

Colorado CTE Course – Scope and Sequence

Course Name	Animal Production A		Course Details	Level 3 course in the Animal Science Pathway. This is the first semester in the animal production strand.	
			Course = 0.50 Carnegie Unit Credit		
Course Description	Students will gain knowledge, skill and understanding in a variety of systems of production as well as the care, management and handling of livestock and companion animal species. Nutrients and nutrition, types of feeds, balancing rations, herd health management, common diseases, parasites, disease treatment and prevention, reproductive management, routine administration techniques and basic animal handling will be the topics covered in this course. 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, 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 #	18103	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: Production systems - Production systems (i.e. cow/calf, backgrounding, grass fed, feedlot) - Marketing methods	5%	AS.01. Analyze historic and current trends impacting the animal systems industry.	AS.01.02 Assess the select animal production methods for use in animal systems based upon their effectiveness and impact.	AS.01.02.02.a Research and examine marketing methods for animal products and services (e.g. conventional niche markets, locally grown, etc). AS.01.02.01.a Identify and categorize terms and methods related to animal production (e.g. sustainable, conventional, humanely raised, natural, organic, etc)	

				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)	
Unit 2: Farm to Table Animal supply chain	15%	CS.02 Evaluate the nature and scope of the Agriculture, Food, & Natural Resources Career Cluster and the role of agriculture, food, and natural resources (AFNR) in society and the economy.	CS.02.02 Examine the components of the AFNR systems and assess their impact on the local, state, national, and global society and economy.	CS.02.02.01.a Identify and summarize the components within AFNR systems (E.g. Animal Systems: health, nutrition, genetics etc.; Natural Resource Systems: soil, water, etc). CS.02.02.01.b Assess components within AFNR systems and analyze relationships between systems. CS.02.02.02.a Define and summarize societies on local, state, national, and global levels and describe how they relate 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 a daily, monthly, or yearly basis.	
Unit 3: Reproduction & Genetics - Reproductive anatomy - Reproductive hormones - Hormone regulation	20%	AS.04 Apply principles of animal reproduction to achieve desired outcomes for performance, development, and/or economic production.	AS.04.01 Evaluate animals for breeding readiness and soundness.	AS.04.01.01.a Identify and categorize the male and female reproductive organs of the major animal species.	

• Reproductive technologies • Mating systems • Artificial Insemination • Embryo Transfer			AS.04.02 Apply scientific principles to select and care for breeding animals. <i>MATH: MA.HS.S-MD.A</i> <i>SCIENCE: SC.HS.2.9</i> <i>SC.HS.2.8</i> AS.04.03 Apply scientific principles to breed animals.	AS.04.01.0.b Analyze the functions of major organs in the male and female reproductive systems. AS.04.02.03.b Evaluate reproductive problems that occur in animals. AS.04.03.01.a Identify and categorize natural and artificial breeding methods (e.g. natural breeding, artificial insemination, estrous synchronization, flushing, cloning, etc) AS.04.03.02.a Analyze the materials, methods, and processes of artificial insemination. AS.04.03.02.b Demonstrate artificial insemination techniques. AS.04.03.03.b Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing, and embryo transfer. AS.04.03.03.a Identify and summarize the advantages	
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Unit 4: Nutrition and Feeding • Digestive system review • Nutrient values • Daily nutrient requirements • Feed rations of common species • Supplements/specialty feeds	20%	AS.03 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction, and/or economic production.	AS.03.01 Analyze the nutritional needs of animals. AS.03.02 Analyze feed rations and assess if they meet the nutritional needs of animals.	AS.03.01.01.a Identify and summarize essential nutrients required for animal health and analyze each nutrient's 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, natural, organic, etc) AS.03.01.01.c Assess the nutritional needs for an individual animal based on its growth stage and production system.	

				AS.03.0.02.b Correlate a species' nutritional needs to feedstuffs that could meet those needs. AS.03.02.01.c Select appropriate feedstuffs for animals based on a variety of factors (e.g. economics, digestive system and nutritional needs, etc) AS.03.02.02.c Select and utilize animal feeds based on nutritional requirements, using rations for maximum nutrition and optimal economic production. AS.03.02.03.b Compare and contrast methods that utilize feed additive and growth promotants with production practices that do not (e.g. organic vs conventional production methods).	

