

FREEHOLD REGIONAL HIGH SCHOOL DISTRICT

OFFICE OF CURRICULUM AND INSTRUCTION

ANIMAL & BOTANICAL SCIENCES ACADEMY

ANIMAL SCIENCE

Grade Level: 12

Credits: 5

Course Code: 285100

BOARD OF EDUCATION ADOPTION DATE:

AUGUST 31, 2015

FREEHOLD REGIONAL HIGH SCHOOL DISTRICT

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COURSE NUMBER: ANMIAL SCIENCE**COURSE PHILOSOPHY**

The *Animal Science* course is designed to expose students to the world of agriculture, animal science, and career options in the Agriculture, Food, and Natural Resource (AFNR) sector. There is a need to identify the role that animals and animal products play in our international food systems and the impact on the environment, economy, and cultural identities. Members of the research community and the AFNR industry will be able to explore, examine, and predict future trends in the industry based on the problems and needs of local, national, and international systems that are identified. There is a local and global need for increased production of food and fiber to meet predicted population growth. AFNR career success requires experience in the study of animal anatomy, physiology, behavior, nutrition, reproduction, health, selection, and marketing.

COURSE DESCRIPTION

Students engage in inquiry-based activities and projects in animal anatomy and behavior, as well as selection and marketing of products and services. The laboratory skills, field skills, thought processes, and communication techniques practiced are the fundamentals used by veterinarians, zoologists, livestock producers, and other animal science industry members and leaders. Throughout the year students will be challenged to consider perceptions and preferences of individuals within local, regional, and world markets about costs, ethics, and environmental concerns. *Animal Science* will provide students with a comprehensive understanding of the industry so they may go on to post-secondary study in animal science and medicine, biology, and agricultural production, processing and marketing.

COURSE SUMMARY**COURSE GOALS**

CG1: Students will apply biological and ecological concepts to design animal production and management practices that address global and local problems, disadvantages, and ethical implications of our complex national and international food and natural resource system.

CG2: Students will create animal production plans that consider local, national, and international ethical norms, and the challenges they pose to production and conservation of animals.

CG3: Students will discuss and analyze the economic and financial implications of national and international food systems on the individual, the nation, and global community.

COURSE ENDURING UNDERSTANDINGS

CEU1: Creating a career path in the animal sciences requires the competent application of biological principals and respect for cultural and ethical norms.

CEU2: Producing and caring for animals requires the dynamic understanding of anatomical and physiological systems.

CEU3: Animals have been and will continue to be an integral part of human civilization.

COURSE ESSENTIAL QUESTIONS

CEQ1a: How do we determine the best practices for using and managing animals?

CEQ1b: What are the ways we can monitor and prepare for the safe use of animals?

CEQ2: How can we monitor animal health so that it has the best possible outcomes for the animal and the producer/caregiver?

CEQ3: How have animals helped shape our civilization?

UNIT GOALS & PACING

UNIT TITLE	UNIT GOALS	RECOMMENDED DURATION
1: Animal History and Use	<p>LG1: Students will identify and classify animals that have been domesticated throughout history so that they may predict future demand trends in animal production and service.</p> <p>LG2: Students will describe the structure of the national animal production systems so that they can create an individualized learning and career plan in the AFNR sector of the economy.</p>	3 weeks
2: Safety and Handling	Students will identify and design appropriate environmental conditions, training, and safety practices for animals that demonstrate personal, cultural, and social respect for animal welfare and efficient production.	4 weeks
3: Cells and Tissues	Students will create a plan to monitor, manage, and improve the health, reproduction, and general care of animals that are of social or economic importance by utilizing their understanding of cells, tissues, and organ systems.	4 weeks
4: Nutrition	Students will form a plan to use dietary rations, animal feed, and supplements that are comparable for the varied domesticated animals and those animals' specific use and life stage so they may produce and/or care for animals economically and effectively.	5 weeks
5: Reproduction and Genetics	<p>LG1: Students will create a traditional or technologically advanced breeding or reproduction prevention plan for animals in their care by applying their understanding of anatomy and physiology.</p> <p>LG2: Students will evaluate animal traits and breeding probability to predict and determine how to produce animals with economically relevant traits.</p>	6 weeks
6: Animal Health	Students will monitor health indicators so they may improve or maintain high level of quality of animals, animal products, or performances.	6 weeks
7: Animal Products, Selection, and Marketing	Students will analyze market demands for animals and animal products and create a plan to meet the need for high demand and market value-added products.	6 weeks

