

Colorado CTE Course – Scope and Sequence

Course Name	Intermediate Veterinary Science		Course Details	Level 3 course in the Animal Science Pathway course sequence. First of four semesters in Vet Science strand.	
			Course = 0.50 Carnegie Unit Credit		
Course Description	Students will develop knowledge, skill, and understanding in the biological processes and physiological systems found in livestock and companion animal species pertaining to animals. Current animal agricultural issues will be researched and addressed. The scientific processes of observation, hypothesizing, data gathering, interpretation, analysis, and application will be included. Career opportunities and education preparation will be examined. Learning activities are varied with classroom, laboratory, and field experiences will be included.				
Note:	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 #	18105	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 https://www.cde.state.co.us/standardsandinstruction/essentialskills					
Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Unit 1: Careers	3%	CS.05 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathway.	CS.05.01 Evaluate and implement the steps and requirements to pursue a career opportunity in each of the AFNR career pathways. (e.g. goals, degrees, certifications, resumes, cover letter, portfolio, interviews, etc) CS.05.02 Examine and choose career opportunities that are matched to personal skills, talents, and career	CS.05.01.01.b Create a personal plan outlining goals and steps to obtain a career in an AFNR pathway. CS.05.01.02.b Analyze personal skillset and create a plan for obtaining the required education, training, and experiences to obtain a career in an AFNR pathway. CS.05.01.03.b Assess personal goals, experiences, education, and skillset and organize the to produce the appropriate tools and develop the skills to effectively communicate about one's	

			goals in an AFNR pathway of interest.	qualifications for an AFNR career.	
Unit 2: The Roles of Animals in Society • Animal Uses • Animal rights and welfare • Human Animal Bond • Companion animals vs. Production animals • Animals in research • Livestock companion animal species and breed taxonomy and identification	22%	AS.01 Analyze historic and current trends impacting the animal systems industry. AS.02 Utilize best practice protocols based upon animal behaviors for animal husbandry and welfare.	AS.01.01 Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment. <u>SCIENCE: SC.HS.2.11</u> AS.02.01 Demonstrate management techniques that ensure animal welfare. <u>SCIENCE: NGSS.HS.ETS1.2</u>	CS.05.02.02.a Research and describe careers in each of the AFNR pathways and choose potential careers connecting to personal interests and skills. AS.01.01.01.a Identify and summarize the origin, significance, distribution, and domestication of different animal specifics. AS.01.01.01.b Evaluate and describe characteristics of animals that developed in response to the animal environment and led to their domestication. AS.01.01.01.c Evaluate the implication of animal adaptations on production practices and then environment. AS.01.01.02.b Describe the historical and scientific developments of different animal industries and summarize the products, services, and careers associated with each. AS.02.01.01.a Explain the implication of animal welfare and animal rights for animal systems. AS.02.01.01.c Implement and evaluate quality assurance	

		AS.06 Classify, evaluate, and select animals based on anatomical and physiological characteristics.	AS.06.01 Classify animals according to taxonomic classification systems and use (e.g. agricultural companion. Etc).	programs and procedures for animal production. AS.02.01.02.a Distinguish between animal husbandry practices that promote animal welfare and those that do not. AS.06.01.02.a Compare and contrast major uses of different animal species (e.g. agricultural, companion, etc) AS.06.01.03.b Analyze the visual characteristics of an animal or animal product and select correct classification terminology when referring to companion and production animals. AS.06.03.03.a Research and summarize the use of products and by-products derived from animals.	
Unit 3: Veterinary Business Management - Animal Care Career Opportunities - Personal Safety and Hazards - Medical Records	35%	CS.05 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways	CS.05.01 Evaluate and implement the steps and requirements to pursue a career opportunity in each of the AFNR career pathways (e.g. goals, degrees, certifications, resumes, cover letter, portfolios, interviews. Etc)	CS.05.01.01.b Create a personal plan outlining goals and steps to obtain a career in an AFNR pathway. CS.05.01.02.a Examine the educational, training, and experiential requirements to pursue a career in an AFNR pathway (e.g. degrees, certifications, training, internships, etc)	Veterinary science CDE Livestock Evaluation CDE Prepared Public Speaking LDE Employment Skills CDE

