

Career and Technical Education TEKS Review Draft Recommendations

Texas Essential Knowledge and Skills (TEKS) for Career and Technical Education Draft Recommendations

Animal Science Work Group

Courses: Equine Science, Livestock Production, Small Animal Management, Veterinary Medical Applications, Advanced Animal Science

The document reflects the final recommendations to the career and technical education (CTE) Texas Essential Knowledge and Skills (TEKS) that have been recommended by the State Board of Education’s TEKS review work groups for: **Equine Science, Livestock Production, Small Animal Management, Veterinary Medical Applications, Advanced Animal Science.**

Proposed additions are shown in green font with underline (additions). Proposed deletions are shown in red font with strikethroughs (~~deletions~~). Text proposed to be moved from its current student expectation is shown in purple italicized font with strikethrough (~~*moved text*~~) and is shown in the proposed new location in purple italicized font with underlines (*new text location*). Numbering for the knowledge and skills statements in the document will be finalized when the proposal is prepared to file with the *Texas Register*.

Comments in the right-hand column provide explanations for the proposed changes. The following notations may be used as part of the explanations.

Abbreviation	Description
CCRS	refers to the College and Career Readiness Standards
CDS	refers to cross disciplinary standards in the CCRS
ELA	refers to English language arts standards in the CCRS
M	Refers to mathematics standards in the CCRS
SCI	refers to science standards in the CCRS
SS	refers to social studies standards in the CCRS
Gap Analysis	refers to report on essential knowledge and skills aligned to in-demand high-wage occupations
VA	information moved or deleted to increase vertical alignment between courses

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§127.XX. §130.6. Equine Science (One-Half Credit), Adopted 2024. ~~Adopted 2015.~~

TEKS with edits		Work Group Comments/Rationale
(a)	General requirements. This course is recommended for students in Grades 10-12. Students shall be awarded one-half credit for successful completion of this course. <u>Recommended prerequisite: Principles of AFNR</u>	Principles of AFNR is the foundational material for all AFNR courses.
(b)	Introduction.	
(1)	Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.	
(2)	The Agriculture, Food, and Natural Resources Career Cluster focuses on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.	
(3)	In Equine Science, students will acquire knowledge and skills related to equine animal systems and the equine industry. Equine Science may address topics related to horses, donkeys, and mules. To prepare for careers in the field of animal science, students must enhance academic knowledge and skills, acquire knowledge and skills related to <u>equine animal</u> systems, and develop knowledge and skills regarding career opportunities, entry requirements, and industry expectations. To prepare for success, students need opportunities to learn, reinforce, apply, and transfer their knowledge and skills in a variety of settings.	
(4)	Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.	
(5)	Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	
(c)	Knowledge and skills.	
(1)	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	
(A)	identify career development, <u>education</u> , and entrepreneurship opportunities in the field of equine science;	Consistency
(B)	<u>identify and</u> demonstrate competencies related to resources, information, interpersonal <u>skills</u> , <u>problem solving, critical thinking skills</u> and systems of operation used in equine science;	Consistency; CCRS: ELA.IV.A.4
(C)	<u>describe and</u> demonstrate knowledge of appropriate personal and occupational health and safety <u>and health</u> practices in <u>for</u> the workplace;	CCRS: S.I.C.2.b; CCRS:ELA.IV.A.4

(D)	identify employers' expectations, including appropriate work habits, ethical conduct, and legal responsibilities;	CCRS: ELA.IV.A.4
(E)	<u>describe and</u> demonstrate characteristics of good citizenship such as stewardship, advocacy, and community leadership; and	Consistency; CCRS:ELA.IV.A.4
(F)	<u>identify training, education, and certification requirements for occupational choices.</u> research career topics using technology such as the Internet.	Consistency
(2)	The student develops a supervised agriculture <u>real</u> experience program. The student is expected to:	consistency
(A)	plan, propose, conduct, document, and evaluate a supervised agriculture <u>real</u> experience program as an experiential learning activity;	Consistency; CCRS:ELA.V
(B)	<u>use appropriate</u> apply proper record-keeping skills as they relate to the supervised agriculture <u>real</u> experience;	Consistency; CCRS: M.II.b.1
(C)	participate in youth <u>agricultural</u> leadership opportunities to create a well-rounded experience program; and	Consistency
(D)	<u>review</u> produce and participate in a local program of activities using a strategic planning process; and	Consistency
(E)	<u>create or update documentation of relevant agricultural experience such as community service, professional or classroom experiences.</u>	Consistency
(3)	The student analyzes <u>the history, domestication, and</u> equine science as it relates to the selection of <u>equine horses</u> . The student is expected to:	Add rigor; to add information about history, domestication; scaffolding;
(A)	<u>research and describe the history and evolution of equine;</u>	To add pertinent information; CCRS: S.III.D.1.a; ELA.I.A.2; ELA.V
(B) (A)	<u>describe</u> recognize the <u>impacts importance</u> of equine industries such as racing, rodeos, equestrian therapy, and the global food market; and	CCRS: SS.I.A.4.b Edit and clarification
(C) (B)	evaluate and select <u>equine breeds</u> horses based on purpose <u>and conformation.</u>	Edit and clarification; CCRS: S.VI.E.1.b
(4)	The student knows how to provide proper nutrition using accepted protocols and processes to maintain animal performance. The student is expected to:	Struck to expand and vertically align with other AFNR courses
(A)	determine nutritional requirements of horses;	Redundant
(B)	describe the anatomy and physiology of horses, including the skeletal, muscular, respiratory, reproductive, and circulatory systems; and	Redundant
(C)	<u>explain methods of maintaining horse health and soundness.</u>	Moved to 7G

(4)	<u>The student explains anatomy and physiology of equine. The student is expected to:</u>	Expanded and vertically aligned with other AFNR courses
(A)	<u>identify and explain the skeletal, muscular, respiratory, reproductive, digestive, and circulatory systems of equine;</u>	Expanded and vertically aligned with other AFNR courses; CCRS: SS.VI.F.2.b-e
(B)	<u>identify and interpret ranges for healthy equine vital signs; and</u>	Expanded and vertically aligned with other AFNR courses
(C)	<u>compare normal and abnormal behavior of equine.</u>	Expand; CCRS: S.VI.G.3.a
(5)	<u>The student determines the nutritional requirements of equine. The student is expected to:</u>	Expand and vertically align with other AFNR courses
(A)	<u>compare the equine digestive system to the digestive systems of other species;</u>	Expanded and vertically aligned with other AFNR courses; CCRS: S.VI.F.2.C
(B)	<u>identify and describe sources of nutrients and classes of feed;</u>	Expanded and vertically aligned with other AFNR courses; CCRS: S.VI.B.1.b
(C)	<u>identify and research vitamins, minerals, and feed additives;</u>	Expanded and vertically aligned with other AFNR courses; CCRS: S.VI.B.1.b
(D)	<u>formulate feed rations based on the nutritional requirements of equine; and</u>	Expanded and vertically aligned with other AFNR courses; CCRS: M.B.1-3; M.III.C.2
(E)	<u>identify and discuss feeding practices, grazing practices, and feed quality issues.</u>	Expanded and vertically aligned with other AFNR courses; CCRS: ELA.III.A.1-2
(7) (5)	The student analyzes equine science as it relates to the management of <u>equine horses</u> . The student is expected to:	Expand and align in a more cohesive sequence; fills gap analysis; clarification
(A)	<u>identify and select appropriate tools and equipment for grooming, riding, and training and facilities for horses;</u>	Expand and align in a more cohesive sequence; CCRS: S.I.C.3.a
(B)	<u>identify and select appropriate tools and equipment for safe demonstrate methods of handling and restraining horses safely; and</u>	Expand and align in a more cohesive sequence; CCRS: S.I.C.3.a; ELA.IV.A.4
(C)	<u>identify and select appropriate facilities such as housing, performance, veterinary, and reproduction;</u>	Expand and align in a more cohesive sequence
(D) (C)	<u>explain identify the procedures for breeding equine and caring for foals horses per in accordance with industry standards;</u>	Clarification; Expand; Enhance rigor
(E)	<u>explain and demonstrate methods of identifying ownership, including branding and tattooing;</u>	Expand and align in a more cohesive sequence
(F)	<u>discuss effective management strategies, such as financial planning, managing governmental regulations, and interpreting performance data; and</u>	Fill gap analysis; CCRS: SS.I.A.6.b; M.IX.B.1; M.VIII.C.2; ELA.III.A.1-2; ELA.III.A.5
(G)	<u>explain methods of maintaining equine health and soundness, such as hoof care and dental health.</u>	Clarification and move from 4C; CCRS: SS.I.A.6.b