UNIT OVERVIEW

UNIT LEARNING GOALS

LG1: Students will identify and classify animals that have been domesticated throughout history so that they may predict future demand trends in animal production and service.

LG2: Students will describe the structure of the national animal production systems so that they can create an individualized learning and career plan in the AFNR sector of the economy.

UNIT LEARNING SCALE LG1

4	In addition to score 3 performances, the student can compare and contrast the regulations and regulatory bodies that oversee the production, use, and processing of animals and animal products.
3	The student can: <ul style="list-style-type: none"> • compare the trajectory of human history with the use of animals in society and use it to predict future trends in demand; • cite examples of animals, their products and use in terms of social, economic and ecological importance; • identify the scope of the animal industry and the importance in other industries.
2	The student can: <ul style="list-style-type: none"> • compare the trajectory of human history with the use of animals in society; • cite examples of animals, their products and use in terms of social, economic and ecological importance; • identify the scope of the animal industry and the importance in other industries.
1	The student can: <ul style="list-style-type: none"> • compare the trajectory of human history with the use of animals in society; • cite examples of animals, their products and use in terms of social, economic and ecological importance.
0	Even with help, the student does not exhibit understanding of animal use now or throughout history.

UNIT LEARNING SCALE LG2

4	In addition to score 3 performances, the student can create a plan for achieving their career goals with time and energy dedicated towards exploring that goal through their supervised agricultural experience.
3	The student can: <ul style="list-style-type: none"> • create a description of a career path in the animal industry including a SMART goal path to skill attainment, degrees and certifications; • identify and utilized resources for identifying careers, skills required and earning potential; • assess their interest in working with animals and their interest in a career as an employee, and entrepreneur or academic.
2	The student can: <ul style="list-style-type: none"> • identify and utilized resources for identifying careers, skills required and earning potential; • assess their interest in working with animals and their interest in a career as an employee, and entrepreneur or academic.
1	The student can assess their interest in working with animals and their interest in a career as an employee, and entrepreneur or academic.
0	Even with help, the student does not exhibit understanding of the animal related industries and careers.

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
EU1: Throughout history the use of animals secured and improved standards of living and economic conditions.	EQ1: How does the use of animals for food, service, protection, and in research enrich life and culture?
EU2: There are dynamic legal regulatory systems that monitor the training, production, and processing of animals and their products.	EQ2: What laws and regulations are in place over animal production and processing?
EU3: The study and use of animals in our local, national, and international economies are critical for ecological sustainability.	EQ3a: How have the different cultures domesticated animals? EQ3b: What ways do undomesticated animals serve man in terms of biodiversity and ecology?
EU4: Careers in the animal sector of our economy require an understanding of business planning, biological and physiological systems as well as care, training, and production.	EQ4a: What is the size, scope and interconnected nature of the AFNR sector of the US, global, and international economy? EQ4b: What are areas of skills, degrees, and certifications are required to contribute and lead in the animal science career path?

NJCCCS & COMMON CORE STANDARDS

NGSS:
 HS-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
 HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
 HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
 HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.
 HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
 HS-LS2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

NJCCCS:
 9.3.12.AG.1 Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.
 9.3.12.AG.2 Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Cluster and the role of agriculture, food and natural resources (AFNR) in society and the economy.
 9.3.12.AG.3 Examine and summarize the importance of health, safety and environmental management systems in AFNR businesses.
 9.3.12.AG.4 Demonstrate stewardship of natural resources in AFNR activities.
 9.3.12.AG.5 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.
 9.3.12.AG.6 Analyze the interaction among AFNR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.

