

**Colorado CTE Course – Scope and Sequence**

<b>Course Name</b>	<b>Principles of Animal and Veterinary Science A</b>		<b>Course Details</b>	2 <sup>nd</sup> course in Animal Science POS after Intro to AFNR First semester content	
			<b>Course = 0.50 Carnegie Unit Credit</b>		
<b>Course Description</b>	Students will develop knowledge, skills and understanding in the biological processes and physiological systems found in livestock and companion animal species including anatomy and physiology, growth and development, muscular and skeletal systems, integumentary system, respiratory and circulatory systems, nervous system, lymphatic and endocrine systems and excretory system. The scientific processes of observation, hypothesizing, data gathering, interpretation, analysis and application will be included. Career opportunities and educational preparation will be examined. Learning activities are varied with classroom, laboratory and field experiences will be included.				
<b>Note:</b>	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.				
SCED Identification #		Schedule calculation based on 60 % of instructional time in the semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.			
All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at <a href="https://www.cde.state.co.us/standardsandinstruction/essentialskills">https://www.cde.state.co.us/standardsandinstruction/essentialskills</a>					
<b>Instructional Unit Topic</b>	<b>Suggested Length of Instruction</b>	<b>CTE or Academic Standard Alignment</b>	<b>Competency / Performance Indicator</b>	<b>Outcome / Measurement</b>	<b>CTSO Integration</b>
Unit 1: Students will analyze and evaluate the production of animal species and the effects those animal production systems have had on society. The use of animals in both the companion animal industry as well as the use of animals in research will be addressed.	10%	<b>AS.01.</b> Analyze historic and current trends impacting the animal systems industry.	<b>AS.01.01.</b> Evaluate the development and implications of animal origin, domestication and distribution on production practices and the environment. <u><a href="#">SCIENCE: SC.HS.2.11</a></u>	<b>AS.01.01.02.b.</b> Describe the historical and scientific developments of different animal industries and summarize the products, services and careers associated with each.  <b>AS.01.01.02.a.</b> Research and summarize major components of animal systems (e.g., livestock, companion animal, etc.).  <b>AS.01.02.01.a.</b> Identify and categorize terms and methods related to animal production (e.g., sustainable, conventional, humanely raised, natural, organic, etc.).	

		<p><b>AS.02.</b> Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.</p>	<p><b>AS.02.01.</b> Demonstrate management techniques that ensure animal welfare. <i>SCIENCE: NGSS.HS.ETS1.2</i></p>	<p><b>AS.01.02.01.b.</b> Analyze the impact of animal production methods on end product qualities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.).</p> <p><b>AS.02.01.01.b.</b> Design programs that assure the welfare of animals and prevent abuse or mistreatment.</p> <p><b>AS.02.01.03.a.</b> Distinguish between animal husbandry practices that promote animal welfare and those that do not.</p>	
<p>Unit 2: Students will examine the animal species at the cellular level and demonstrate an understanding of how animal growth and development is affected by various cell structures and processes</p>	<p>14%</p>	<p><b>AS.06.</b> Classify, evaluate and select animals based on anatomical and physiological characteristics.</p>	<p><b>AS.06.02.</b> Apply principles of comparative anatomy and physiology to uses within various animal systems <i>SCIENCE: SC.HS.2.1</i></p>	<p><b>AS.06.02.01.a.</b> Research and summarize characteristics of a typical animal cell and identify the organelles.</p> <p><b>AS.06.02.01.b.</b> Analyze the functions of each animal cell structure.</p> <p><b>AS.06.02.02.a.</b> Examine the basic functions of animal cells in animal growth and reproduction.</p> <p><b>AS.06.02.02.b.</b> Analyze the processes of meiosis and mitosis in animal growth, development, health and reproduction.</p> <p><b>AS.06.02.03.a.</b> Identify and summarize the properties, locations, functions and types of animal cells, tissues, organs and body systems.</p>	

				<p><b>AS.06.02.03.b.</b> Compare and contrast animal cells, tissues, organs, body systems types and functions among animal species.</p>	
<p>Unit 3: Students will develop an understanding of and the proper usage of the terminology associated with the internal and external anatomy of livestock and companion animal species</p>	22%	<p><b>AS.06.</b> Classify, evaluate and select animals based on anatomical and physiological characteristics.</p>	<p><b>AS.06.01.</b> Classify animals according to taxonomic classification systems and use (e.g. agricultural, companion, etc.).</p> <p><b>AS.06.02.</b> Apply principles of comparative anatomy and physiology to uses within various animal systems. <i>SCIENCE: SC.HS.2.1</i></p>	<p><b>AS.06.01.02.a.</b> Compare and contrast major uses of different animal species (e.g., agricultural, companion, etc.)</p> <p><b>AS.06.01.03.a.</b> 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.)</p> <p><b>AS.06.01.03.b.</b> Analyze the visual characteristics of an animal or animal product and select correct classification terminology when referring to companion and production animals.</p> <p><b>AS.06.02.02.a.</b> Examine the basic functions of animal cells in animal growth and reproduction.</p> <p><b>AS.06.02.03.a.</b> Identify and summarize the properties, locations, functions and types of animal cells, tissues, organs and body systems.</p> <p><b>AS.06.02.03.b.</b> Compare and contrast animal cells, tissues, organs, body systems types and functions among animal species.</p>	