(6)	The student <u>understands how</u> identifies equine-animal <u>are affected by pests and</u> diseases <u>and pests</u> . The student is expected to:	Increase rigor; VA
(A)	identify and describe <u>how</u> the role of bacteria, fungi, viruses, genetics, and nutrition <u>affect equine health in disease</u> ;	Clarification; CCRS: SS.I.B.1.b; SS.VI.D.3.a
(B)	identify <u>signs, symptoms,</u> methods of disease control ; treatment, and prevention <u>of diseases</u> ;	Expand/clarify
(C)	<u>identify</u> classify internal and external parasites; <u>including and explain the signs, symptoms,</u> treatment, and prevention; and	CCRS: S.X.E.2.a
(D)	identify behavioral <u>conditions</u> diseases such as cribbing, heaving, and wind sucking-; <u>and</u>	Clarification; CCRS: S.VI.G.3.a
(E)	<u>discuss methods of administering equine medications and calculating dosage.</u>	Increase rigor; VA; fills gap analysis; CCRS: M.VII.B.1; M.I.C
(8) (7)	The student <u>discusses</u> compares and contrasts issues affecting the equine industry. The student is expected to:	Clarification; expand
(A)	describe biotechnology issues related to the equine industry; and	
(B)	<u>research and present</u> identify animal welfare policy pertaining to equine industries such as racing, rodeos, equestrian therapy, the global food market, and pharmaceutical research-; <u>and</u>	CCRS: CDS.I.A.2.c; ELA.V; ELA.I.2.A
(C)	<u>research and present governmental regulations, environmental regulations, or current events that affect the equine industry.</u>	Fills gap analysis, expand; CCRS:CDS.II.D.1.b; ELA.V; ELA.I.2.A

§127.XX. §130.7. Livestock Production (One Credit), Adopted 2024. ~~Adopted 2015~~.

TEKS with edits		Work Group Comments/Rationale
(a)	General requirements. This course is recommended for students in Grades 10-12. Students shall be awarded one credit for successful completion of this course. <u>Recommended prerequisite: Principles of AFNR</u>	Principles of AFNR is the foundational material for all AFNR courses.
(b)	Introduction.	
(1)	Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.	
(2)	The Agriculture, Food, and Natural Resources Career Cluster focuses on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.	
(3)	In Livestock Production, students will acquire knowledge and skills related to livestock and the livestock production industry. Livestock Production may address topics related to beef cattle, dairy cattle, swine, sheep, goats, and poultry. To prepare for careers in the field of animal science, students must attain academic skills and knowledge, acquire knowledge and skills related to <u>livestock animal</u> systems and the workplace, and develop knowledge and skills regarding career opportunities, entry requirements, and industry expectations. To prepare for success, students need opportunities to learn, reinforce, apply, and transfer their knowledge and skills in a variety of settings.	
(4)	Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.	
(5)	Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	
(c)	Knowledge and skills.	
(1)	The student demonstrates professional standards/employability skills as required by business and industry The student is expected to:	
(A)	identify career development, <u>education</u> , and entrepreneurship opportunities in the field of <u>livestock production animal systems</u> ;	Consistency
(B)	<u>identify and demonstrate</u> apply competencies related to resources, information, interpersonal skills, problem solving, and critical thinking skills used <u>and systems of operation in animal systems; livestock production;</u>	Consistency; CCRS: ELA.IV.A.4

(C)	<u>describe and</u> demonstrate appropriate knowledge of personal and occupational safety and health practices for in the workplace;	Consistency; CCRS: ELA.IV.A.4; S.I.C.2.b
(D)	identify employers' expectations, including appropriate work habits, ethical conduct, and legal responsibilities;	CCRS: ELA.IV.A.4
(E)	<u>describe and</u> demonstrate characteristics of good citizenship such as stewardship, advocacy, and community leadership; and	Consistency; CCRS: ELA.IV.A.4
(F)	<u>identify training, education, and certification requirements for occupational choices.</u> research career topics using technology such as the Internet.	Consistency
(2)	The student develops a supervised agriculture real experience program. The student is expected to:	Consistency
(A)	plan, propose, conduct, document, and evaluate a supervised agriculture real experience program as an experiential learning activity;	Consistency; CCRS: ELA.V
(B)	<u>use appropriate</u> apply proper record-keeping skills as they relate to the supervised agriculture real experience;	Consistency; CCRS: M.II.B.1
(C)	participate in youth <u>agricultural</u> leadership opportunities to create a well-rounded experience program; and	Consistency
(D)	<u>review produce</u> and participate in a local program of activities using a strategic planning process; and	Consistency
(E)	<u>create or update documentation of relevant agricultural experience such as community service, professional or classroom experiences.</u>	consistency
(3)	The student demonstrates technical skills relating to the interrelated human, scientific, and technological dimensions of animal systems. The student is expected to:	Ambiguous
(A)	assess the importance of the United States' impact on world commodity markets;	Moved to another SE
(B)	apply the principles of livestock breeding and nutrition to predict the impact of current advances in genetics; and	Redundant
(C)	examine the interrelationship of plants and animals in concepts such as forage identification, rotational grazing, and grass protein levels.	Redundant
(3)	<u>The student analyzes the history, domestication, and selection of livestock. The student is expected to:</u>	Add rigor; to add information about history, domestication; scaffolding
(A)	<u>research and describe the history, domestication, and evolution of livestock species;</u>	To add pertinent information; CCRS: ELA.I.A.2; ELA.V; CDS.II.B.7.a
(B)	<u>describe the impacts of the livestock industry such as entertainment, recreational, exhibition of livestock, environmental impacts, sustainability, and the global food market; and</u>	To add pertinent information; CCRS: M.IX; SS.I.A.3.b

(C)	<u>evaluate and select livestock breeds based on purpose and conformation.</u>	Edit and clarification; CCRS: S.VI.E.1.b
(8) (4)	The student <u>analyzes the management skills needed</u> performs technical skills related to <u>for</u> livestock production. The student is expected to:	Expand; Add rigor
(A)	<u>identify and select appropriate tools and equipment for safe handling and restraining;</u> gather performance data;	VA; CCRS: S.I.C.3.a
(B)	<u>identify and select appropriate facilities such as housing, veterinary, reproduction;</u>	VA
(C) (B)	<u>evaluate and describe</u> common <u>industry practices</u> veterinary procedures and skills to maximize <u>efficiency of livestock such as dehorning, castrating, docking, and vaccinating; and</u>	Clarification; VA; Fills gap analysis
(C)	practice proper animal restraint techniques;	Included in another SE
(D)	<u>explain and demonstrate methods of identifying ownership, including branding, ear tagging, ear notching, wing bands, and tattooing.</u> demonstrate identification techniques; and	Fills gap analysis
(E)	demonstrate effective management strategies such as financial planning and managing governmental regulations.	Move to 9A
(4) (5)	The student explains anatomy and physiology related to nutrition, reproduction, health, and management of livestock species. The student is expected to:	Clarification
(A)	<u>identify and</u> explain the skeletal, muscular, respiratory, reproductive, and circulatory systems of livestock animals; <u>and</u>	Clarification, expand; CCRS: S.VI.F.2.b-e
(B)	<u>identify and interpret</u> evaluate <u>ranges for healthy livestock</u> vital signs; <u>and</u> and normal <u>behavior.</u>	Clarification
(C)	<u>compare normal and abnormal behavior of livestock.</u>	Expand, VA; CCRS: S.VI.G.3.a
(5) (6)	The student determines nutritional requirements of <u>livestock</u> ruminant and non-ruminant animals, including poultry. The student is expected to:	Clarification
(A)	describe <u>and compare</u> the digestive systems of ruminant and non-ruminant animals;	CCRS: S.VI.F.2.c
(B)	identify sources of nutrients and classes of feed;	CCRS: S.VI.B.1.c
(C)	identify vitamins, minerals, and feed additives;	CCRS: S.VI.B.1.c
(D)	formulate <u>feed rations</u> <u>based on least-cost factors</u> <u>and nutritional needs;</u> and	Clarification; Moved from 9C; CCRS: M.III.C.2; M.IV.B.1; M.V.C.2-3
(E)	discuss feeding practices and feed quality issues-;	
(F)	<u>identify forage plants used for livestock grazing; and</u>	Expand; VA; CCRS: S.VI.B.1.c
(G)	<u>research and present grazing practices, such as rotational grazing and deferred grazing.</u>	Expand; VA; CCRS: S.X.E.4.b; ELA.I.A.2; ELA.V