CCCS:
 11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
 11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
 11-12.RST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
 11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades
 11-12.RST.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

NJCCCS & COMMON CORE STANDARDS

11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

COMMON ASSESSMENT

ALIGNMENT	DESCRIPTION
LG1, LG2 EU1, EQ1 EU2, EQ2 EU3, EQ3 HS-LS2-8 HS-LS4-1 HS-ETS-1, 2, 3 9.3.12.AG.1-6 11-12.RST.2, 3, 4 11-12.WHST.2 DOK 3	Students will create a journal recording their use of animal products or bi-products throughout a week and include this in a timeline that depicts large culturally significant periods in human civilization that visually compares the past and present with the use of animals, their products and advance of agriculture in general. This timeline should also include future trends in product use.
LG1, LG2 EU1, EQ1 EU2, EQ2 EU3, EQ3 EU4, EQ4a, b HS-LS2-8 HS-LS4-1 HS-ETS-1, 2, 3 9.3.12.AG.1-6 11-12.RST.2, 3, 4 11-12.WHST.2 DOK 3	Students use the agricultural experience tracker to plot out SMART goals for a supervised agricultural experience, aligning their goals to a career they have researched, identifying the necessary credentials (degrees, certificates, etc.) for, working conditions of, and industry demand for that career.

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
  <p>Everyday Animals: Students choose three animals and in teams list all the products they can make use of from the animals. Students then use digital resources to identify the products of the animals and categorize them into food, fiber, research, companionship, recreation and by-products.</p>	agriculture aquaculture beef cattle by-product companion animal dairy cattle food goat hide horse marketing process poultry research sheep swine	<p>Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text</p> <p>DOK 2</p>
<p>Harvest the Wild: Students will use characteristics of domesticated and wild animals to identify the traits society has identified as important. They then research the diet, disposition, growth and breeding capacity of the domesticated animals.</p>	adaptation bovine canine civilization diet domesticate equine evolution feline flight zone livestock ovine porcine selective breeding swine tame trophic level	<p>Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text</p> <p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics</p> <p>DOK 2</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
  <p>Animals Now and Then: Students will pick one animal of their choice and use digital resources to research the evolution of the animal and the use of the animal over time. Student will be able to draw conclusions about the arch of time with species like the auroch and the cow.</p>	adaptation bovine canine civilization diet domesticate equine evolution feline flight zone livestock ovine porcine selective breeding swine tame trophic level	<p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics</p> <p>DOK 2</p>
 <p>SAE by Design--Gateway to Experience: Students choose an animal or group of animals and begin creating a journal plan to examine the animal and its production with the goal of creating a production, management and marketing manual.</p>	SAE Agricultural Experience Tracker (AET)	<p>Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p> <p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics</p> <p>DOK 2, 3</p>

UNIT OVERVIEW

UNIT LEARNING GOALS

Students will identify and design appropriate environmental conditions, training, and safety practices for animals that demonstrate personal, cultural, and social respect for animal welfare and efficient production.

UNIT LEARNING SCALE

4	In addition to score 3 performances, the student can demonstrate the safe and ethical interaction with animals within their supervised agricultural experience.
3	The student can: <ul style="list-style-type: none"> discern the difference between animal welfare and animal rights; design a management plan that respects animal welfare and keeps animals and their caretakers safe and efficient with respect cost; compare and contrast the beliefs of different cultures and personal views.
2	The student can: <ul style="list-style-type: none"> discern the difference between animal welfare and animal rights; design a management plan that respects animal welfare and keeps animals and their caretakers safe.
1	Students will be able to compare and contrast the difference between animal welfare and animal rights.
0	Even with help, the student does not demonstrate understanding of Animal Handling and Safety.

ENDURING UNDERSTANDINGS

EU1: People can interact with animals in ways that can preserve the health, safety, and wellbeing of both people and animals.
 EU2: People and their cultures have very different belief systems about animals and their acceptable uses.

ESSENTIAL QUESTIONS

EQ1: How do I ensure my own wellbeing while ensuring the wellbeing of an animal as well?
 EQ2: Why do people’s attitudes towards animals vary from culture to culture?

