Texas CTE

Advanced Animal Science (One Credit), Adopted 2015.

General requirements. This course is recommended for students in Grades 11 and 12. Prerequisites: Biology and Chemistry or Integrated Physics and Chemistry (IPC); Algebra I and Geometry; and either Small Animal Management, Equine Science, or Livestock Production. Recommended prerequisite: Veterinary Medical Applications. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course. AAS.A

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Introduction. AAS.B

1 Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions. AAS.B.1

. The Agriculture, Food, and Natural Resources Career Cluster focuses on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources. AAS.B.

3 **Advanced Animal Science examines the interrelatedness of human, scientific, and technological dimensions of livestock production. Instruction is designed to allow for the application of scientific and technological aspects of animal science through field and laboratory experiences. To prepare for careers in the field of animal science, students must attain academic skills and knowledge, acquire knowledge and skills related to animal systems, and develop knowledge and skills regarding career opportunities, entry requirements, and industry standards. To prepare for success, students need opportunities to learn, reinforce, apply, and transfer their knowledge and skills in a variety of settings.** AAS.B.3

4 **Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.** AAS.B.4

9 **Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.** AAS.B.9

8 **Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.** AAS.B.8

7 **A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.** AAS.B.7

6 **Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).** AAS.B.6

5 **Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.** AAS.B.5

Knowledge and skills. AAS.C

1 **The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:** AAS.C.1

- a identify career development and entrepreneurship opportunities in the field of animal systems; AAS.C.1.A
- b apply competencies related to resources, information, interpersonal skills, and systems of operation in animal systems; AAS.C.1.B
- c demonstrate knowledge of personal and occupational safety and health practices in the workplace; AAS.C.1.C
- d identify employers' expectations, including appropriate work habits, ethical conduct, and legal responsibilities; AAS.C.1.D
- e demonstrate characteristics of good citizenship such as stewardship, advocacy, and community leadership; AAS.C.1.E
- f research career topics using technology such as the Internet. AAS.C.1.F

2 **The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:** AAS.C.2

- a demonstrate safe practices during laboratory and field investigations; AAS.C.2.A
- b demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. AAS.C.2.B

3 **The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:** AAS.C.3

a know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section; AAS.C.3.A

b know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; AAS.C.3.B

c know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science are created and new technologies emerge; AAS.C.3.C

d distinguish between scientific hypotheses and scientific theories; AAS.C.3.D

e plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology; AAS.C.3.E

f collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, datacollecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures; AAS.C.3.F

g analyze, evaluate, make inferences, and predict trends from data; AAS.C.3.G

h communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports. AAS.C.3.H

4 **The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:** AAS.C.4

- a in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student; AAS.C.4.A
- b communicate and apply scientific information extracted from various sources such as accredited scientific journals, institutions of higher learning, current events, news reports, and marketing materials; AAS.C.4.B
- c draw inferences based on data related to promotional materials for products and services; AAS.C.4.C
- d evaluate the impact of scientific research on society and the environment; AAS.C.4.D
- e evaluate models according to their limitations in representing biological objects or events; AAS.C.4.E
- f research and describe the history of biology and contributions of scientists. AAS.C.4.F

5 **he student develops a supervised agriculture experience program. The student is expected to:** AAS.C.5

- a plan, propose, conduct, document, and evaluate a supervised agriculture experience program as an experiential learning activity; AAS.C.5.A
- b apply proper record-keeping skills as they relate to the supervised agriculture experience; AAS.C.5.B
- c participate in youth leadership opportunities to create a well-rounded experience program; AAS.C.5.C
- d produce and participate in a local program of activities using a strategic planning process. AAS.C.5.D

6 **The student demonstrates principles related to the human, scientific, and technological dimensions of animal agriculture and the resources necessary for producing domesticated animals. The student is expected to:** AAS.C.6

- a evaluate market classes and grades of livestock; AAS.C.6.A
- b identify animal products such as organic and farm-raised and consumption patterns relative to human diet and health issues; AAS.C.6.B
- c describe the growth and development of livestock as a global commodity. AAS.C.6.D

7 **The student applies the principles of reproduction and breeding to livestock improvement. The student is expected to:** AAS.C.7

- a describe reproductive cycles and relate them to breeding systems; AAS.C.7.A
- b explain the embryo transfer process and how it can impact livestock industries; AAS.C.7.B
- c recognize the significance of meiosis to sexual reproduction; AAS.C.7.C
- d evaluate animal behavior and its relationship to livestock management. AAS.C.7.D

8 **The student applies the principles of molecular genetics and heredity. The student is expected to:** AAS.C.8