(6) (7)	The student explains <u>livestock animal</u> genetics and reproduction. The student is expected to:	Consistency
(A)	describe <u>and compare</u> the reproductive systems of various livestock;	CCRS: S.VI.F.2.e
(C) (B)	use Expected Progeny Differences (EPDs) <u>to evaluate livestock production;</u> explain the use of genetics in animal agriculture such as, phenotype, and genotype;	Moved to 7F; CCRS: M.III.C.2; M.IV.C.1; M.V.B.4; M.V.C; M.IX.B.1
(B) (C)	identify <u>and explain</u> systems of animal <u>livestock</u> breeding <u>systems, such as grading up, crossbreeding, linebreeding, and inbreeding;</u>	Fills gap analysis; Clarification
(D)	research <u>and present</u> current and emerging technologies in <u>livestock animal</u> reproduction such as cloning, embryo transfer, in vitro fertilization, and artificial insemination; and	Clarification and expand; CCRS: ELA.I.A.2; ELA.V
(E)	use Punnett Squares design and conduct experiments to support known principles of genetics to predict phenotypes and genotypes of offspring; and	Moved from 7B; CCRS S.VI.D.1.d; M.III.C.2; M.IV.B.1; M.V.4; M.V.C.2-3; M.IX.B.1
(F)	<u>explain the relationship between body condition scores and reproductive efficiency.</u>	Rigor
(7) (8)	The student <u>understands</u> <u>identifies</u> <u>how</u> livestock are affected by <u>animal</u> pests and diseases. The student is expected to:	Consistency
(A)	identify and describe <u>how</u> the role of bacteria, fungi, viruses, genetics, and nutrition in disease affect livestock health;	Consistency; VA; CCRS: S.VI.F.2.e
(B)	identify <u>signs, symptoms, methods of disease control,</u> treatment, and prevention <u>of diseases;</u> and	Rigor
(C)	<u>identify</u> classify internal and external parasites <u>including and explain the signs, symptoms, treatment, and prevention;</u> and	Clarification; CCRS: S.X.E.2.a
(D)	<u>calculate dosage and identify administration methods of livestock medications.</u>	Fills gap analysis; rigor; VA; CCRS: M.I.C; M.VII.B.1
(9)	The student <u>examines the interrelationship of</u> knows the factors impacting commodity prices and costs <u>livestock production operations.</u> The student is expected to:	Rigor; VA
(A)	identify design, conduct, and complete research to and solve <u>livestock management problems and generate potential solutions for them;</u> and	Moved from 10A; Clarification; CCRS: S.X.E.3.a
(B)	<u>create</u> demonstrate an effective <u>financial management strategies</u> <u>plan for a livestock production operation</u> such as financial planning;	Moved from 8E, Expand; CCRS: M.IX.B.1; M.VIII.C.2
(C)	<u>analyze and discuss environmental regulations, and managing</u> governmental regulations, <u>and animal welfare policies related to livestock production;</u>	Moved from 8E; CCRS SS.I.A.6.b; CDS.2.D.2.b; gap analysis

(D) (A)	evaluate the relationship between livestock <u>and grain commodity</u> markets; and	Clarification, Expand, Rigor
(E)	assess the <u>impact importance</u> of the United States' <u>livestock industry impact</u> on world commodity markets;	Moved from 3A, Clarification; CCRS: M.IX.B.1; SS.I.D.2.a
(B)	formulate rations based on least-cost factors.	Moved to 5D
(10)	The student plans for dynamic changes in business operation. The student is expected to:	Found in other SE
(A)	design, conduct, and complete research to identify and solve livestock management problems; and	Moved to 9A
(F) (B)	use charts, tables, <u>data</u> , or graphs to <u>evaluate the efficiency of livestock production; and</u> prepare written summaries of data such as nutrition, digestion, and reproduction data obtained in a laboratory activity and an individual scientific research project.	CCRS S.V.C1.f; M.V.C.1; M.V.C.2; M.VII.A.1; M.VII.A.5; Clarification
(G)	<u>develop and present a livestock operation plan that includes health, reproduction, nutrition, and management practices necessary for maximum efficiency.</u>	Increase rigor; Fills gap analysis; CCRS: ELA.IV.A.4; M.II.B.1; M.VIII.C.2

§127.XX. §130.8. Small Animal Management (One-Half Credit), Adopted 2024. ~~Adopted 2015.~~

TEKS with edits		Work Group Comments/Rationale
(a)	General requirements. This course is recommended for students in Grades 10-12. Students shall be awarded one-half credit for successful completion of this course. <u>Recommended prerequisite: Principles of AFNR</u>	Foundational content found in this course for all AFNR courses.
(b)	Introduction.	
(1)	Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.	
(2)	The Agriculture, Food, and Natural Resources Career Cluster focuses on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.	
(3)	In Small Animal Management, students will acquire knowledge and skills related to small animals and the small animal management industry. Small Animal Management may address topics related to small animals mammals such as dogs and cats, <u>rabbits, pocket pets</u> , amphibians, reptiles, and birds. To prepare for careers in the field of animal science, students must enhance academic knowledge and skills, acquire knowledge and skills related to <u>small</u> animal systems, and develop knowledge and skills regarding career opportunities, entry requirements, and industry expectations. To prepare for success, students need opportunities to learn, reinforce, apply, and transfer knowledge and skills in a variety of settings.	Clarification, expand
(4)	Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.	
(5)	Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	
(c)	Knowledge and skills.	
(1)	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	
(A)	identify career development, <u>education</u> , and entrepreneurship opportunities in the field of <u>small animal management</u> specialty agricultural enterprises ;	Consistency
(B)	<u>identify and demonstrate</u> apply competencies related to resources, information, interpersonal skills, <u>problem solving, and critical thinking skills</u> and systems of operation used in <u>specialty agricultural enterprises</u> small animal management ;	Consistency; CCRS: ELA.IV.A.4

(C)	<u>describe and</u> demonstrate knowledge of <u>appropriate</u> personal and mechanical <u>occupational</u> safety and health practices for in the workplace;	Consistency; CCRS: ELA.IV.A.4; S.I.C.2.b
(D)	identify employers' expectations, including appropriate work habits, ethical conduct, and legal responsibilities;	CCRS: ELA.IV.A.4
(E)	<u>describe and</u> demonstrate characteristics of good citizenship such as stewardship, advocacy, and community leadership; and	Consistency; CCRS: ELA.IV.A.4
(F)	<u>identify training, education, and certification requirements for occupational choices.</u> research career topics using technology such as the Internet.	consistency
(2)	The student develops a supervised agriculture <u>real</u> experience program. The student is expected to:	Consistency
(A)	plan, propose, conduct, document, and evaluate a supervised agriculture <u>real</u> experience program as an experiential learning activity;	Consistency; CCRS: ELA.V
(B)	<u>use appropriate</u> apply proper record-keeping skills as they relate to the supervised agriculture <u>real</u> experience;	Consistency; CCRS: M.IV.B.1
(C)	participate in youth <u>agricultural</u> leadership opportunities to create a well-rounded experience program; and	consistency
(D)	review produce and participate in a local program of activities using a strategic planning process. <u>and</u>	consistency
(E)	<u>create or update documentation of relevant agricultural experience such as community service, professional or classroom experiences</u>	Consistency
(3)	The student <u>analyzes the history, domestication, and importance of</u> describes the importance of <u>responsible</u> small animal ownership. The student is expected to:	Clarification and VA
(A)	<u>research and present</u> explain the <u>history</u> , domestication, and <u>purpose</u> use of small animals;	Expand, increase rigor; CCRS: SS.I.A.3.b; ELA.I.A.2; ELA.V
(B)	identify <u>and discuss</u> the influence small animals have on society;	Increase rigor; CCRS: SS.I.A.4.b; ELA.III.A.1-2; ELA.III.A.5
(C)	describe the <u>economic impact</u> importance of the small animal industry;	Increase rigor; CCRS: SS.I.A.4.b; M.IX.B.2
(D)	describe the <u>responsibilities</u> obligations and benefits of small animal ownership; and	Clarification
(E)	<u>explain</u> discuss the use and services provided by small animals <u>provide to society such as medical, support, research, and working;</u> and	Expand, increase rigor
(F)	<u>research and discuss the environmental and governmental regulations related to small animal ownership.</u>	Increase rigor, expand; CCRS: SS.I.A.6.b; ELA.I.A.2; ELA.III.A.1-2; ELA.III.A.5; ELA.V; fills gap analysis