NJCCCS & COMMON CORE STANDARDS

NGSS:

HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
 HS-LS2-8 Evaluate the evidence for the role of group behavior on individual and species’ chances to survive and reproduce.

NJCCCS:

9.3.12.AG-ANI.1 Analyze historic and current trends impacting the animal systems industry.
 9.3.12.AG-ANI.2 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.
 9.3.12.AG-ANI.7 Apply principles of effective animal health care.
 9.3.12.AG-FD.1 Develop and implement procedures to ensure safety, sanitation and quality in food product and processing facilities.
 9.3.12.AG-FD.2 Apply principles of nutrition, biology, microbiology, chemistry and human behavior to the development of food products.
 9.3.12.AG-FD.3 Select and process food products for storage, distribution and consumption.
 9.3.12.AG-FD.4 Explain the scope of the food industry and the historical and current developments of food products and processing.

CCSS:

11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

NJCCCS & COMMON CORE STANDARDS

11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades

11-12.RST.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11-12.RST.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

11-12.RST.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11-12.WHST.1 Write arguments focused on discipline-specific content.

11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

11-12.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

11-12.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

COMMON ASSESSMENT

ALIGNMENT	DESCRIPTION
LG1 EU1, EQ1 EU2, EQ2 HS-LS-7, 8 9.3.12.AG-ANI.1-2,7 9.3.12.AG-FD.1-4 11-12.RST.2 11-12.WHST.1, 2, 5, 6 DOK 3	Students will create a design for a facility for their chosen animal or animal species that: identifies and provides appropriate environmental conditions, training, and safety practices for animals; demonstrates personal, cultural, and social respect for animal welfare; ensures efficient production. Suggestions include animal “resort” brochure, business plan facilities proposal, or base plan diagram with narrative.

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>“Welfarest” or “Rightest”: Students and teachers begin by silently creating an outline of their beliefs, then with a directed conversation share their beliefs and opinions. Students may share out in a digital platform like Edmodo, or TodaysMeet.</p> 	activist animal rights animal welfare biotechnology cloning cold-blooded confinement operation controversy cruelty dilemma dominion downer embryo transfer ethical ethics extremist farrowing crate humane inhumane insect invertebrate issue laboratory animal mammal PETA philosophy rights values vegan vegetarian vertebrate warm-blooded animal welfare	<p>Write arguments focused on discipline-specific content</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 2</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Acting Like an Animal: Students complete a web quest investigating learned behaviors, instinctual behaviors, as well as best practices of handling and restraint. Students share out their research and identify themes and trends amongst the animals.</p>	<p>aggressive behavior behavior conditioning docile dominance ethology flight zone flighty flocking habituation handling imprinting ingestive behavior instinct intelligence kinesis novelty operant conditioning point of balance social behavior stress submissive behavior taxis temperament</p>	<p>Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information</p> <p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes</p> <p>DOK 3</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Manipulating Manners: Students use sample insects to devise an experiment to investigate the responses of insects to their altered environment. Students predict the outcomes then record responses to stimuli. The advanced student also may choose other animals and stimuli scenarios to design investigations for.</p>	agar bacteria biosecurity colony control point controlled environment corral environment facilities farrowing crate feed bunk feed lot head-catch chute holding pen homeostasis humidity (relative) hutch lambing pen milking parlor nest box pathogen risk management squeeze chute stall stanchion temperature thermoneutral zone thermoregulation ventilation	<p>Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information</p> <p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes</p> <p>DOK 4</p>

UNIT OVERVIEW

UNIT LEARNING GOALS

Students will create a plan to monitor, manage, and improve the health, reproduction, and general care of animals that are of social or economic importance by utilizing their understanding of cells, tissues, and organ systems.