- a explain Mendel's laws of inheritance by predicting genotypes and phenotypes of offspring using the Punnett square; AAS.C.8.A
- b predict genotypes and phenotypes of animal offspring using Mendelian or non-Mendelian patterns of inheritance in various forms of livestock and use Punnett Square and assign alleles to justify all predictions; AAS.C.8.B
- c identify the parts of the nucleotide and the difference between the nucleotides found in deoxyribonucleic acid (DNA) versus ribonucleic acid (RNA); AAS.C.8.C
- d explain the functions of DNA and RNA; AAS.C.8.D
- e describe how heredity is used in the selection of livestock such as knowing the difference between outbreeding and inbreeding/linebreeding; AAS.C.8.E
- f explain how traits are passed from parent to offspring through genetic transfer and the implications of breeding practices. AAS.C.8.F

9 **The student examines and compares animal anatomy and physiology in livestock species. The student is expected to:** AAS.C.9

- a identify and compare the external anatomy of livestock species; AAS.C.9.A
- b compare the anatomy and physiology of the skeletal, muscular, reproductive, digestive, circulatory, genito-urinary, respiratory, nervous, immune, and endocrine systems of animals; AAS.C.9.B
- c describe interactions among various body systems such as circulatory, respiratory, and muscular systems; AAS.C.9.C
- d identify and describe the functions of epithelial, nervous, connective, and muscular tissue and relate the functions to animal body systems. AAS.C.9.D

10 **The student determines nutritional requirements of ruminant and non-ruminant animals. The student is expected to:** AAS.C.10

- a describe the structures and functions of the digestive system of ruminant animals, including cattle, and non-ruminant animals, including poultry; AAS.C.10.A
- b identify and describe sources of nutrients and classes of feeds and relate them to ruminant and non-ruminant animals; AAS.C.10.B
- c identify and describe vitamins, minerals, and feed additives and how they relate to the nutritional requirements of ruminant and non-ruminant animals; AAS.C.10.C
- d formulate rations based on different nutritional requirements; AAS.C.10.D
- e analyze feeding practices in relation to nutritional requirements of animals; AAS.C.10.E
- f analyze feed quality issues and determine their effect on animal health. AAS.C.10.F

11 **The student evaluates animal diseases and parasites. The student is expected to:** AAS.C.11

- a identify factors that influence the health of animals such as geographic location, age, genetic composition, and inherited diseases for a particular species; AAS.C.11.A
- b identify pathogens and describe the effects that diseases have on various body systems; AAS.C.11.B
- c explain the methods of prevention, control, and treatment for diseases; AAS.C.11.C
- d describe the process of immunity and disease transmission; AAS.C.11.D
- e explain how external and internal parasites are transmitted and the effect they have on the host; AAS.C.11.E
- f explain the methods of prevention, control, and treatment of internal and external parasites; AAS.C.11.F
- g describe the life cycles of various parasites and relate them to animal health issues; AAS.C.11.G
- h conduct parasite diagnostic tests. AAS.C.11.H

12 **The student defines how an organism grows and how specialized cells, tissues, and organs develop. The student is expected to:** AAS.C.12

- a compare cells from different parts of animals, including epithelia, muscles, and bones, to show specialization of structure and function; AAS.C.12.A
- b describe and explain cell differentiation in the development of organisms; AAS.C.12.B
- c sequence the levels of organization in animals and relate the parts to each other and to the whole. AAS.C.12.C

13 **The student demonstrates an understanding of policies and issues in animal science. The student is expected to:** AAS.C.13

- a discuss the effects of biotechnology such as cloning, artificial insemination, and freezing of semen and embryos on the production of livestock; AAS.C.13.A
- b analyze the issues surrounding animal welfare and the humane treatment of livestock; AAS.C.13.B
- c apply principles of nutrition to maximize feed efficiency for livestock; AAS.C.13.C
- d design, conduct, and complete research to solve a self-identified problem in scientific animal agriculture; AAS.C.13.
- e analyze the issues surrounding the impact of livestock production on the environment. AAS.C.13.E

14 **The student discusses livestock harvesting operations. The student is expected to:** AAS.C.14

- a map the stages of animal growth and development and how they relate to market readiness; AAS.C.14.A
- b describe the harvesting process; AAS.C.14.B
- c describe federal and state meat inspection standards such as safety, hygiene, and quality control standards; AAS.C.14.
- d identify retail and wholesale cuts of meat and meat by-products and correlate to major muscle groups. AAS.C.14.D

15 **The student explores methods of marketing livestock. The student is expected to:** AAS.C.15

- a compare various methods of marketing livestock; AAS.C.15.A
- b describe methods of marketing meat and meat products. AAS.C.15.B