Oregon Agriculture, Food and Natural Resources (AFNR)

AFNR - Animal Systems

Analyze historic and current trends impacting the animal systems industry. AS.01.

1 **Evaluate the development and implications of animal origin, domestication and distribution on production practices and the environment.** AS.01.01.

1a Identify and summarize the origin, significance, distribution and domestication of different animal species. AS.01.01.01.A.

1b Evaluate and describe characteristics of animals that developed in response to the animal's environment and led to their domestication. AS.01.01.01.B.

1c Evaluate the implications of animal adaptations on production practices and the environment. AS.01.01.01.C.

2a Research and summarize major components of animal systems (e.g., livestock, companion animal, etc.). AS.01.01.02.A.

2b Describe the historical and scientific developments of different animal industries and summarize the products, services and careers associated with each. AS.01.01.02.B.

2c Predict trends and implications of future developments within different animal industries on production practices and the environment. AS.01.01.02.C.

2 **Assess and select animal production methods for use in animal systems based upon their effectiveness and impacts.** AS.01.02.

- 1a Identify and categorize terms and methods related to animal production (e.g., sustainable, conventional, humanely raised, natural, organic, etc.). AS.01.02.01.A.
- 1b Analyze the impact of animal production methods on end product qualities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.). AS.01.02.01.B.
- 1c Evaluate the effectiveness of different production methods and defend the use of selected methods using data and evidence. AS.01.02.01.C.
- 2a Research and examine marketing methods for animal products and services (e.g., conventional, niche markets, locally grown, etc.). AS.01.02.02.A.
- 2b Calculate costs of marketing versus predicted increases in sales. AS.01.02.02.B.
- 2c Devise and evaluate marketing plans for an animal agriculture product or service. AS.01.02.02.C.
- 3a Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal systems enterprises (e.g., managing records for animal identification, feeding, breeding, treatment, income/expense, etc.). AS.01.02.03.A.
- 3b Analyze and evaluate the accuracy and effectiveness of records used in an animal system business. AS.01.02.03.B.
- 3c Select and defend the use of a specific record management system based upon its effectiveness for a business related to animal systems. AS.01.02.03.C.
- 4a Identify and summarize wildlife management methods. AS.01.02.04.A.
- 4b Research and summarize local wildlife populations, challenges and ecological measures that are being utilized. AS.01.02.04.B.
- 4c Devise and evaluate plans to manage wildlife populations to achieve optimal ecological health. AS.01.02.04.C.

3 **Analyze and apply laws and sustainable practices to animal agriculture from a global perspective.** AS.01.03.

- 1a Distinguish between the types of laws pertaining to animal systems. AS.01.03.01.A.
- 1b Analyze the structure of laws governing animal industries, international trade and animal production policies. AS.01.03.01.B.
- 1c Evaluate the impact of laws pertaining to animal agriculture (e.g., pros, cons, effect on individuals, effect on businesses, etc.) and assess the compliance of production practices with established regulations. AS.01.03.01.C.
- 2a Research and summarize sustainability in animal systems. AS.01.03.02.A.
- 2b Analyze the local and global impact of sustainable animal agriculture prac AS.01.03.02.B.
- 2c Select, evaluate and defend the use of sustainable practices in animal agriculture. AS.01.03.02.C.

Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare. AS.02.

1 **Demonstrate management techniques that ensure animal welfare.** AS.02.01.

1a Explain the implications of animal welfare and animal rights for animal systems. AS.02.01.01.A.

1b Design programs that assure the welfare of animals and prevent abuse or mistreatment. AS.02.01.01.B.

1c Implement and evaluate quality-assurance programs and procedures for animal production. AS.02.01.01.C.

2a 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.). AS.02.01.02.A.

2b Analyze and document animal welfare procedures used to ensure safety and maintain low stress when moving and restraining animals. AS.02.01.02.B.

2c Devise, implement and evaluate safety procedures and plans for working with animals by species using information based on animal behavior and responses. AS.02.01.02.C.

3a Distinguish between animal husbandry practices that promote animal welfare and those that do not. AS.02.01.03.A.