(4)	The student <u>understands</u> learns the hazards associated with working in the small animal industry. The student is expected to:	VA; clarification
(A)	explain <u>and demonstrate</u> the importance of safe practices when working with small animals;	Increase rigor, clarification; fills gap analysis
(B)	identify zoonotic diseases that can be transmitted <u>by</u> from small animals to humans ;	clarification; fills gap analysis; CCRS: S.X.E.2.a
(C)	describe <u>sanitation</u> methods <u>used to prevent</u> of preventing the spread of disease; <u>and</u>	clarification; fills gap analysis; CCRS: S.X.E.2.a; ELA.IV.4
(D)	follow <u>Safety Data Sheets (SDS)</u> safety guidelines when handling dangerous chemicals <u>and</u> working with small animals; and ;	CCRS: S.I.C.2.a – b; ELA.IV.A.4; fills gap analysis
(E)	demonstrate the proper use of laboratory equipment.	Removed because laboratory equipment is not used in this course
(5)	The student evaluates current topics in <u>small</u> animal rights and animal welfare. The student is expected to:	Clarification; CCRS: CDS.I.A.2.c
(A)	compare and contrast animal rights and animal welfare;	Clarification; CCRS: CDS.I.A.2.c
(B)	research <u>and report</u> important persons, organizations, and groups involved in the animal rights movement; <u>and</u>	CCRS: CDS.I.A.2.c; ELA.I.A.2; ELA.V
(C)	create <u>and present</u> a timeline of dates and acts of legislation related to animal welfare; and ;	CCRS: CDS.I.A.2.c
(A) (D)	analyze current issues in animal rights and animal welfare; ;	CCRS: CDS.I.A.2.c
(7) (6)	The student <u>analyzes</u> knows the care and management <u>skills</u> requirements for a variety of small animals. The student is expected to:	clarification
(A)	<u>identify and</u> discuss the <u>impact</u> physical characteristics <u>have on the management practices</u> for each species studied;	Increase rigor; expand; CCRS: ELA.III.A.1-2; ELA.III.A.5
(B)	<u>Identify and compare</u> list the breeds <u>and</u> or types of each species studied as appropriate ;	Increase rigor; CCRS: S.VI.E.1.b
(C)	discuss the <u>ownership identification methods</u> , habitat, housing, and equipment needs for each species studied;	Expand; CCRS: ELA.III.A.1-2; ELA.III.A.5
(D)	<u>identify</u> compare and contrast nutritional requirements for each species studied;	Clarification; CCRS: S.VI.B.1.c
(E)	explain health maintenance <u>for in</u> each species studied, including the prevention and control of diseases and parasites;	Expand; CCRS: S.X.E.2.a
(F)	describe and practice common methods of handling <u>for</u> each species studied; <u>and</u>	clarification
(G)	<u>discuss</u> perform procedures such as fecal and blood testing and basic grooming procedures <u>for each species studied</u> using available laboratory equipment, and	Clarification; CCRS: ELA.III.A.1-2; ELA.III.A.5

(H)	<u>identify copulation, gestation, parturition, and weaning practices for each species studied.</u>	Increase rigor; expand; fills gap analysis; CCRS: S.VI.F.2.e
(6) (7)	The student <u>explains anatomy and physiology of small animals</u> examines career opportunities in small animal care. The student is expected to:	Increase rigor; expand
(A)	<u>identify and explain the skeletal, muscular, respiratory, reproductive, digestive, and circulatory systems for each species studied;</u> identify, describe, and compare career opportunities in small animal care and management; and	Redundant; CCRS: S.VI.F.2.b-e; Increase rigor; expand
(B)	<u>identify and interpret ranges for healthy small animal vital signs; and</u> describe the nature of the work, salaries, and educational requirements for careers in small animal care.	Redundant; CCRS: S.VI.G.3.a; Increase rigor; expand
(C)	<u>compare normal and abnormal behavior of small animals.</u>	Expand; Increase rigor
(8)	<u>The student examines the interrelationship of the factors impacting small animal ownership. The student is expected to:</u>	CCRS S.V.C1.f; Clarification; Increase rigor; Fills gap analysis;
(A)	<u>develop and present a small animal ownership plan that includes health, reproduction, nutrition, and management practices; and</u>	Increase rigor; Fills gap analysis;
(B)	<u>research and create a financial plan for small animal operation or ownership.</u>	Increase rigor; Fills gap analysis; CCRS: ELA.V; M. IX.B.1; M.VIII.C.2

§127.XX. §130.9. Veterinary Science Medical Applications (One Credit), Adopted 2024. ~~Adopted 2015.~~

TEKS with edits		Work Group Comments/Rationale
(a)	General requirements. This course is recommended for students in Grades 11 and 12. Prerequisite: Equine Science, Small Animal Management, or Livestock Production. Students shall be awarded one credit for successful completion of this course.	
(b)	Introduction.	
(1)	Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.	
(2)	The Agriculture, Food, and Natural Resources Career Cluster focuses on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.	
(3)	Veterinary <u>Science Medical Applications</u> covers topics relating to veterinary practices, including practices for large and small animal species. To prepare for careers in the field of animal science, students must attain academic skills and knowledge, acquire technical knowledge and skills related to animal systems and the workplace, and develop knowledge and skills regarding career opportunities, entry requirements, and industry expectations. To prepare for success, students need opportunities to learn, reinforce, apply, and transfer knowledge and skills and technologies in a variety of settings.	
(4)	Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.	
(5)	Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	
(c)	Knowledge and skills.	
(1)	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	
(A)	identify career development , <u>education</u> , and entrepreneurship opportunities in <u>for a chosen occupation in</u> the field of veterinary science <u>and develop a plan for obtaining the education, training, and certifications required;</u>	Consistency; increase rigor

(B)	<u>model professionalism by continuously exhibiting appropriate work habits, solving problems, taking initiative, communicating effectively, listening actively, and thinking critically;</u> demonstrate competencies related to resources, information, interpersonal skills, and systems of operation in veterinary science	Consistency; CCRS: ELA.IV.A.4; Moved from 1D; increase rigor
(C)	<u>model appropriate demonstrate knowledge of</u> personal and occupational <u>health and safety and health practices and explain the importance of established safety and health protocols for in</u> the workplace;	Consistency; CCRS: ELA.IV.A.4; S.I.C.2.b; increase rigor
(D)	<u>analyze and interpret the rights and responsibilities, including ethical conduct and legal responsibilities of employers and employees;</u> identify employers' expectations, including appropriate work habits, ethical conduct, and legal responsibilities;	CCRS: ELA. IV.A.4; increase rigor
(E)	<u>analyze the importance demonstrate characteristics of exhibiting</u> good citizenship <u>such as stewardship, advocaey, and community leadership;</u> and <u>describe the effects of good citizenship on the development of home, school, workplace, and community.</u>	Consistency; CCRS: ELA.IV.A.4; increase rigor
(F)	research career topics using technology such as the Internet.	Consistency; removed because irrelevant
(2)	The student develops a supervised agriculture <u>real</u> experience program. The student is expected to:	consistency
(A)	plan, propose, conduct, document, and evaluate a supervised agriculture <u>real</u> experience program as an experiential learning activity;	Consistency; CCRS: ELA.V
(B)	<u>use appropriate apply proper</u> record-keeping skills as they relate to the supervised agriculture <u>real</u> experience;	Consistency; CCRS: M.IV.B.1
(C)	participate in youth <u>agricultural</u> leadership opportunities; to create a well-rounded experience program; and	consistency
(D)	produce <u>review</u> and participate in a local program of activities; <u>and using a strategic planning process.</u>	Consistency
(E)	<u>create or update documentation of relevant agricultural experience such as community service, professional or classroom experiences</u>	consistency
(4) (3)	The student <u>understands researches</u> current topics, in veterinary medicine, recognizes the importance of animals in society, and discusses professional ethics, and laws that relate to veterinary medicine. The student is expected to:	Redundant; clarification
(A)	explain the human animal bond and how to interact with clients and their animals;	Better in other KS (reworded)
(A) (B)	<u>research and present identify historical events, trends, and issues; and historical events</u> that have <u>impacted veterinary medicine influenced animal use and care;</u>	Expand; increase rigor; CCRS: ELA.V; ELA.I.A.2; SS.I.A.3.b

(C)	describe the legal aspects of animal welfare and animal rights;	Moved to 4B
(B) (D)	analyze evaluate the principles of veterinary medical ethics, including animal welfare rights and animal rights-welfare; and	Moved from 4; increase rigor
(C) (E)	explain review policies and procedures in veterinary medicine that reflect various local, state, and federal laws.	Clarification
(5) (4)	The student evaluates veterinary hospital effective management approaches and marketing strategies to determine their importance to the success of veterinary practices such as clinics and hospitals. The student is expected to:	Clarification
(A)	describe how the human-animal bond impacts veterinary practices when working with clients and their animals;	Expand; fills gap analysis
(B) (A)	identify and demonstrate skills needed to communicate effectively with clients and veterinary professionals and pet owners in the community;	Expand; CCRS: ELA.III.A.1-2; ELA.IV.A.4
(B)	identify vital information and demonstrate effective communication skills necessary to solve problems;	Included in a previous SE
(C)	explain how the role and importance of marketing and its effects on the success of a veterinary practice-hospital; and	Clarification
(D)	discuss how develop skills involving the use of electronic technology such as computer programs, medical records, and tablets commonly found is used in a veterinary practice hospital such as centrifuge, autoclave, and radiography positions.	Found in 14A; Clarification; CCRS: CDS.II.E.4.b; ELA.III.A.1-2; fills gap analysis; increasing rigor
(6) (5)	The student communicates the importance of medical terminology, evaluates veterinary terms to discover their meanings, and demonstrates the ability to use terms correctly. The student is expected to:	
(A)	analyze veterinary terms to discover their meanings and recognize common Greek and Latin prefixes, suffixes, and roots-Greek and Latin prefixes, suffixes, and roots to determine the meaning of veterinary terms;	Clarification; CCRS: ELA.II.B; reworded
(C) (B)	use directional anatomy anatomical terms appropriately;	CCRS: ELA.II.B; clarification
(C)	identify anatomical structures of animals;	In another SE (6C)
(D)	describe the major body systems using appropriate medical terminology; and	In another SE (KS8)
(B) (E)	identify recognize, pronounce, and spell, and define medical veterinary terms appropriately; and relating to diagnosis, pathology, and treatment of animals.	Clarification; CCRS: ELA.II.B