UNIT LEARNING SCALE

4	In addition to score 3 performances, the student can demonstrate monitoring animals safely through exploratory or entrepreneurial supervised agricultural experiences with records in their journals.
3	The student can: <ul style="list-style-type: none"> • create an informative publication in the extension service style or veterinarian journal article that communicates keys to cell, organ and tissue health; • create a monitoring manual that outlines how to monitor the vital signs and tissue health for a given animal; • compare and contrast organ systems and comparison of plants or bacteria.
2	The student can: <ul style="list-style-type: none"> • create a monitoring manual that outlines how to monitor the vital signs and tissue health for a given animal; • compare and contrast organ systems and signs of healthy function.
1	The student can identify structure of healthy cells and functions of tissues.
0	Even with help, the student does not exhibit understanding of differences in animal tissues and cells.

ENDURING UNDERSTANDINGS

EU1: A producer or manager of animals must monitor biological and ecological systems in order to be successful in raising animals.

EU2: Cells make up tissues, and the cells and tissues work in concert with tissues systems to keep an animal healthy.

EU3: Monitoring specific behaviors or reactions in animals or their tissues can help a producer keep their animals healthy and productive.

ESSENTIAL QUESTIONS

EQ1: How can we monitor the health of specific cells, tissues, and systems to ensure health and quality of people, animals, and their products?

EQ2: What are the signs, symptoms, and environmental conditions that can be observed to monitor organ systems working together to keep the animal healthy and thriving?

EQ3: How do you monitor the health of an animal when it can't tell you something is wrong?

NJCCCS & COMMON CORE STANDARDS

NGSS:

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
 HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
 HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

NJCCCS:

9.3.12.AG-ANI.1 Analyze historic and current trends impacting the animal systems industry.
 9.3.12.AG-ANI.2 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.
 9.3.12.AG-ANI.3 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.

NJCCCS & COMMON CORE STANDARDS

- 9.3.12.AG-ANI.4 Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.
- 9.3.12.AG-ANI.5 Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.
- 9.3.12.AG-ANI.6 Classify, evaluate and select animals based on anatomical and physiological characteristics.
- 9.3.12.AG-ANI.7 Apply principles of effective animal health care.

- CCSS:**
- 11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- 11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades
- 11-12.RST.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
- 11-12.RST.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- 11-12.RST.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.WHST.1 Write arguments focused on discipline-specific content.
- 11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes
- 11-12.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- 11-12.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

COMMON ASSESSMENT

ALIGNMENT	DESCRIPTION
LG1 EU1, EQ1 EU2, EQ2 EU3, EQ3 HS-LS-1-2 HS-LS1-7 HS-ETS1-3 9.3.12.AG-ANI.1-7 11-12.RST.2, 4, 5, 8, 9 11-12.WHST.1, 2, 5, 6 DOK 3	The students will create cell, tissue and pathogen “profiles” (in formats like popular social media platforms) that depict the “likes” for environment, cell structures, products or healthy and malfunctioning cells. The profiles will be adapted to be included in the monitoring manual for the student’s selected species.

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
<p>Cruising with a Blood Cell: Students create travel brochure for an organ system. The students must illustrate and discuss cell types, tissues and structures in organs. Systems in a healthy state and a diseased or distressed state should also be discussed. Students may choose other types of formats and media for communication of content mastery – map, video, model.</p>	<p>absorption active transport aerobic anaerobic anatomy cell membrane cellular respiration centrosome cytoskeleton diffusion endoplasmic reticulum epidermis tissue equilibrium epithelial facilitated diffusion Golgi (apparatus) hibernation hypertonic hypotonic isotonic lateral lysosome membrane metabolism mitochondria nucleolus nucleus osmosis passive transport protoplast protoplasm respiration ribosome secretory vesicle tissue vacuole</p>	<p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades</p> <p>Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information</p> <p>Write arguments focused on discipline-specific content</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 2, 3</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Mapping Reactions in the Body: Students create concept maps of the body systems. They may use Prezi, draw or other tactile modalities to illustrate the interconnected nature of the organ systems. Measurable indicators of physiological system health will be included as a key to identifying the systems and their connected nature.</p>	anatomy bone cardiac cartilage circulation digestion epithelial layer hock ligament monogastric muscle tissue organ physiology reproductive system respiration ruminant tendon tissue vertebrate	<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3</p>