			<p><b>AS.06.03.</b> Select and train animals for specific purposes and maximum performance based on anatomy and physiology.</p>	<p><b>AS.06.03.02.a.</b> Evaluate an animal against its optimal anatomical and physiological characteristics.</p>	
<p>Unit 4: Students will analyze animal behavior and the effects of stress on the animal. Handling and restraining processes will be evaluated</p>	<p>14%</p>	<p><b>AS.02.</b> Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.</p> <p><b>AS.05.</b> Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.</p>	<p><b>AS.02.01.</b> Demonstrate management techniques that ensure animal welfare. <i>SCIENCE: NGSS.HS.ETS1.2</i></p> <p><b>AS.05.01.</b> Design animal housing, equipment and handling facilities for the major systems of animal production.</p> <p><b>AS.05.02.</b> Comply with government regulations and safety standards for</p>	<p><b>AS.02.01.02.b.</b> Analyze and document animal welfare procedures used to ensure safety and maintain low stress when moving and restraining animals.</p> <p><b>AS.02.01.02.a.</b> 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.).</p> <p><b>AS.02.01.03.b.</b> Analyze and document animal husbandry practices and their impact on animal welfare.</p> <p><b>AS.05.01.01.a.</b> Differentiate between the types of facilities needed to house and produce animal species safely and efficiently.</p> <p><b>AS.05.01.01.b.</b> Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe, sustainable and efficient use of the facility.</p>	

			facilities used in animal production. <a href="#"><i>ELA: RW.H1.4.1</i></a>	<b>AS.05.02.01.b.</b> Analyze animal facilities to determine if standards have been met.	

<b>Course Name</b>	Principles of Animal and Veterinary Science II		<b>Course Details</b>	2 <sup>nd</sup> course in Animal Science POS after Intro to AFNR <b>,Second semester of content</b>	
<b>Course Description</b>	Students will develop knowledge, skills and understanding in the biological processes and physiological systems found in livestock and companion animal species including anatomy and physiology, growth and development, muscular and skeletal systems, integumentary system, respiratory and circulatory systems, nervous system, lymphatic and endocrine systems and excretory system. The scientific processes of observation, hypothesizing, data gathering, interpretation, analysis and application will be included. Career opportunities and educational preparation will be examined. Learning activities are varied with classroom, laboratory and field experiences will be included.				
<b>Note:</b>	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.				
SCED Identification #	18101	Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.			
All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at <a href="https://www.cde.state.co.us/standardsandinstruction/essentialskills">https://www.cde.state.co.us/standardsandinstruction/essentialskills</a>					
<b>Instructional Unit Topic</b>	<b>Suggested Length of Instruction</b>	<b>CTE or Academic Standard Alignment</b>	<b>Competency / Performance Indicator</b>	<b>Outcome / Measurement</b>	<b>CTSO Integration</b>
Unit 1: Students will demonstrate an understanding of a healthy animal and the causes of disease and the various disease causing agents. Disease prevention will also be addressed	29%	<b>AS.07.</b> Apply principles of effective animal health care.	<b>AS.07.01.</b> Design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare. <i>MATH: MA.HS.N-Q.A</i>	<p><b>AS.07.01.01.a.</b> Identify and summarize specific tools and technology used in animal health management.</p> <p><b>AS.07.01.02.a.</b> Explain methods of determining animal health and disorders.</p> <p><b>AS.07.01.03.a.</b> List and summarize the characteristics of wounds, common diseases, parasites and physiological disorders that affect animals.</p> <p><b>AS.07.01.03.b.</b> Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds,</p>	