• Veterinary Law & Ethics • Common Veterinary Medical Equipment • Veterinary Medical Terms & Terminology		AS.01 Analyze historic and current trends impacting the animal systems industry. AS.02 Utilize best practice protocols based upon animal behaviors for animal husbandry and welfare.	AS.01.02 Assess and select animal production methods for use in animal systems based upon their effectiveness and impacts. AS.02.01 Demonstrate management techniques that ensure animal welfare. <u>SCIENCE: NGSS.HS.ETS1.2</u>	CS.05.01.02.b Analyze personal skillset and create a plan for obtaining the required education, training, and experiences to obtain a career in an AFNR pathway. AS.01.02.01.b Analyze the impact of animal production methods on end product qualities (e.g. price, sustainability, marketing, labeling, animal welfare, etc) AS.01.02.01.c Evaluate the effectiveness of different production methods and defend the use of selected methods using data and evidence. AS.01.02.01.c 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.02.01.01.a Explain the implications of animal welfare and animal rights for animal systems. AS.02.01.02.b Analyze and document animal welfare procedures used to ensure safety and maintain low stress	
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			AS.02.02 Analyze procedures to ensure that animal products are safe for consumption (e.g. use in the food system) <u>SCIENCE:</u> <u>NGSS.HS.ETS1.2</u> AS.04.02 Apply scientific principles to select and care for breeding animals. <u>SCIENCE:</u> <u>SC.HS.2.9</u> <u>SC.HS.2.8</u> AS.06.02 Apply principles of comparative anatomy and physiology to uses within various animal systems. <u>SCIENCE:</u> <u>SC.HS.2.1</u> <u>SC.HS.2.2</u> AS.06.03 Select and train animals for specific purposes and maximum	when moving and restraining animals. AS.02.01.02.c Devise, implement, and evaluate safety procedures and plans for working with animals by species using information based on animal behavior and responses. AS.02.01.03.b Analyze and document animal husbandry practices and their impact on animal welfare. AS.02.02.02.b Analyze consumer concerns with animal production practices relative to human health. AS.04.02.04.a Identify and summarize different needs of breeding animals based on their growth. AS.06.02.03.a Identify and summarize properties, locations, functions, and types of animal cells, tissues, organs, and body systems. AS.06.02.03.b Compare and contrast animal cells, tissues, organs, body systems types and functions among animal species. AS.06.03.02.a Evaluate an animal against its optimal anatomical and physiological characteristics.	
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		AS.07 Apply principles of effective animal health care.	performance based on anatomy and physiology. AS.07.01 Design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare. MATH: MA.HS.N.Q.A	AS.07.01.01.b Describe and demonstrate the proper use and function of specific tools and technology related to animal health. AS.07.01.02.a Explain methods of determining animal health and disorders. AS.07.01.04.b Research and analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites, and disorders among animals.	
		CS.03 Examine and summarize the importance of health, safety, and environmental management systems in AFNR workplaces.	CS.03.01 Identify and explain the implications of required regulations to maintain and improve safety, health, and environmental management systems. CS.03.04 <i>Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.</i>	CS.03.01.02.a Summarize the importance of safety, health, and environmental management in the workplace. CS.03.04.01.a Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools and equipment (e.g. PPE, etc) CS.03.04.02.a Identify standard tools, equipment, and safety procedures related to AFNR. CS.03.04.03.a Read and interpret operating instructions related to operation, storage, and maintenance of tools and equipment related to AFNR tasks.	

Course Name	Intermediate Veterinary Science - B		Course Details	Level 3 course in the Animal Science pathway course sequence. Second of four semesters in Vet science strand.	
			Course = 0.50 Carnegie Unit Credit		
Course Description	Students will develop knowledge, skill, and understanding in the biological processes and physiological systems found in livestock and companion animal species. Current animal agricultural issues will be researched and addressed. 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 and laboratory and field experience will be included.				
Note:	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 #	18105	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 https://www.cde.state.co.us/standardsandinstruction/essentialskills					
Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Unit 1: Anatomy and Physiology - External anatomy of companion animals - External anatomy of livestock - Organ systems - Nutrition - Reproduction and genetics	35%	AS.02 Utilize best practice protocols based upon animal behaviors for animal husbandry and welfare. AS.03 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction, and/or economic production.	AS.02.01 Demonstrate management techniques that ensure animal welfare. <i>SCIENCE: NGSS.HS.ETS1.2</i> ABS.03.01 Analyze the nutritional needs of animals.	AS.02.01.02.a 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.03.01.01.a Identify and summarize essential nutrients required for animal health and analyze each nutrients role in growth and performance. AS.03.01.01.b Differentiate between nutritional needs of animals in different growth stages and production systems (e.g. maintenance, gestation,	Veterinary Science CDE Livestock Evaluation CDE