3b Analyze and document animal husbandry practices and their impact on animal welfare. AS.02.01.03.B.

3c Devise economical recommendations to increase the welfare of animals in animal systems. AS.02.01.03.C.

2 **Analyze procedures to ensure that animal products are safe for consumption (e.g., use in food system, etc.).** AS.02.02.

1a Identify and categorize tools, technology and equipment used in animal husbandry and welfare to help provide an abundant and safe food supply. AS.02.02.01.A.

1b Utilize tools, technology and equipment to perform animal husbandry and welfare tasks. AS.02.02.01.B.

1c Select, evaluate and defend the use of specific tools, technology or equipment used to perform animal husbandry and welfare tasks. AS.02.02.01.C.

2a Research and summarize animal production practices that may pose health risks. AS.02.02.02.A.

2b Analyze consumer concerns with animal production practices relative to human health. AS.02.02.02.B.

2c Research and evaluate programs to assure the safety of animal products for consumption. AS.02.02.02.C.

3a Identify and describe animal tracking systems used in animal systems (e.g., livestock, companion animal, exotics, etc.). AS.02.02.03.A.

3b Analyze and summarize the impact of animal trace-back capabilities on producers and consumers. AS.02.02.03.B.

3c Evaluate the effectiveness of animal and/or premise identification programs for a given species. AS.02.02.03.C.

Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production. AS.03.

1 **Analyze the nutritional needs of animals.** AS.03.01.

1a Identify and summarize essential nutrients required for animal health and analyze each nutrient's role in growth and performance. AS.03.01.01.A.

1b Differentiate between nutritional needs of animals in different growth stages and production systems (e.g., maintenance, gestation, natural, organic, etc.). AS.03.01.01.B.

1c Assess nutritional needs for an individual animal based on its growth stage and production system. AS.03.01.01.C.

2a Differentiate between nutritional needs of animal species. AS.03.01.02.A.

2b Correlate a species' nutritional needs to feedstuffs that could meet those needs. AS.03.01.02.B.

2c Design and defend the use of a nutritional program by demonstrating the relationship between the nutrient requirements and the feedstuffs provided. AS.03.01.02.B.

2 Analyze feed rations and assess if they meet the nutritional needs of animals. AS.03.02

1a Compare and contrast common types of feedstuffs and the roles they play in the diets of animals. AS.03.02.01.A.

1b Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition. AS.03.02.01.B.

1c Select appropriate feedstuffs for animals based on a variety of factors (e.g., economics, digestive system and nutritional needs, etc.). AS.03.02.01.C.

2a Examine the importance of a balanced ration for animals based on the animal's growth stage (e.g., maintenance, newborn, gestation, lactation, etc.). AS.03.02.02.A.

2b Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements and performance. AS.03.02.02.B.

2c Select and utilize animal feeds based on nutritional requirements, using rations for maximum nutrition and optimal economic production. AS.03.02.02.C.

3a Examine the purpose, impact and mode of action of feed additives and growth promotants in animal production. AS.03.02.03.A.

3b 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.03.02.03.B.

3c Make and defend decisions regarding whether to use feed additives and growth promotants after researching and considering scientific evidence, production system needs and goals, and input from industry professionals. AS.03.02.03.C.

3 **Utilize industry tools to make animal nutrition decisions.** AS.03.03.

1a Identify and categorize tools and equipment used to meet animal nutrition needs and ensure an abundant and safe food supply AS.03.03.01.A.

1b Utilize tools and equipment to perform animal nutrition tasks. AS.03.03.01.B.

1c Select, evaluate and defend the use of specific tools or equipment used to perform animal nutrition tasks. AS.03.03.01.C.

2a Examine and summarize the meaning of various components of feed labels and feeding directions. AS.03.03.02.A.

2b Analyze and apply information from a feed label and feeding directions to feed animals. AS.03.03.02.B.

2c Evaluate and summarize the potential impacts, positive and negative, of compliance and/or noncompliance with a feed label and feeding directions. AS.03.03.02.C.

3a Examine the use of technology to provide animal nutrition. AS.03.03.03.A.