(7) (6)	The student <u>understands proper</u> explores the area of animal <u>handling management</u> as it relates to animal identification, animal characteristics, and behavioral temperament . The student is expected to:	Clarification
(A)	identify a variety of animal <u>breeds</u> species such as companion, exotic, and large animal species according to common breed characteristics;	Clarification; CCRS: S.VI.E.1.b
(B)	<u>identify and compare</u> recognize <u>normal and abnormal behavior within and among various animal species;</u> common animal behavioral problems within companion, exotic, and large animals per industry standard;	Expand; fills gap analysis; CCRS: S.VI.G.3.a
(C)	identify <u>and discuss</u> correct handling <u>and restraint</u> protocols, <u>such as muzzling, lateral recumbency, sternal recumbency, jugular venipuncture, and haltering;</u> and discuss their relevance to veterinary medical staff; and	fills gap analysis; CCRS: ELA.III.A.1-2; ELA.III.A.5
(D)	demonstrate appropriate methods of handling a variety of animal behaviors.	In another SE (7C)
(8) (7)	The student <u>explains anatomy and physiology of animals.</u> investigates the body systems and gains a working knowledge of each system's purpose and functions and how each system is affected by disease. The student is expected to:	Fills gap analysis; VA
(A)	identify the parts <u>and functions</u> of the skeletal, muscular, respiratory, circulatory, digestive, endocrine, and nervous systems; <u>and</u>	Endocrine and nervous are new systems being discussed in this SE compared to other courses where the systems are included; fills gap analysis; CCRS: S.VI.F.2.a-d
(B)	describe the <u>interrelationship among functions of the skeletal, muscular, respiratory, circulatory, digestive, endocrine, and nervous animal body</u> systems;	Expand, increase rigor; fills gap analysis; CCRS: S.VI.D.1.a
(C)	identify appropriate anatomical sites for injections, measuring vital signs, and collecting blood samples for various animal species; and	In another KS/SE (10B, 10C, 12A, 12B, 16A)
(D)	describe normal animal behavior and vital signs compared to sick animals using medical terminology.	In another KS/SE (7B, 10B, 10C)
(8)	The student performs mathematical calculations used in veterinary medicine. The student is expected to:	
(A)	add, subtract, multiply, and divide whole numbers, fractions, and decimals as related to veterinary medicine;	
(B)	apply mathematical skills needed for accurate client assessment such as measurement, conversion, and data analysis;	Moved to 10G
(C)	solve veterinary problems by calculating percentages and averages;	
(D)	convert between English and metric units;	Included in another SE (10G)
(E)	determine weight, volume, and linear measurements using scientific calculations;	Moved to 10G

(F)	solve word problems using ratios and dimensional analysis;	
(G)	interpret data using tables, charts, and graphs; and	Moved to 10G
(H)	calculate and prepare chemical concentrations using mathematical equations.	Removed due to not being essential for this course
(11) (9)	The student <u>analyzes how</u> evaluates animal diseases and identifies internal, and external, and protozoal parasites <u>affect animal health</u> . The student is expected to:	Clarification
(A)	identify factors that influence the health of animals;	Put in KS
(B) (B)	identify <u>and describe</u> pathogens <u>and the diseases they cause.</u> and describe the effects that diseases have on various body systems;	Clarification; this topic fills gap analysis
(C)	<u>describe the effects that diseases have on various body systems.</u>	Moved from 11B; this topic fills gap analysis
(D) (E)	explain courses of treatment for common viral and bacterial diseases;	this topic fills gap analysis
(A) (D)	describe the process of immunity and disease transmission;	this topic fills gap analysis
(E)	identify internal, external, and protozoal parasites using common and scientific names;	this topic fills gap analysis
(F)	describe life cycles of common parasites;	this topic fills gap analysis
(G)	explain how parasites are transmitted and their effect on the host;	this topic fills gap analysis
(H)	<u>describe</u> conduct parasitic diagnostic procedures; and	this topic fills gap analysis
(I)	describe types of treatments <u>protocols</u> for diseases and parasites.	this topic fills gap analysis; CCRS: S.X.E.2.a
(10)	The student evaluates an animal's health during a clinical examination. The student is expected to:	
(A)	describe the characteristics and signs of a healthy <u>and unhealthy</u> animal;	Clarification
(B)	recognize examples of abnormalities and relate them to their associated problems and illnesses;	In another SE (10A)
(B) (E)	<u>identify ranges for healthy animal vital signs such as temperature, pulse, respiration, hydration, and capillary refill time;</u> take temperature, pulse, and respiration for a variety of animals;	VA; Expand
(C)	<u>demonstrate the proper procedures for obtaining vital signs and interpret vital sign measurements to determine the health of the animal;</u>	Expand
(D)	describe effects of age, stress, and environmental factors on vital signs of animals;	
(E)	explain procedures for physical examinations; and	
(F)	explain the <u>anatomical</u> regional approach to assess an animal's health-;	Clarification

(G)	apply mathematical skills needed for accurate client assessment such as <u>to calculate weight and linear body measurement, and to convert conversion between measurement systems; and</u>	Moved from 16B, 16E; expand; CCRS: M.I.C; M.VIII.A; M.IX.B.3
(H)	<u>apply mathematical skills to analyze tables, charts, and graphs to interpret patient and clinical data.</u>	Moved from 16G; expand; CCRS: M.V.C.1-2
(15) (11)	The student identifies imaging equipment and <u>understands</u> demonstrates how to safely operate and maintain equipment. The student is expected to:	clarification
(A)	<u>research and explain</u> identify <u>the parts and function of</u> imaging equipment such as an ultrasonograph, endoscope, electrocardiograph, and radiograph;	Increase rigor; CCRS: ELA.V; ELA.I.A.2
(B)	explain safety procedures , maintenance, and operation <u>procedures</u> of imaging equipment; and	Clarification; CCRS: ELA.IV.A.4
(C)	demonstrate patient restraint and positioning methods used for imaging purposes.; and	
(D)	<u>differentiate between the images from various imaging equipment.</u>	Increase rigor; fills gap analysis
(9) (12)	The student determines nutritional requirements for ruminant and non-ruminant animals and communicates the importance of animal nutrition in maintaining a healthy animal. The student is expected to:	Clarification; fills gap analysis
(A)	identify the anatomy of the digestive system of ruminant and non-ruminant animals;	In another SE (8A)
(B)	describe the process of digestion in ruminant and non-ruminant animals;	In another SE (8A)
(A) (C)	identify types and sources of nutrients and classes of feeds;	fills gap analysis; CCRS: S.VI.B.1.c
(B) (D)	identify feed additives and describe how additives affect the food supply;	fills gap analysis; CCRS: S.VI.B.1.c
(C) (E)	<u>analyze evaluate</u> animal dietary needs and feeding factors <u>feed-quality issues and their effect on feeding practices; and</u>	Clarification; fills gap analysis; Moved from 9G
(F)	calculate energy requirements and formulate rations;	In another SE (9C for energy requirements) Removed rations because it is covered extensively in prerequisite courses/not an essential veterinary skill
(G)	discuss feeding practices and feed-quality issues; and	Clarification; fills gap analysis; Moved to 9C
(D) (H)	<u>research and compare</u> analyze the <u>quality nutritional value</u> of commercially prepared feeds <u>such as prescription, commercial, homemade, fad diets, and raw diets.</u>	Expand; fills gap analysis; CCRS: M.VII.A.1; ELA.I.A.2; ELA.V