SUGGESTED STRATEGIES		
ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
<p>Just Wing It! Students complete a dissection of a muscle system (chicken wings, hearts or other appropriate readily available muscle system). Students use stains and magnifiers to help view the different tissues. Students draw, compare and contrast the tissues. Once they review the tissues they draw conclusions about why there is a difference in the tissues.</p>	<p>alveolus (alveoli) aorta artery atrium (atria) blood pressure bromothymol blue bronchiole bronchus (bronchi) capillary cardiovascular cellular respiration circulation diaphragm diastolic diffusion exhalation external respiration heart heart rate inhalation internal respiration larynx lung pharynx physiology pulmonary circulation pulse respiration respiration rate sphygmomanometer stethoscope systemic circulation systolic titration trachea vena cava ventricle</p>	<p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades</p> <p>Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Nerves, Hormones and Filters... Oh My! Students record a list of hormones, nerves, and filters and complete a simple search of general function. Once complete and shared, students will create analogies for the function. Students may include this in a collaborative web based document or message board of analogies.</p>	adrenal glands adrenalin anterior pituitary autonomic system central nervous system cerebellum cerebrum endocrine excretion gonad homeostasis hormone hypothalamus kidney medulla medulla oblongata nephron nerve neuron pancreas parasympathetic system parathyroid glands peripheral nervous system pineal gland pituitary gland receptor renal sensory somatic system sympathetic system target organ thalamus thymus gland thyroid gland urea ureter urethra urinary system	<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p> <p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 4</p>

UNIT OVERVIEW

UNIT LEARNING GOALS

Students will form a plan to use dietary rations, animal feed, and supplements that are comparable for the varied domesticated animals and those animals' specific use and life stage so they may produce and/or care for animals economically and effectively.

UNIT LEARNING SCALE

4	In addition to score 3 performances, the student can implement their plan for the balancing of rations for specific animal and role.
3	The student can: <ul style="list-style-type: none"> • compare and contrast rations based on animal use; • describe the concerns about the environmental impacts of certain ration choices; • recall and cite examples of all the components of a balanced ration; • calculate feed efficiency in their animal.
2	The student can: <ul style="list-style-type: none"> • compare and contrast rations based on animal use; • describe the concerns about the environmental impacts of certain ration choices; • recall and cite examples of all the components of a balanced ration.
1	The student can: <ul style="list-style-type: none"> • compare and contrast rations based on animal use; • recall and cite examples of all the components of a balanced ration.
0	Even with help, the student does not exhibit understanding the importance of animal feed and nutrition.

ENDURING UNDERSTANDINGS

ESSENTIAL QUESTIONS

EU1: Proper nutrition has positive effects on the biological systems in animals, the ecological systems in which they are produced, and the economic wellbeing of the producers of the animals.	EQ1: How can proper nutrition benefit more than just the animal?
EU2: Animal feed selection can have positive impacts on animal health and negative environmental implications.	EQ2: How does a producer read and apply a nutritional requirement table so as to increase benefits to the animals and reduce the impacts on the environment?
EU3: Animal species, reproductive suitability, use, and age should be considered when deciding appropriate feed for animals.	EQ3: How can a Pearson square be used to balance rations for animals to maximize health and production while keeping costs reasonable?

NJCCCS & COMMON CORE STANDARDS

NGSS:
 HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
 HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
 HS-LS2-3 Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
 HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
 HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
 HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

NJCCCS & COMMON CORE STANDARDS

HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

NJCCCS:

9.3.12.AG-ANI.1 Analyze historic and current trends impacting the animal systems industry.

9.3.12.AG-ANI.2 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.

9.3.12.AG-ANI.3 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.

9.3.12.AG-ANI.4 Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.

9.3.12.AG-ANI.5 Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.

9.3.12.AG-ANI.6 Classify, evaluate and select animals based on anatomical and physiological characteristics.

9.3.12.AG-ANI.7 Apply principles of effective animal health care.

9.3.12.AG-FD.4 Explain the scope of the food industry and the historical and current developments of food products and processing.