				<p>diseases, parasites and physiological disorders.</p> <p><b>AS.07.01.04.a.</b> Identify and summarize characteristics of causal agents and vectors of diseases and disorders in animals.</p> <p><b>AS.07.01.05.a.</b> Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).</p> <p><b>AS.07.01.04.b.</b> Research and analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites and disorders among animals.</p> <p><b>AS.07.01.04.c.</b> Design and implement a health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments.</p>	
Unit 2: Students will analyze and evaluate biosecurity measures that ensure animal welfare and protect the public from disease outbreaks and public health concerns	5%	<b>AS.07.</b> Apply principles of effective animal health care.	<b>AS.07.02:</b> Analyze biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level.	<p><b>AS.07.02.01.a.</b> Summarize the importance of biosecurity to the animal industry at multiple levels (e.g., local, state, national, global).</p> <p><b>AS.07.02.01.b.</b> Analyze procedures at the local, state and national levels to ensure biosecurity of the animal industry.</p> <p><b>AS.07.02.02.b.</b> Analyze the health risk of different zoonotic</p>	

				<p>diseases to humans and identify prevention methods.</p> <p><b>AS.07.02.02.a.</b> Identify and describe zoonotic diseases including their historical significance and potential future implications.</p> <p><b>AS.07.02.02.c.</b> 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.</p>	
<p>Unit 3: Students will demonstrate an understanding of the laws governing veterinary professionals and animal production facilities and their impact on animal welfare</p>	8%	<p><b>AS.01.</b> Analyze historic and current trends impacting the animal systems industry.</p>	<p><b>AS.01.03.</b> Analyze and apply laws and sustainable practices to animal agriculture from a global perspective.</p> <p><i>ELA: RW.H1.4.1</i> <i>RW.H2.4.1</i> <i>RW.H1.2.2</i> <i>RW.H2.2.2</i></p>	<p><b>AS.01.03.01.a.</b> Distinguish between the types of laws pertaining to animal systems.</p> <p><b>AS.01.03.01.b.</b> Analyze the structure of laws governing animal industries, international trade and animal production policies.</p> <p><b>AS.01.03.01.c.</b> 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.</p>	
<p>Unit 4: Students will develop an understanding of the terminology, equipment, and procedures used in the veterinary medical field and animal</p>	18%	<p><b>AS.01.</b> Analyze historic and current trends impacting the animal systems industry.</p>	<p><b>AS.01.02.</b> Assess and select animal production methods for use in animal systems based upon their effectiveness and impacts.</p>	<p><b>AS.01.02.01.b.</b> Analyze the impact of animal production methods on end product qualities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.).</p> <p><b>AS.07.01.02.b.</b> Perform simple</p>	



<p>husbandry procedures and practices. Basic animal husbandry skills will be developed</p>		<p><b>AS.07.</b> Apply principles of effective animal health care.</p>	<p><b>AS.07.01.</b> Design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare. <a href="#">MATH:MA.HS.N-Q.A</a></p>	<p>health-check evaluations on animals and practice basic emergency response procedures related to animals.</p> <p><b>AS.07.01.05.b.</b> Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures.</p> <p><b>AS.07.01.05.c.</b> Identify and describe surgical and nonsurgical veterinary treatments and procedures to meet specific animal health care objectives.</p>	
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**CAS Academic Standards Alignment:** Online Version: <https://www.cde.state.co.us/apps/standards/>; Download version: <https://www.cde.state.co.us/apps/standards/>

### Reading, Writing, and Communicating:

- RW.H1.2.2
- RW.H2.2.2
- RW.H1.4.1 – Synthesize multiple, authoritative literary and/or informational sources, creating cohesive research projects that show an understanding of the subject.
- RW.H2.4.1 – Synthesize multiple, authoritative literary and/or informational sources to answer questions or solve problems, producing well-organized and developed research projects that defend information, conclusions, and solutions.

### Math:

- MA.HS.N-Q.A – Quantities: Reason quantitatively and use units to solve problems.

### Science:

- SC.HS.1.6 – Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system.
- SC.HS.2.1 – DNA codes for the complex hierarchical organization of systems that enable life's functions.
- SC.HS.2.11 – Genetic variation among organisms affect survival and reproduction.
- NGSS.HS.ETS1.2 – Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

### **Essential Skills:**

#### Problem Solver:

- **Critical Thinking and Analysis:** The ability to apply a deliberate process of identifying problems, gathering information, and weighing possible solutions, including: making choices rooted in understanding patterns, cause-and-effect relationships, and the impacts that a decision can have on the individual and others.
- **Creativity and innovation:** the ability to demonstrate curiosity and imagination through experimenting with new and emerging ideas.

#### Community Member:

- **Civic Engagement:** The ability to develop and apply knowledge, skills, and habits gained from experiences – within communities of diverse perspectives – to address issues, affect change, and/or solve problems.
- **Global and cultural awareness:** the ability to collaborate with individuals from diverse backgrounds and/or cultures to address national and global issues, and to develop complex, appropriate, and workable solutions.