(12) (13)	The student examines various aspects of <u>laboratory procedures</u> clinical hematology . The student is expected to:	Clarification; fills gap analysis; CCRS: ELA.IV.A.4; S.III.A.2.a
(A)	<u>explain the procedures used in collecting, handling, and preparing fecal, blood, and urine specimens;</u> describe laboratory tests and explain the importance of proper laboratory tests and procedures;	Expand, fills gap analysis, clarification;
(B)	<u>explain demonstrate</u> the procedures used in collecting, handling, preparing, and examining fecal, blood, and urine specimens; <u>and</u>	Expand, fills gap analysis, clarification Comment pertaining to combining A and B: These are very distinct, separate, and intricate procedures that are too much to be combined into one SE.
(C)	<u>analyze and compare discuss</u> normal and abnormal results obtained in <u>laboratory procedures</u> complete blood counts;	Expand, fills gap analysis, clarification
(D)	explain sensitivity testing and how to read testing results; and	Not needed for this course
(E)	prepare microscope slides, preserve specimens, and perform several of the most common laboratory tests such as fecal flotations, microfilaria smear, and packed cell volume.	Addressed in other SE (12A, 12B)
(13) (14)	The student <u>analyzes technical identifies veterinary hospital</u> procedures; <u>and skills; and objectives</u> that are included in the job description of an animal care assistant . The student is expected to:	Fills gap analysis; clarification
(A)	explain the care, maintenance, and use of equipment and instruments found in veterinary practices;	<u>Equipment and instruments are distinctly different</u>
(B)	<u>interpret and prepare a veterinary medical record, adhering to client and patient confidentiality;</u> explain appropriate hospital procedures	Fills gap analysis; expand; increase rigor; include competencies from industry and career development event standards
(E) (C)	<u>describe discuss</u> emergency protocols and <u>describe</u> first aid procedures, including cardiopulmonary resuscitation, control of bleeding, and treatment for shock, for small and large animals;	Fills gap analysis; clarification; CCRS: ELA.IV.A.4
(C) (D)	<u>explain and demonstrate routine</u> animal care skills such as administering medications, nail trimming, bathing, <u>dipping</u> , grooming, ear cleaning, expressing anal sacs, dental <u>prophylaxis care, enema administration, placing a tail tie, and ownership</u> identification <u>methods of animals;</u>	Fills gap analysis; expand; increase rigor; include competencies from industry and career development event standards; CCRS: S.III.A.2.a
(D) (E)	<u>explain and demonstrate</u> therapeutic care such as patient observation, maintaining and administering fluids, applying <u>and removing</u> bandages, caring for open wounds, <u>and managing</u> hydrotherapy, <u>and</u> physical therapy, <u>and suture removal;</u> and	Fills gap analysis; expand; increase rigor; include competencies from industry and career development event standards; CCRS: S.III.A.2.a
(F)	describe skills involved in the reproductive and genetic evaluation of animals.	Not needed in this course

(F)	research and compare describe <u>veterinary care</u> of <u>specialty patients, including newborn, orphan, geriatric, and recumbent, and animals with disabilities patients</u> ;	Moved from 14E; increase rigor, include competencies from industry and career development event standards; CCRS: ELA.I.A.2; ELA.V
(14) (15)	The student identifies and discusses surgical-assisting procedures, <u>and skills</u> , and objectives that are included in the job description of an animal care assistant . The student is expected to:	Clarification
(A)	explain the protocol for pre-surgical and post-surgical care of a patient;	Fills gap analysis; CCRS: ELA.IV.A.4
(B)	<u>identify tools and equipment used in veterinary surgical procedures</u> .	Expand, include competencies from industry and career development event standards; fills gap analysis; CCRS: S.I.C.3.a
(C) (B)	describe methods used in the <u>preparation sterilization, and preparation sterilization, and opening</u> of small and large animal surgery packs;	Clarification, expand, include competencies from industry and career development event standards; CCRS: S.I.C.3.a
(C)	review skills involved in patient and surgical room preparation;	In another SE (14A)
(D) (D)	describe surgical procedures such as <u>spaying, castration, dehorning, and docking, dental prophylaxis, and tooth extraction</u> ;	Expand; increase rigor; include competencies from industry and career development event standards; fills gap analysis
(E)	describe care of newborn, orphan, and recumbent patients; and	Moved to 13F
(F)	identify and monitor equipment used in surgical procedures.	In another SE (14B)
(16)	The student identifies <u>veterinary pharmacology</u> - assisting procedures, <u>and skills</u> , and objectives that are included in the job description of an animal care assistant . The student is expected to:	Clarification
(A)	identify <u>veterinary</u> medications according to their classification, <u>schedule</u> , form, routes of <u>administration</u> , and methods of administration;	Clarification; fills gap analysis
(B)	explain handling, <u>storage, and</u> distribution, protocols, and laws for <u>veterinary medications, including controlled substances</u> ; controlled substances, including the U.S. Drug Enforcement Agency	Clarification; fills gap analysis; CCRS: ELA.IV.A.4
(C)	calculate dosage using factors such as concentration of drug, weight of animal, and <u>required prescribed</u> dosage;	Clarification; CCRS: M.I.C
(D)	<u>prepare complete</u> a prescription label with identifiers that are required by the <u>United States U.S.</u> Food and Drug Administration;	Clarification; CCRS: CDS.I.C.3.c
(E)	<u>identify and explain select the</u> equipment and instruments used to <u>safely administer give</u> medications;	Increase rigor

(F)	<u>research and present emerging trends in pharmacology, such as internet pharmacies, herbal supplements, organic labeling, and extra-label and off-label use of medications.</u>	Increase rigor, VA, Expand; CCRS: ELA.V; ELA.I.A.2; M.IV.B.1
(3)	<u>The student understands safety and health practices associated with working in veterinary medicine. The student is expected to:</u>	Missing information; Increase rigor of course
(A)	<u>explain the importance of safe practices when working with animals, such as handling, restraint, and proper use of tools and equipment;</u>	CCRS: S.I.C.2.b; ELA.IV.A.4
(B)	<u>identify and discuss transmission and prevention of zoonotic diseases;</u>	CCRS: ELA.III.A.1-2
(C)	<u>describe sanitation methods to prevent the spread of pathogens and maintain asepsis in sterile environments;</u>	CCRS: M.I.C; ELA.IV.A.4
(D)	<u>locate, interpret, and implement Safety Data Sheets (SDS) for handling chemicals;</u>	CCRS: ELA.IV.A.4; S.I.C.2.a-b
(E)	<u>demonstrate and explain safe usage of clinical tools and equipment; and</u>	CCRS: ELA.IV.A.4; S.I.C.3.a
(F)	<u>perform proper disposal of sharps and biohazards.</u>	CCRS: ELA.IV.A.4

§127.XX §130.10. Advanced Animal Science (One Credit), Adopted 2024 ~~Adopted 2015~~.

TEKS with edits		Work Group Comments/Rationale
(a)	General requirements. This course is recommended for students in Grades 11 and 12. Prerequisites: Biology and Chemistry or Integrated Physics and Chemistry (IPC); Algebra I and Geometry; and either Small Animal Management, Equine Science, or Livestock Production. Recommended prerequisite: Veterinary Medical Applications. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course.	
(b)	Introduction.	
(1)	Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.	
(2)	The Agriculture, Food, and Natural Resources Career Cluster focuses on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.	
(3)	Advanced Animal Science examines the interrelatedness of human, scientific, and technological dimensions of <u>animal livestock production, including canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> . Instruction is designed to allow for the application of scientific and technological aspects of animal science through field and laboratory experiences. To prepare for careers in the field of animal science, students must attain academic skills and knowledge, acquire knowledge and skills related to animal systems, and develop knowledge and skills regarding career opportunities, entry requirements, and industry standards. To prepare for success, students need opportunities to learn, reinforce, apply, and transfer their knowledge and skills in a variety of settings.	
(4)	<u>Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.</u>	

(5)	<u>Scientific hypotheses and theories. Students are expected to know that:</u>	
(A)	<u>hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and</u>	
(B)	<u>scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.</u>	
(6)	<u>Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.</u>	
(A)	<u>Scientific practices. Students should be able to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.</u>	
(B)	<u>Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.</u>	
(7)	<u>Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).</u>	
(8)	<u>Science consists of recurring themes and making connections between overarching concepts. Recurring themes include systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide tools for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.</u>	

(4)	Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.	
(5)	Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.	
(6)	Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).	
(7)	A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.	
(8)	Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.	
(9)	Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	
(c)	Knowledge and skills.	
(1)	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	
(A)	identify career development , and entrepreneurship opportunities <u>for a chosen occupation</u> in the field of animal science systems <u>and develop a plan for obtaining the education, training, and certifications required</u> ;	Consistency; Increase rigor
(B)	<u>model professionalism by continuously exhibiting appropriate work habits, solving problems, taking initiative, communicating effectively, listening actively, and thinking critically</u> apply competencies related to resources, information, interpersonal skills, and systems of operation in animal systems ;	Increase rigor; Consistency; CCRS: ELA.IV.A.4
(C)	<u>model appropriate</u> demonstrate knowledge of personal and occupational safety and health practices <u>and explain the importance of established safety and health protocols for</u> in the workplace;	Increase rigor; Consistency; CCRS: ELA.IV.A.4; S.I.C.2.b