			AS.03.02 Analyze feed rations and assess if they meet the nutritional needs of animals.	natural, organic, etc) AS.03.01.01.c Assess nutritional needs for an individual animal based on its growth stage and production system. AS.03.01.02.a Differentiate between nutritional needs of animal species. AS.03.01.02.b Correlate a species' nutritional needs to feedstuffs that could meet those needs AS.03.02.01.a Compare and contrast common types of feedstuffs by evaluating their general quality and condition. AS.03.02.01.b Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition. AS.03.02.01.c Select appropriate feedstuffs for animals based on a variety of factors (e.g. economics, digestive system, and nutritional needs) AS.03.02.02.a Examine the importance of a balanced ration for animals based on the animals growth stage (e.g. maintenance, newborn, gestation, lactation, etc) AS.03.02.02.b Appraise the adequacy of feed rations using	
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		AS.04 Apply principles of animal reproduction to achieve desired outcomes for performance, development, and/or economic production.	AS.03.03 Utilize industry tools to make animal nutrition decisions. AS.04.02 Apply scientific principles to select and care for breeding animals <u>SCIENCE: SC.HS.2.9</u> <u>SC.HS.2.8</u>	data from the analysis of feedstuffs, animal requirements and performance. AS.03.03.01.a Identify and categorize tools and equipment used to meet animal nutrition needs and ensure an abundant and safe food supply. AS.03.03.02.a Examine and summarize the meaning of various components of feed labels and feeding directions. AS.03.03.02.b Analyze and apply information from a feed label and feeding directions to feed animals. AS.04.02.01.a Summarize genetic inheritance in animals. AS.04.02.02.a 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.b Demonstrate how to determine probability trait inheritance in animals. AS.04.02.02.c Select and evaluate breeding animals and determine the probability of a given trait in their offspring.	
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		AS.06 Classify, evaluate, and select animals based on anatomical and physiological characteristics. AS.07 Apply principles of effective animal health care.	AS.06.02 Apply principles of comparative anatomy and physiology to uses within various animal systems. SCIENCE: SC.HS.2.1 SC.HS.2.2 AS.07.01 Design programs to prevent animal diseases, parasites, and other disorders to ensure animal welfare. MATH: MA.HS.N.Q.A	AS.04.02.03.a Identify and summarize genetic defects that affect animal performance. AS.06.02.03.a Identify and summarize the properties, locations, functions, and types of animal cells, tissues, organs, and body systems AS.06.02.03.b Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species. AS.07.01.01.a Identify and summarize specific tools and technology used in animal health management. AS.07.01.01.b Describe and demonstrate the proper use and function of specific tools and technology related to animal health management. AS.07.01.01.c Select and use tools and technology to meet specific animal health management goals. AS.07.01.05.a Explain the clinic significance of common veterinary methods and treatment (e.g. aseptic techniques, antibiotic use, wound management, etc)	
Unit 2: Biosecurity	25%	CS.02 Evaluate the nature and scope of the Agriculture, Food, and Natural Resources Career Cluster and the role	CS.02.01 Research and use geographic and economic data to	CS.02.01.02.b Analyze and interpret a set of economic data and explain how it impacts an AFNR system.	Veterinary Science CDE

