Indiana CTE

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

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

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

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

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

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

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

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

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

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

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