Colorado CTE Course – Scope and Sequence

Course Name	Equine Science		Course Details	Level 3 course in the Animal Science Pathway. This course would be applicable to either the Vet Science or Animal Production Strands.
			Course = 0.50 Carnegie Unit Credit	
Course Description	This course is designed to introduce students to the scientific principles of equine animal systems and to the equine industry. Competencies will cover basics of the equine industry, breeds, selection, form to function, care and management, soundness, health, reproduction, feeding, facilities, production systems and management systems.			
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 #	18104	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: Equine Industry • Employability Skills & Resources • Industry concerns • Industry trends, history, evolution, zoological order, and today's horse types • Light breeds • Draft and coach horses • Horses less than 14.2 hands • Donkeys and mules	6%	**AS.01.** Analyze historic and current trends impacting the animal systems industry.	**AS.01.01.** Evaluate the development and implications of animal origin, domestication and distribution on production practices and the environment. *SCIENCE: SC.HS.2.11*	**AS.01.01.01.a** Identify and summarize the origin, significance , distribution, and domestication of different animal species. **AS.01.01.01.b** Evaluate and describe characteristics of animals that developed in response to the animals environment and led to their domestication. **AS.01.01.02.b** Describe the historical and scientific developments of different animals industries and summarize the products, services and careers associated with each. **AS.01.01.02.c** Predict trends and implications of future developments within different animal industries on production practices and the	

				environment.	
• Coat colors, markings, and patterns		**AS.02.** Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare. **AS.06.** Classify, evaluate and select animals based on anatomical and physiological characteristics.	**AS.02.01.** Demonstrate management techniques that ensure animal welfare. *SCIENCE: NGSS.HS.ETS1.2* **AS.06.01** Classify animals according to taxonomic classification systems and use (e.g. agricultural, companion, etc)	**AS.02.01.02.a** Explain the implications of animal welfare and animal rights for animal systems. **AS.06.01.01.a** Explain the importance of the binomial nomenclature system for classifying animals. **AS.06.01.01.b** Explain how animals are classified using a taxonomic classification system. **AS.06.01.01.c** Assess taxonomic characteristics and classify animals according to the taxonomic classification system.	
Unit 2: Anatomy and Physiology • External anatomy identification • Organ systems • External & Internal parts of the hoof • Teeth and age	15%	**AS.06.** Classify, evaluate and select animals based on anatomical and physiological characteristics.	**AS.06.02.** Apply principles of comparative anatomy and physiology to uses within various animal systems	**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.	
Unit 3: Reproduction & Genetics • Reproductive anatomy review • Hormones of reproduction • Estrous/Estrus • Selection and Breeding	12%	**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.b** Analyze the functions of major organs in the male and female reproductive systems. **AS.04.01.02.a** Compare and contrast how age, size, life cycle, maturity level, and health status affect the reproductive efficiency of male and female animals.	

• Fertilization, Gestation and Parturition • Reproductive technologies • Dominant and recessive genes • Things that affect heredity • Coat Color Genetics • Genetic Disorders			**AS.04.02.** Apply scientific principles to select and care for breeding animals. *MATH: MA.HS.S.MD.A* *SCIENCE: SC.HS.2.9* *SC.HS.2.8*	**AS.04.01.02.b** Assess and describe factors that lead to reproductive maturity. **AS.04.01.02.c** Evaluate and select animals for reproductive readiness. **AS.04.02.03.a** Summarize the importance of efficient and economic reproduction in animals. **AS.04.02.03.b** Evaluate reproductive problems that occur in animals. **AS.04.02.03.c** Treat or cull animals with reproductive problems. **AS.04.02.01.a** Summarize genetic inheritance in animals. **AS.04.02.01.b** Compare and contrast the use of genetically superior animals in the production of animals and animal products. **AS.04.02.01.c** Select and evaluate a breeding system based on the principles of genetics. **AS.04.02.02.a** Identify and summarize inheritance and terms related to inheritance in animal breeding (e.g. dominate, co-dominate, recessive, heterozygous, homozygous) **AS.04.02.02.b** Demonstrate how to determine probability trait inheritance in animals.	