• Disease causing organisms • Biosecurity, pathogen control, human and animal risks associated with it. • Impacts on biosecurity • Veterinary office biosecurity measures and procedures		agriculture, food, and natural resources in society and the economy. CS.03 Examine and summarize the importance of health, safety, and environmental management systems in AFNR workplaces.	solve problems in AFNR systems. CS.02.02 Examine the components of the AFNR systems and assess their impact on the local, state, national, and global security and economy. CS.03.01 Identify and explain the implication of required regulations to maintain and improve safety, health, and environmental management systems. CS.03.02 Develop and implement a plan to maintain and improve health, safety, and environmental	CS.02.02.02.a Define and summarize societies on local, state, national, and global levels and describe how they related to AFNR systems. CS.02.02.02.b Assess how people within societies on local, state, national, and global levels interact with AFNR systems on daily, monthly, or yearly basis. CS.02.02.02.c Evaluate how society traditions, customs, or policies have resulted from practices with AFNR systems. CS.02.02.03.a Examine and summarize the components of the agricultural economy (e.g. environmental, crops, livestock, etc) CS.02.02.03.b Assess the economic impact of an AFNR system on a local, state, national and global level. CS.03.01.02.a Summarize the importance of safety, health, and environmental management in the workplace. CS.03.02.01.a Research and identify components require in health and safety performance plans.	Prepared Public Speaking LDE
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		CS.06 Analyze the interaction among AFNR systems in the production, processing, and management of food, fiber, and fuel and the sustainable uses of natural resources.	compliance and performance. CS.03.03 Apply health and safety practices to AFNR workplaces. CS.06.02 Analyze and explain the connection and relationships between different AFNR systems on a national and global level.	CS.03.02.01.b Analyze the effectiveness of health and safety performance plans of an AFNR workplace. CS.03.02.02.a Examine and categorize examples of environmental compliance plans from AFNR workplace. CS.03.02.02.b Develop plans to improve environmental compliance and performance within an AFNR system. CS.03.03.04.a Examine and categorize the risk level of contamination or injury as associated with AFNR tasks in the workplace. CS.06.02.01.a Summarize how AFNR systems connect and relation on a national and global level. (e.g. soil, water, economic, etc) CS.06.02.01.b Analyze difference between AFNR systems on a national and global scale. CS.06.02.02.b Analyze the connections and relationships impacted when there is a change in an AFNR system on a national or global level	
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Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

[CO CTE Academic Standards Resources](#) (Rubrics, integration strategies, etc)

[CDE Colorado Academic Standards Online](#) (Online standards lookup tool)

Standard 1: Oral Expression and Listening

Prepared Graduate 1: *Collaborate effectively as group members or leaders who listen actively and respectfully; pose thoughtful questions, acknowledge the ideas of others; and contribute ideas to further the group's attainment of an objective.*

Students collaborate to evaluate animal welfare, analyze veterinary case studies, develop health and safety plans, assess biosecurity practices, and solve animal health and management challenges through laboratory investigations, field experiences, and veterinary science activities.

Prepared Graduate 2: *Deliver effective oral presentations for varied audiences and varied purposes.*

Students communicate veterinary science concepts through presentations, career exploration activities, and CTSO events while explaining animal health, anatomy and physiology, biosecurity, and veterinary management practices.

Standard 2: Reading for All Purposes

Prepared Graduate 4: *Read a wide range of informational texts to build knowledge and to better understand the human experience.*

Students analyze veterinary medical records, animal health data, feed labels, scientific literature, biosecurity protocols, safety regulations, genetics information, and technical resources to understand veterinary medicine and animal systems.

Prepared Graduate 5: *Understand how language functions in different contexts, command a variety of word-learning strategies to assist comprehension, and make effective choices for meaning or style when writing and speaking.*

Students develop and apply specialized vocabulary related to veterinary medicine, anatomy and physiology, genetics, nutrition, biosecurity, animal welfare, disease prevention, and animal health management to communicate effectively in veterinary science settings.

Standard 3: Writing and Composition

Prepared Graduate 6: *Craft arguments using techniques specific to the genre.*

Students evaluate animal health management practices, biosecurity procedures, breeding decisions, nutrition programs, and animal welfare protocols and justify recommendations using scientific evidence, veterinary data, and industry standards.

Prepared Graduate 7: *Craft informational/explanatory texts using techniques specific to the genre.*

Students develop animal health reports, veterinary medical documentation, nutrition analyses, biosecurity plans, safety procedures, and technical explanations describing animal anatomy, physiology, genetics, and veterinary management practices.

Standard 4: Research Inquiry and Design

Prepared Graduate 10: *Gather information from a variety of sources; analyze and evaluate its quality and relevance; and use it ethically to answer complex questions.*

Students research animal anatomy and physiology, genetics, nutrition, breeding, disease prevention, biosecurity, veterinary treatments, animal welfare, agricultural safety, and the economic impacts of animal health management to develop evidence-based solutions for veterinary and animal science challenges.

Note: *Mathematics and Science standards will be added in the future. Visit the [Colorado Academic Standards](#) page for the most current version.*