3b Analyze technologies used to provide animal nutrition and summarize their potential benefits and consequences. AS.03.03.03.B.

3c Research and recommend technology improvements to provide proper nutrition to animals. AS.03.03.03.C.

Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production. AS.04.

1 **Evaluate animals for breeding readiness and soundness.** AS.04.01.

1a Identify and categorize the male and female reproductive organs of the major animal species. AS.04.01.01.A.

1b Analyze the functions of major organs in the male and female reproductive systems. AS.04.01.01.B.

1c Select breeding animals based on characteristics of the reproductive organs. AS.04.01.01.C.

2a Compare and contrast how age, size, life cycle, maturity level and health status affect the reproductive efficiency of male and female animals. AS.04.01.02.A.

2b Assess and describe factors that lead to reproductive maturity. AS.04.01.02.B.

2c Evaluate and select animals for reproductive readiness. AS.04.01.02.C.

3a Summarize the importance of efficient and economic reproduction in animals. AS.04.02.03.A.

3b Evaluate reproductive problems that occur in animals. AS.04.02.03.B.

3c Treat or cull animals with reproductive problems. AS.04.02.03.C.

2 Apply scientific principles to select and care for breeding animals. AS.04.02.

1a Summarize genetic inheritance in animals. AS.04.02.01.A.

1b Compare and contrast the use of genetically superior animals in the production of animals and animal products. AS.04.02.01.B.

1c Select and evaluate a breeding system based on the principles of genetics. AS.04.02.01.C.

2a Identify and summarize inheritance and terms related to inheritance in animal breeding (e.g., dominate, co-dominate, recessive, homozygous, heterozygous, etc.). AS.04.02.02.A.

2b Demonstrate how to determine probability trait inheritance in animals. AS.04.02.02.B.

2c Select and evaluate breeding animals and determine the probability of a given trait in their offspring. AS.04.02.02.C.

3a Identify and summarize genetic defects that affect animal performance. AS.04.02.03.A.

3b Analyze how DNA analysis can detect genetic defects in breeding stock. AS.04.02.03.B.

3c Perform a DNA analysis and use the data to make and defend breeding decisions. AS.04.02.03.C.

4a Identify and summarize different needs of breeding animals based on their growth stages (e.g., newborn, parturition, gestation, gestation lengths, etc.). AS.04.02.04.A.

4b Analyze the care needs for breeding stock in each stage of growth. AS.04.02.04.B.

4c Create a plan to differentiate care of a species of breeding animals throughout their growth stages. AS.04.02.04.C.

3 Apply scientific principles to breed animals. AS.04.03.

1a Identify and categorize natural and artificial breeding methods (e.g., natural breeding, artificial insemination, estrous synchronization, flushing, cloning, etc.). AS.04.03.01.A.

1b Calculate the potential economic benefits of natural versus artificial breeding methods. AS.04.03.01.B.

1c Select animal breeding methods based on reproductive and economic efficiency AS.04.03.01.C.

2a Analyze the materials, methods and processes of artificial insemination. AS.04.03.02.A.

2b Demonstrate artificial insemination techniques. AS.04.03.02.B.

2c Evaluate the implementation and effectiveness of artificial insemination techniques. AS.04.03.02.C.

3a 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.). AS.04.03.03.A.

3b Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer. AS.04.03.03.B.

3c Create and evaluate plans and procedures for estrous synchronization, superovulation, flushing, embryo transfer and other reproductive management practices. AS.04.03.03.C.

4a Examine the use of quantitative breeding values (e.g., EPDs, Performance records, pedigrees) in the selection of genetically superior breeding stock. AS.04.03.04.A.

4b Compare and contrast quantitative breeding value differences between genetically superior animals and animals of average genetic value. AS.04.03.04.B.

4c Select and assess animal performance based on quantitative breeding values for specific characteristics. AS.04.03.04.C.

Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health. AS.05.

1 **Design animal housing, equipment and handling facilities for the major systems of animal production.** AS.05.01.