			AS.04.03 Apply scientific principles of breed animals.	**AS.04.02.03.b** Analyze how DNA analysis can detect genetic defects in breeding stock **AS.04.02.04.a** Identify and summarize different needs of breeding animals based on their growth stages (e.g. newborn, parturition, gestation, gestation lengths, etc) **AS.04.02.04.b** Analyze the care needs for breeding stock in each stage of growth. **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.04.03.01.b** Calculate the potential economic benefits of natural versus artificial breeding methods. **AS.04.03.01.c** Select animal breeding methods based on reproductive and economic efficiency. **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.a Identify and summarize the advantages and disadvantage of major reproductive management practices, including estrous synchronization, superovulation, flushing, embryo transfer (e.g cost, labor, equipment, etc) AS.04.03.03.b Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing, and embryo transfer.	
Unit 4: Diseases and Disorders • Fungai • Bacterial • Viral • Parasitic • Nutritional • Genetic • Behavioral	6%	**AS.07** Apply principles of effective animal health care.	**AS.07.01** Design programs to prevent animal diseases, parasites, and other disorders to ensure animal welfare. *MATH: MA.HS.N.Q.A*	**AS.07.01.03.a** List and summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals. **AS.07.01.03.b** Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders. **AS.07.01.04.a** Identify and summarize characteristics of causal agents and vectors of diseases and disorders in animals. **AS.07.01.04.b** Research and analyze data to evaluate preventative measures for controlling and limiting the spread of diseases, parasites, and disorders among animals.	

Unit 5: Management and Facilities	15%	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.	AS.02.01.01.b Design programs that assure the welfare of animals and prevent abuse or mistreatment.	Horse Judging CDE
• Health & Safety housing • Housing considerations • Barn design & flooring • Common facility equipment • Nutrition & Health • Uses and disciplines • Exercise • Grooming • Saddling •				AS.02.01.02.a Research and summarize the challenges involved with working with animals and resources available to overcome them (e.g. tools, technology, equipment, facilities, animal behavior signs, etc) 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.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.a Distinguish between animal husbandry practices and their impact on animal welfare. AS.02.01.03.b Analyze and document animal husbandry practices and their impact on animal welfare. AS.02.01.03.c Devise economical recommendations to increase the welfare of animals in animal systems.	Veterinary Science CDE
		AS.03 Design and provide proper animal nutrition to		AS.03.01.01.a Identify and summarize essential nutrients	

		achieve desired outcomes for performance, development, reproduction, and/or economic production	**AS.03.01** Analyze the nutritional needs of animals.	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.05 Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.	**AS.05.01** Design animal housing, equipment, and handling facilities for the major systems of animal production.	**AS.05.0.01.a** Differentiate between types of facilities needed to house and produce animal species safety and efficiently. **AS.05.01.01.b** Critique designs for animal facility and prescribe alternative layouts and adjustments for the safe, sustainable, and efficient use of the facility. **AS.05.01.01.c** Design an animal facility focusing on animal requirements, economic efficiency, sustainability, safety, and ease of handling. **AS.05.01.02.a** Identify and summarize equipment, technology, and handling facility procedures used in modern animal production (e.g. climate control devises, sensors, automation, etc) **AS.05.01.02.b** Analyze the use of modern equipment, technology, and handling facility procedures and determine if they enhance the safe, economic, and	

				sustainable production of animals.	
		AS.07 Apply principles of effective animal health care.	**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.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.07.01.04.c** Design and implement a health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments.	
Unit 6: Uses and Evaluation • Halter Evaluation • Western Pleasure • Western Horsemanship • Hunter Under Saddle • Hunter Hack • Hunt Seat Equitation • Reining	6%	**AS.06** Classify, evaluate, and select animals based on anatomical and physiological characteristics.	**AS.06.03** Select and train animals for specific purposes and maximum performance based on anatomy and physiology.	**AS.06.03.02.a** Evaluate an animal against its optimal anatomical and physiological characteristics. **AS.06.03.02.b** Compare and contrast procedures to sustainability and efficiently develop an animal to reach its highest performance potential with respect to its anatomical and physiological characteristics.	Horse Judging CDE

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.N-Q.A – Quantities: Reason quantitatively and use units to solve problems.
- MA.HS.S-MD.A – Use probability to make decisions: Calculate expected values and use them to solve problems.

Science:

- 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 result from genetic and environmental factors.
- SC.HS.2.11 – Genetic variation among organisms affect survival and reproduction.
- NGSS.HS.ETS.1,2 – 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.

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.

Communicator:

- Data Literacy: the ability to identify, collect, evaluate, analyze, interpret, present, and protect data.