(D)	<u>analyze and interpret the rights and responsibilities, including ethical conduct and legal responsibilities of employers and employees; identify employers' expectations, including appropriate work habits, ethical conduct, and legal responsibilities;</u>	Increase rigor; CCRS: ELA.IV.A.4; Moved to 1B
(E)	<u>analyze the importance demonstrate characteristics of exhibiting good citizenship such as stewardship, advocacy, and community leadership; and describe the effects of good citizenship on the development of home, school, workplace, and community.</u>	Increase rigor; Consistency; CCRS: ELA.IV.A.4
(F)	research career topics using technology such as the Internet.	Consistency; irrelevant
(2)	<u>Scientific and engineering practices. The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to:</u>	
(A)	<u>ask questions and define problems based on observations or information from text, phenomena, models, or investigations;</u>	
(B)	<u>apply scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;</u>	
(C)	<u>use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards;</u>	
(D)	<u>use appropriate tools such as dissection equipment, standard laboratory glassware, microscopes, various prepared slides, measuring devices, micropipettors, hand lenses, thermometers, hot plates, laboratory notebook, timing devices, cameras, Petri dishes, laboratory incubators; models, diagrams, and samples of biological specimens, syringes, needles, scalpels, microscopes slides, cover slips, artificial insemination equipment, and drench gun;</u>	
(E)	<u>collect quantitative data using the International System of Units (SI) and qualitative data as evidence;</u>	
(F)	<u>organize quantitative and qualitative data using calculators, computers, software, laboratory notebook, recordkeeping system, and reliable sources;</u>	
(G)	<u>develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and</u>	
(H)	<u>distinguish among scientific hypotheses, theories, and laws.</u>	

(3)	<u>Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:</u>	
(A)	<u>identify advantages and limitations of models such as their size, scale, properties, and materials;</u>	
(B)	<u>analyze data by identifying significant statistical features, patterns, sources of error, and limitations;</u>	
(C)	<u>use mathematical calculations to assess quantitative relationships in data; and</u>	
(D)	<u>evaluate experimental and engineering designs.</u>	
(4)	<u>Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:</u>	
(A)	<u>develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;</u>	
(B)	<u>communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and</u>	
(C)	<u>engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.</u>	
(5)	<u>Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:</u>	
(A)	<u>analyze, evaluate, and critique scientific explanations and solutions by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student;</u>	
(B)	<u>relate the impact of past and current research on scientific thought and society, including research methodology, cost-benefit analysis, and contributions of diverse scientists as related to the content; and</u>	
(C)	<u>research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field in order to investigate STEM careers.</u>	
(2)	The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:	
(A)	demonstrate safe practices during laboratory and field investigations; and	

(B)	demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.	
(3)	The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:	
(A)	know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section;	
(B)	know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories;	
(C)	know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly reliable explanations, but they may be subject to change as new areas of science are created and new technologies emerge;	
(D)	distinguish between scientific hypotheses and scientific theories;	
(E)	plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;	
(F)	collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;	
(G)	analyze, evaluate, make inferences, and predict trends from data; and	
(H)	communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.	
(4)	The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	
(A)	in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;	

(B)	communicate and apply scientific information extracted from various sources such as accredited scientific journals, institutions of higher learning, current events, news reports, and marketing materials;	
(C)	draw inferences based on data related to promotional materials for products and services;	
(D)	evaluate the impact of scientific research on society and the environment;	
(E)	evaluate models according to their limitations in representing biological objects or events; and	
(F)	research and describe the history of biology and contributions of scientists.	
(5)	The student develops a supervised agricultural e experience program. The student is expected to:	Consistency
(A)	plan, propose, conduct, document, and evaluate a supervised agricultural e experience program as an experiential learning activity;	Consistency; CCRS: ELA.V
(B)	<u>use appropriate</u> apply proper record-keeping skills <u>in a</u> as they relate to the supervised agricultural e experience <u>program</u> ;	Consistency; CCRS: M.IV.B.1
(C)	participate in youth <u>agricultural</u> leadership opportunities; to create a well-rounded experience program; and	consistency
(D)	<u>review</u> produce and participate in a local program of activities using a strategic planning process; <u>and</u>	consistency
<u>(E)</u>	<u>create or update documentation of relevant agricultural experience such as community service, professional or classroom experiences.</u>	consistency
(6)	<u>The student analyzes the history, domestication, and evaluation of animals, including canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs. The student is expected to:</u> The student demonstrates principles related to the human, scientific, and technological dimensions of animal agriculture and the resources necessary for producing domesticated animals. The student is expected to:	Clarification; VA
(A)	evaluate market classes and grades of livestock;	Moved to 14
<u>(A)</u>	<u>research and describe the history, including evolution, domestication, and introduction of species to countries of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs;</u>	VA; Expand; increase rigor; CCRS: CDS.II.B.7.a; ELA.I.A.2; ELA.V
<u>(B)</u>	<u>analyze and describe how changes in the global food market impact the livestock industry;</u>	VA; Expand; increase rigor; CCRS: SS.I.A.3.b; M.IX.B

(C)	<u>evaluate breeds of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs based on purpose and conformation; and</u>	VA; Expand; increase rigor; CCRS: S.VI.E.1.b
(B)	identify animal products such as organic and farm-raised and consumption patterns relative to human diet and health issues; and	Moved to 15
(E)	describe the growth and development of livestock as a global commodity.	Increase rigor; CCRS: SS.I.A.2.c Combined this SE with B because they are redundant
(11) (7)	The student applies the principles of reproduction and breeding to <u>animal livestock</u> improvement. The student is expected to:	CCRS: S.VI.F.2.e
(A)	describe <u>and compare</u> reproductive <u>anatomy of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs;</u> cycles and relate them to breeding systems;	Expand; increase rigor; CCRS: S.VI.F.2.e Students should complete this SE for all animals listed in the introduction
(B)	<u>analyze and compare reproductive cycles and phases of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs;</u>	Moved from 7A, Moved from 7D; Increase rigor Students should complete this SE for all animals listed in the introduction
(C)	<u>correlate the reproductive cycles and phases to animal behavior;</u>	Expand, Increase rigor; CCRS: S.VI.G.3.a Separated to emphasize and clarify
(D)	<u>research breeding systems, including grading up, crossbreeding, linebreeding, and inbreeding, and explain the advantages and disadvantages of each; and</u>	Moved from 7A; increase rigor; expand; CCRS: ELA.I.A.2; ELA.V
(E) (B)	<u>research explain breeding methods, including the embryo transfer process, artificial insemination, and natural mating, and explain the advantages and disadvantages of each.</u>	Increase rigor; expand; CCRS: ELA.I.A.2; ELA.V
(E)	recognize the significance of meiosis to sexual reproduction; and	Moved to 12
(D)	evaluate animal behavior and its relationship to livestock management.	Moved to 7B
(10) (8)	The student <u>applies understands</u> the principles of molecular genetics and heredity. The student is expected to:	We reviewed the Biology standards and have concluded that the necessary components are included in this KS and the subsequent SEs.
(A)	explain Mendel's laws of inheritance <u>and by</u> predicting genotypes and phenotypes of offspring using the Punnett square;	Clarification; CCRS: M.III.C.2; M.IV.B.1; M.V.C.2-3; S.VI.D.1.e