- 1a Differentiate between the types of facilities needed to house and produce animal species safely and efficiently. AS.05.01.01.A.
- 1b Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe, sustainable and efficient use of the facility. AS.05.01.01.B.
- 1c Design an animal facility focusing on animal requirements, economic efficiency, sustainability, safety and ease of handling. AS.05.01.01.C.
- 2a Identify and summarize equipment, technology and handling facility procedures used in modern animal production (e.g., climate control devices, sensors, automation, etc.). AS.05.01.02.A.
- 2b 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.05.01.02.B.
- 2c Select, use and evaluate equipment, technology and handling procedures to enhance sustainability and production efficiency. AS.05.01.02.C.

2 **Comply with government regulations and safety standards for facilities used in animal production.** AS.05.02.

- 1a Identify and summarize the general standards that must be met in facilities for animal production (e.g., environmental, zoning, construction, etc.). AS.05.02.01.A.
- 1b Analyze animal facilities to determine if standards have been met. AS.05.02.01.B.
- 1c Evaluate facility designs and make recommendations to ensure that it meets standards for the legal, safe, ethical, economical and efficient production of animals. AS.05.02.01.C.
- 2a Distinguish between the types of laws and regulations pertaining to animal systems. AS.05.02.02.A.
- 2b Analyze the structure of laws pertaining to animal systems. AS.05.02.02.B.
- 2c Evaluate the impact of laws pertaining to animal systems. AS.05.02.02.C.

Classify, evaluate and select animals based on anatomical and physiological characteristics. AS.06.

1 **Classify animals according to taxonomic classification systems and use (e.g. agricultural, companion, etc.).** AS.06.01.

1a Explain the importance of the binomial nomenclature system for classifying animals AS.06.01.01.A.

1b Explain how animals are classified using a taxonomic classification system. AS.06.01.01.B.

1c Assess taxonomic characteristics and classify animals according to the taxonomic classification system. AS.06.01.01.C.

2a Compare and contrast major uses of different animal species (e.g., agricultural, companion, etc.). AS.06.01.02.A.

2b Appraise and evaluate the economic value of animals for various applications in the agriculture industry. AS.06.01.02.B.

2c Recommend different uses for an animal species based upon an analysis of local market needs. AS.06.01.02.C.

3a Identify and summarize common classification terms utilized in animal systems (e.g., external and internal body parts, maturity, mature male, immature female, animal products, breeds, etc.). AS.06.01.03.A.

3b Analyze the visual characteristics of an animal or animal product and select correct classification terminology when referring to companion and production animals. AS.06.01.03.B.

3c Apply knowledge of classification terms to communicate with others about animal systems in an effective and accurate manner. AS.06.01.03.C.

2 **Apply principles of comparative anatomy and physiology to uses within various animal systems.** AS.06.02.

1a Research and summarize characteristics of a typical animal cell and identify the organelles. AS.06.02.01.A.

1b Analyze the functions of each animal cell structure. AS.06.02.01.B.

1c Correlate the functions of animal cell structures to animal growth, development, health and reproduction. AS.06.02.01.C.

2a Examine the basic functions of animal cells in animal growth and reproduction. AS.06.02.02.A.

2b Analyze the processes of meiosis and mitosis in animal growth, development, health and reproduction. AS.06.02.02.B.

2c Apply the processes of meiosis and mitosis to solve animal growth, development, health and reproductive problems. AS.06.02.02.C.

3a Identify and summarize the properties, locations, functions and types of animal cells, tissues, organs and body systems. AS.06.02.03.A.

3b Compare and contrast animal cells, tissues, organs, body systems types and functions among animal species. AS.06.02.03.B.

3c Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions. AS.06.02.03.C.

3 **Select and train animals for specific purposes and maximum performance based on anatomy and physiology.** AS.06.03.

1a Identify and summarize how an animal's health can be affected by anatomical and physiological disorders. AS.06.03.01.A.

1b Compare and contrast desirable anatomical and physiological characteristics of animals within and between species. AS.06.03.01.B.

1c Evaluate and select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth and reproduction. AS.06.03.01.C.

2a Evaluate an animal against its optimal anatomical and physiological characteristics. AS.06.03.02.A.

2b 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.06.03.02.B.

