems** 2.2.2. Identify the anatomical parts of the digestive system and describe their physiology. 2.2.5. Identify the anatomy of the musculature systems, including striated, cardiac and smooth muscle, and describe their physiology. **Outcome 8.1: Plant Nutrition** 8.1.1. Compare and contrast organic and inorganic sources of macronutrients and micronutrients.
9. Understand the nutritional, social, and economic values associated with food, fiber, and by-products of the animal industries.	**Outcome 2.1: Nutrition** 2.1.5. Identify and describe biological and non-biological contaminants found in feedstuffs and their impacts on animals. **Outcome 6.7: Solid Waste and Renewable Resource Management** 6.7.6. Describe and implement solid waste management methods (e.g., composting, incineration, recycling, burial). 6.7.7. Explain the control processes and potential uses for solid waste byproducts (e.g., leachate, ash, landfill gas, sludge, methane, manure).

	Outcome 7.1: The Science of Food 7.1.6. Relate the functions and physical properties of simple and complex carbohydrates, lipids, vitamins, minerals and proteins (i.e., functional ingredients) to the manufacturing of food product **Outcome 7.3: Meat Science** 7.3.2. Perform humane harvesting techniques, including stunning, shackling and bleeding 7.3.9. Calculate carcass value using a grid-based marketing system. **Outcome 7.4: Food Production and Processing** 7.4.7. Process raw materials and products and apply food grading systems and standards of identity. 7.4.9. Determine the environmental impact of processing a food product. **Outcome 8.1: Plant Nutrition** 8.1.1. Compare and contrast organic and inorganic sources of macronutrients and micronutrients. **Outcome 9.1: Energy** 9.1.7. Determine best management practices (e.g., carbon sequestration, conservation, animal safety, efficiency) that lessen environmental impact.
10. Understand the, social, recreational, and economic impact of the companion animal industry.	**Outcome 2.6: Population Management** 2.6.8. Describe ethical and responsible animal population management practices (e.g., spaying, neutering, birth control, relocation, reintroduction, hunting, containment, culling). **Outcome 2.7: Animal Behavior** 2.7.2. Describe the adaptations and special senses (e.g., sight, hearing, smell, touch) of animals and how they contribute to animal behavior. 2.7.4. Identify social relationships involved in behavioral adjustment and adaptation (e.g., animal-to-animal and human-to-animal interaction). 2.7.5. Interpret an animal's intent based on its vocalization, body posture and chemical means of communication. 2.7.7. Handle, restrain, and move animals, while ensuring the safety of the animals and their handlers.
11. * Recognize legal and current social issues associated with animal production.	**Outcome 2.6: Population Management** 2.6.8. Describe ethical and responsible animal population management practices (e.g., spaying, neutering, birth control, relocation, reintroduction, hunting, containment, culling, euthanasia). **Outcome 2.7: Animal Behavior** 2.7.4. Identify social relationships involved in behavioral adjustment and adaptation (e.g., animal-to-animal and human-to-animal interaction). **Outcome 9.1: Energy** 9.1.7. Determine best management practices (e.g., carbon sequestration, conservation, animal safety, efficiency) that lessen environmental impact.