(B)	use Punnett Square and assign alleles to justify all <u>genotype and phenotype</u> predictions; predict genotypes and phenotypes of animal offspring using Mendelian or non-Mendelian patterns of inheritance in various forms of livestock and	Clarification; CCRS: M.III.C.2; M.IV.B.1; M.V.C.2-3; S.VI.D.1.d
(C)	identify the parts of the nucleotide and <u>differentiate the difference</u> between the nucleotides found in deoxyribonucleic acid (DNA) and versus ribonucleic acid (RNA); <u>and</u>	Clarification; CCRS: S.VI.D.3.b
(D)	explain the functions of DNA and RNA; ;	CCRS: S.VI.D.3.e
(E)	describe how heredity is used in the selection of livestock such as knowing the difference between outbreeding and inbreeding/linebreeding; and	Found in another SE (11D)
(F)	explain how traits are passed from parent to offspring through genetic transfer and the implications of breeding practices.	Found in another SE (10A and 11E)
(8) (9)	The student examines and compares animal anatomy and physiology in <u>animals livestock species</u> . The student is expected to:	
(A)	identify and compare the external anatomy of <u>canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs livestock species</u> ;	Clarification Students should complete this SE for all animals listed in the introduction
(B)	<u>identify the anatomical structures and physiological functions of</u> compare the anatomy and physiology of the skeletal, muscular, reproductive, digestive, circulatory, genito-urinary, respiratory, nervous, immune, and endocrine systems of <u>canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs animals</u> ; <u>and</u>	Clarification, expand; increase rigor; reproductive and digestive are covered in other SEs; CCRS: S.VI.F.2.adc
(C)	describe <u>the interrelationship among animal body systems</u> . interactions among various body systems such as circulatory, respiratory, and muscular systems; and	Clarification; increase rigor; CCRS: S.VI.B.1.a
(D)	identify and describe the functions of epithelial, nervous, connective, and muscular tissue and relate the functions to animal body systems.	Found in another SE
(9) (10)	The student <u>understands the anatomical structures and physiological functions of the digestive system to</u> determine nutritional requirements of ruminant and non-ruminant animals. The student is expected to:	Increase rigor; VA
(A)	describe the structures and functions of the digestive systems <u>of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs of ruminant animals, including cattle, and non-ruminant animals, including poultry</u> ;	Clarification; CCRS: S.VI.F.2.b
(B)	identify and describe sources of nutrients and classes of feeds for canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs and relate them to ruminant and non-ruminant animals ;	Clarification; CCRS: S.VI.B.1.c

(C)	identify and describe the vitamins, minerals, and feed additives <u>and supplements used to meet and how they relate to</u> the nutritional requirements of <u>canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ruminant and non-ruminant animals ;	Clarification; CCRS: S.VI.B.1.c
(D)	formulate rations based on different nutritional requirements <u>including age, gestation, lactation, sex, and purpose, for canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ;	Increase rigor; expand; CCRS: S.VI.B.1.c; M.III.C.2; M.IV.B.1; M.V.C.2-3
(E)	analyze feeding practices in relation to nutritional requirements <u>including age, gestation, lactation, sex, and purpose for canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs of animals</u> ; and	Increase rigor; expand; CCRS: S.VI.A.1.c
(F)	analyze feed quality issues and determine their effect on the animal health <u>of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ;	
(G)	<u>research and compare the nutritional value of feeds</u> ;	Increase rigor; expand; VA; CCRS: M.VII.A.1; ELA.I.A.2; ELA.V
(H)	<u>identify forage plants used for livestock grazing and analyze the protein levels of each</u> ; and	Increase rigor; expand; VA; CCRS: S.VI.A.1.c; M.VII.A.1
(I)	<u>research grazing practices, such as rotational grazing and deferred grazing, and explain the advantages and disadvantages of each.</u>	Increase rigor; expand; VA; CCRS: ELA.I.A.2; ELA.V; S.X.E.4.b
(12) (H)	The student <u>analyzes</u> evaluates <u>how animal</u> diseases and parasites <u>affect animal health</u> . The student is expected to:	Clarification; VA
(A)	<u>examine</u> identify <u>how</u> factors that influence the health of animals such as geographic location, age, genetic composition, and inherited diseases <u>influence the health of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> animals for a particular species ;	Increase rigor; Reword to clarify
(C) (B)	identify pathogens and describe <u>pathogens and the effects that</u> diseases have on various body systems <u>they cause in canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ;	VA; expand; clarification; moved to 11C; fills gap analysis
(D)	<u>describe the effects that</u> diseases have on various body systems <u>of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ;	Moved from 11B; fills gap analysis
(E) (C)	<u>research and</u> explain the methods of prevention, control, and treatment for diseases <u>of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ;	Increase rigor; CCRS: ELA.III.A.1-2; ELA.III.A.5; ELA.I.A.2; ELA.V
(B) (D)	describe the process of immunity and disease transmission <u>of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ;	
(F)	<u>identify parasites of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs using common and scientific names</u> ;	Increase rigor; VA; expand

(H) (E)	explain how external and internal parasites are transmitted and the effect they have on <u>canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> the host ;	
(J) (F)	explain the methods of prevention, control, and treatment of internal and external parasites <u>of canine, feline, bovine, equine, caprine, porcine, ovine, poultry, and lagomorphs</u> ;	CCRS: S.X.E.2.a
(G)	describe the life cycles of various parasites and relate them to animal health issues; and	
(I) (H)	conduct <u>or simulate</u> parasite diagnostic tests.	Clarification
(7) (12)	The student defines how an organism grows and how specialized cells, tissues, and organs develop. The student is expected to:	
(A)	compare cells from different parts of animals, including epithelia, muscles, and bones , to show specialization of structure and function;	Clarification; CCRS: S.VI.A.1.a-c
(B)	describe and explain cell <u>division, including mitosis and meiosis; differentiation in the development of organisms</u> ; and	CCRS: S.VI.A.4.a; brought from 7C; Moved to 12C
(C)	<u>explain cell differentiation in the development of tissues and organs</u> ; and	Moved from 12B; increase rigor; CCRS: S.VI.A.3.a
(D) (E)	<u>identify and explain sequence</u> the <u>biological</u> levels of organization in animals and relate the parts to each other and to the whole.	Clarification
(15) (13)	The student demonstrates an understanding of policies and <u>current</u> issues in animal science. The student is expected to:	Clarification
(A)	<u>analyze and</u> discuss the effects use of biotechnology <u>in the animal science industry such as cloning, artificial insemination, and freezing of semen and embryos on the production of livestock</u> ;	Clarification; increase rigor; VA; expand; CCRS: ELA.III.A.1-2; ELA.III.A.5
(B)	analyze the issues surrounding animal welfare and the humane treatment of livestock ;	In another SE
(C)	apply principles of nutrition to maximize feed efficiency for livestock ;	In another SE
(C) (D)	<u>identify and research a current issue in scientific animal agriculture and design a protocol to address the issue. design, conduct, and complete research to solve a self-identified problem in scientific animal agriculture</u> ; and	Increase rigor; clarification; expand; CCRS: ELA.I.A.2; ELA.V; CDS.II.D.1.b
(B) (E)	analyze the issues surrounding the impact of livestock production on the environment. <u>Identify governmental regulations and policies, such as environmental and animal welfare, and research the impacts on animal production</u> ; and	Increase rigor; VA; expand; CCRS: ELA.I.A.2; ELA.V; CDS.II.D.1.b; Clarification
(13) (14)	The student discusses <u>livestock market readiness and livestock</u> harvesting <u>methods operations</u> . The student is expected to:	Clarification

(A)	<u>explain</u> map the stages of animal growth and development and how they relate to market readiness;	Clarification; CCRS: S.X.E.3.a
(B)	evaluate market class and grades of livestock;	Moved from 6A
(C) (B)	<u>compare</u> describe the harvesting <u>methods for various species</u> process ;	Clarification; increase rigor
(D) (E)	<u>research and</u> describe federal and state meat inspection standards such as safety, hygiene, and quality control standards; and	Increase rigor; CCRS: ELA.I.A.2; ELA.IV.A.4; ELA.V
(E) (D)	identify <u>wholesale and</u> retail and wholesale cuts of meat and meat by-products and correlate to major muscle groups-; <u>and</u>	Clarification; moved to 14E
(F)	<u>research animal by-products and explain their impact on society.</u>	Expand; moved from 14D; increase rigor; CCRS: ELA.I.A.2; ELA.V
(14) (15)	The student explores methods of marketing <u>animals and animal products</u> livestock . The student is expected to:	Clarification
(A)	compare various methods of marketing livestock <u>animal marketing such as auction, contract sales, private treaty, internet sales, value-based, and exhibition of various animals</u> ; and	Expand; increase rigor; clarification; CCRS: S.X.E.3.a; M.IX.B.1; M.IX.B.3
(B)	describe methods of marketing meat and meat <u>animal products such as farmers market, direct sales, wholesale, and retail</u> ;	Expand; increase rigor; clarification; CCRS: M.IX.B.1; M.IX.B.3
(C)	<u>research and evaluate the effectiveness of various strategies and campaigns, such as Beef: It's What's For Dinner, Certified Angus Beef, Pork: The Other White Meat, Got Milk?, Beef Check Off, Man's Best Friend, Cat Cafes, Goat Yoga, and Farm to Plate, to market animal products based on consumption patterns and consumer preferences; and</u>	Expand; increase rigor; CCRS: ELA.I.A.2; ELA.V; reworded to clarify
(D)	<u>research and evaluate the effectiveness of various labeling options to market animal products, such as organic, farm-raised, hormone-free, cage-free, grass-fed, antibiotic-free, and non-GMO labels, based on consumption patterns and consumer preferences.</u>	Moved from 6C; CCRS: ELA.I.A.2; ELA.V; S.X.E.3.a; reworded to clarify