2c Choose, implement and evaluate sustainable and efficient procedures (e.g., selection, housing, nutrition and management) to produce consistently high-quality animals that are well suited for their intended purposes. AS.06.03.02.C.

3a Research and summarize the use of products and by-products derived from animals. AS.06.03.03.A.

3b Evaluate and select products from animals based on industry standards. AS.06.03.03.B.

3c Evaluate and select animals to produce superior animal products based on industry standards. AS.06.03.03.C.

Apply principles of effective animal health care. AS.07.

1 **Design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare.** AS.07.01.

1a Identify and summarize specific tools and technology used in animal health management. AS.07.01.01.A.

1b Describe and demonstrate the proper use and function of specific tools and technology related to animal health management. AS.07.01.01.B.

1c Select and use tools and technology to meet specific animal health management goals. AS.07.01.01.C.

2a Explain methods of determining animal health and disorders. AS.07.01.02.A.

2b Perform simple health-check evaluations on animals and practice basic emergency response procedures related to animals. AS.07.01.02.B.

2c Determine when an animal health concern needs to be referred to an animal health professional. AS.07.01.02.C.

3a List and summarize the characteristics of wounds, common diseases, parasites and physiological disorders that affect animals. AS.07.01.03.A.

3b Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites and physiological disorders AS.07.01.03.B.

3c Treat common diseases, parasites and physiological disorders of animals according to directions prescribed by an animal health professional. AS.07.01.03.C.

4a Identify and summarize characteristics of causal agents and vectors of diseases and disorders in animals. AS.07.01.04.A.

4b Research and analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites and disorders among animals. AS.07.01.04.B.

4c Design and implement a health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments. AS.07.01.04.C.

5a Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.). AS.07.01.05.A.

5b Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures. AS.07.01.05.B.

5c Identify and describe surgical and nonsurgical veterinary treatments and procedures to meet specific animal health care objectives. AS.07.01.05.C.

2 **Analyze biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level.** AS.07.02.

- 1a Summarize the importance of biosecurity to the animal industry at multiple levels (e.g., local, state, national, global). AS.07.02.01.A.
- 1b Analyze procedures at the local, state and national levels to ensure biosecurity of the animal industry. AS.07.02.01.B.
- 1c Design and evaluate a biosecurity plan for an animal production operation. AS.07.02.01.C.
- 2a Identify and describe zoonotic diseases including their historical significance and potential future implications AS.07.02.02.A.
- 2b Analyze the health risk of different zoonotic diseases to humans and identify prevention methods. AS.07.02.02.B.
- 2c Research and evaluate the effectiveness of zoonotic disease prevention methods and procedures to identify those that are best suited to ensure public safety and animal welfare. AS.07.02.02.C.

Analyze environmental factors associated with animal production. AS.08.

1 **Design and implement methods to reduce the effects of animal production on the environment.** AS.08.01.

- 1a Identify and summarize the effects of animal agriculture on the environment (e.g., waste disposal, carbon footprint, air quality, environmental efficiencies, etc.). AS.08.01.01.A.
- 1b Assess the effectiveness of methods of reducing the effects of animal agriculture on the environment. AS.08.01.01.B.
- 1c Devise a plan that includes measures to reduce the impact of animal agriculture on the environment AS.08.01.01.C.

2 **Evaluate the effects of environmental conditions on animals and create plans to ensure favorable environments for animals.** AS.08.02.

1a Research and summarize environmental conditions that impact animals (e.g., weather, sources of water, food resources, etc.). AS.08.02.01.A.

1b 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.08.02.01.B.

1c Apply valid and reliable research evidence to predict the potential effects of different environmental conditions for an animal population. AS.08.02.01.C.

2a Identify and summarize methods for ensuring optimal environmental conditions for animals. AS.08.02.01.A.

2b Implement and evaluate the effectiveness of methods to ensure optimal environmental conditions for animals. AS.08.02.02.B.

2c Devise and improve plans to establish favorable environmental conditions for animal growth and performance based on a variety of factors (e.g., economic feasibility, environmental sustainability, impact on animals, etc.). AS.08.02.02.C.