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 aswell 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 activitiesare 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	

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				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 • Reproductive technologies • Mating systems	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.04.02** Apply scientific principles to	**AS.04.01.01.a** Identify and categorize the male and female reproductive organs of the major animal species. **AS.04.01.0.b** Analyze the functions of major organs in	

• Artificial Insemination • Embryo Transfer			select and care for breeding animals. *MATH: MA.HS.S-MD.A* *SCIENCE: SC.HS.2.9* *SC.HS.2.8* **AS.04.03** Apply scientific principles to breed animals.	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 and disadvantages of major reproductive management practices, including estrous	

| | | | | synchronization, superovulation, flushing, and embryo transfer (e.g. cost, labor, equipment, etc)

AS.04.03.04.b Compare and contrast quantitative breeding value differences between genetically superior animals and animals of average genetic value. |
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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 |

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				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	
		Course = 0.50 Carnegie Unit Credit	second semester in the animal production strand.	

Course Description	Students will gain knowledge, skill and understanding in a variety of systems of production aswell 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 activitiesare 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.

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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 design and layout.	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. *SCIENCE: NGSS.HS.ETS1.2*	**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 programs that assure the	

• Laws applied to animal handling • Animal husbandry practices, tools, and equipment.				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, Food & Natural Resources Career Cluster.	**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. **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. *SCIENCE: SC.HS.2.6 SC.HS.2.5* **AS.08.02** Evaluate the effects of environmental conditions on animals and create plans to ensure favorable environments for animals. *SCIENCE: SC.HS.2.13*	**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)	

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:

Math:

- MA.HS.S-MD.A – Use probability to make decisions: Calculate expected values and use them to solve problems.

Science:

- SC.HS.2.5 – Matter and energy necessary for life are conserved as they move through the ecosystem
- SC.HS.2.6 – A complex set of interactions determine how ecosystems respond to disturbances.
- SC.HS.2.8 – The characteristics of one generation are dependent upon the genetic information inherited from previous generations.
- SC.HS.2.9 – Variation between individuals results from genetic and environmental factors.
- SC.HS.2.13 – Humans have complex interactions with ecosystems and have the ability to influence biodiversity on the planet.
- NGSS.HS.ETS.1.2 – Design a solutions 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:

- 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.