Course Name	Animal Production B		Course Details	Level 3 course in the Animal Science Pathway. This is the second semester in the animal production strand.		
			Course = 0.50 Carnegie Unit Credit			
Course Description	Students will gain knowledge, skill and understanding in a variety of systems of production as well as the care, management and handling of livestock and companion animal species. Nutrients and nutrition, types of feeds, balancing rations, herd health management, common diseases, parasites, disease treatment and prevention, reproductive management, routine administration techniques and basic animal handling will be the topics covered in this course. 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, 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 #	18103	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: Animal Behavior and Management - Types of animal behaviors - Behavior management and animal handling - Animal handling systems and facilities	20%	AS.02 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.	AS.02.01 Demonstrate management techniques that ensure animal welfare. <i>SCIENCE:</i> <i>NGSS.HS.ETS1.2</i>	AS.02.01.02.b Analyze and document animal welfare procedures used to ensure safety and maintain low stress when moving and restraining 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.02.01.01.b Design		

design and layout. • Laws applied to animal handling • Animal husbandry practices, tools, and equipment.				programs that assure the welfare of animals and prevent abuse or mistreatment. AS.02.02.01.b Utilize tools, technology and equipment to perform animal husbandry and welfare tasks. AS.02.02.01.a Identify and categorize tools, technology, and equipment used in animal husbandry and welfare to help provide an abundant and safe food supply. AS.02.02.02.b Analyze consumer concerns with animal production practices relative to human health. AS.02.02.03.a Identify and describe animal tracking systems used in animal systems (e.g. livestock, companion animal, exotics', etc) AS.02.02.02.a Research and summarize animal production practices that may pose health risks.	
Unit 2: Issues Facing Animal Agriculture • Current Ag. Issues	15%	CS.01 Analyze how issues, trends, technologies, and public policies impact systems in the Agriculture,	CS.01.01 Research, examine, and discuss issues and trends that impact AFNR systems on local, state, national, and global levels.	CS.01.01.01.b Analyze and summarize AFNR issues and their impact on local, state, national, and global levels.	

		Food & Natural Resources Career Cluster.		CS.01.01.02.a Research and summarize trends impacting AFNR systems. CS.01.01.02.b Analyze current trends in AFNR systems and predict their impact on local, state, national, and global levels.	
Unit 3: Wildlife Ecology - Identify wildlife species - Wildlife's impact on ecological processes - Importance of wildlife for balanced systems of production	10%	AS.01. Analyze historic and current trends impacting the animal systems industry.	AS.01.02 Assess and select animal production methods for use in animal systems based upon their effectiveness and impacts.	AS.01.02.04.a Identify and summarize wildlife management methods. AS.01.02.04.b Research and summarize local wildlife populations, challenges, and ecological measures that are being utilized. AS.01.02.04.c Devise and evaluate plans to manage wildlife populations to achieve optimal ecological health.	
Unit 4: Environmental Impact Impact of animal production on the environment	15%	AS.08 Analyze environmental factors associated with animal production.	AS.08.01 Design and implement methods to reduce the effects of animal production on the environment. <i>SCIENCE: SC.HS.2.6 SC.HS.2.5</i> AS.08.02 Evaluate the effects of environmental conditions on animals and create plans to ensure favorable environments for animals. <i>SCIENCE: SC.HS.2.13</i>	AS.08.01.01.a 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.b Assess the effectiveness of methods of reducing the effects of animal agriculture on the environment. AS.08.01.01.c Devise a plan that includes measures to reduce the impact of animal	

				agriculture on the environment.	
				AS.08.02.01.a Research and summarize environmental conditions that impact animals (e.g. weather, sources of water, food sources, etc)	

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 breeding programs, formulate feed rations, assess animal welfare practices, analyze animal agriculture issues, develop environmental management plans, and solve livestock production challenges through laboratory, classroom, and field experiences.

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 scientific literature, livestock production records, feed labels, nutrition data, breeding information, animal welfare guidelines, wildlife management resources, environmental studies, and current agricultural issue reports to understand animal production 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 genetics, reproduction, nutrition, feed rations, animal behavior, welfare, wildlife ecology, environmental stewardship, and livestock production to communicate effectively in animal production settings.

Standard 3: Writing and Composition

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

Students evaluate breeding strategies, nutrition programs, animal production methods, environmental management practices, and wildlife management plans, defending recommendations using scientific evidence, production data, and industry standards.

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

Students develop feed ration analyses, breeding plans, animal welfare documentation, wildlife management plans, environmental impact assessments, and reports explaining animal production systems and 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 genetics, reproductive technologies, animal nutrition, feed additives, animal welfare, current issues in animal agriculture, wildlife ecology, and environmental impacts to evaluate production systems and develop evidence-based management solutions for livestock operations.

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