9.3.12.AG-NR.1 Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.

9.3.12.AG-NR.2 Analyze the interrelationships between natural resources and humans.

9.3.12.AG-NR.3 Develop plans to ensure sustainable production and processing of natural resources.

9.3.12.AG-NR.4 Demonstrate responsible management procedures and techniques to protect or maintain natural resources.

CCSS:

11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades

11-12.RST.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11-12.RST.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

11-12.RST.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11-12.WHST.1 Write arguments focused on discipline-specific content.

11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

11-12.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

11-12.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

COMMON ASSESSMENT

ALIGNMENT	DESCRIPTION
LG1 EU1, EQ1 EU2, EQ2 EU3, EQ3 HS-LS1-6, 7 HS-LS2-3, 4 HS-ETS1-1, 3 9.3.12.AG-ANI.1-7 9.3.12.AG-FD.4 9.3.12.AG-NR.1-4 11-12.RST.2, 5, 8, 9 11-12.WHST.1, 2, 5, 6 DOK 3	Students will create a series of menus for different species of animals with different menu options for the animals' life stages and their use; for example, a horse that is for show may have a lower energy requirement than a leisure animal used for instructional riding and will have lower energy requirements still than an animal used in logging or other work/utility. This will draw on their abilities to balance rations for nutrients and energy, as well as consider the costs of their feed.

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
  <p>Grocery List: Students use online resources to identify the costs associated with the animals they are researching. They will use their ability to design rations and review readily available sources locally and nationally to devise the monthly and annual cost for their animal of choice for their management book.</p>	anemia bloat colic deficiency disorder founder grass tetany hunger nutritional disease overfeeding toxicity underfeeding as-fed basis balanced ration diet dry matter maintenance ration nutritionist Pearson square ration supplement	<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p> <p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3, 4</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
  <p>Hunger Pains: Students research several nutritional deficiencies in their select animals; dogs, cattle, chickens, equine, goat, etc. With the research complete students rotate the room sharing the disorder and animal on posts with themes; energy, protein, vitamin, mineral. Other options may be considered for digital web based collaborative documents or message boards to “share out.”</p>	<p>abomasum absorption alimentary canal anabolism anterior, posterior anus bile bolus cardia cecum (pl. ceca) chyme cloaca concentrates cud digestive tract duodenum enzyme esophagus gastrointestinal tract gizzard gullet ileum jejunum large, small intestine mastication metabolism monogastric omasum pancreas prehension proventriculus rectum reticulum roughage rumen ruminant salivary glands vent villi</p>	<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p> <p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 2, 3</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Rational Rules of Thumb: Students practice the ration calculations for specific protein sources with directed worksheets. Lesson should be tiered or designed with a scaffold to build the fundamental structures. The students should work towards being able to use commercial feed sources listings and price sheets to design three to four ration mixes with similar bimolecular profiles so if one sources is not available and need to be substituted.</p>	<p>amino acids carbohydrate diet fat mineral nutrient nutrition nutritional requirements protein ration vitamin</p>	<p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades</p> <p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3</p>

UNIT OVERVIEW

UNIT LEARNING GOALS

LG1: Students will create a traditional or technologically advanced breeding or reproduction prevention plan for animals in their care by applying their understanding of anatomy and physiology.

LG2: Students will evaluate animal traits and breeding probability to predict and determine how to produce animals with economically relevant traits.

UNIT LEARNING SCALE LG1

4	In addition to score 3 performances, the student can: <ul style="list-style-type: none"> describe ways managers ethically manipulate breeding cycles; create a breeding plan for a specific species; implement their understanding of breeding in their supervised agricultural experience.
3	The student can: <ul style="list-style-type: none"> identify and contrast breeding systems and reproduction prevention procedures; compare and contrast different breeding systems based on different species; recall the types of reproductive systems and their different anatomy and physiology.
2	The student can: <ul style="list-style-type: none"> identify and contrast breeding systems; compare and contrast different breeding systems based on different species.
1	The student can identify and contrast breeding systems.
0	Even with help, the student does not exhibit understanding reproduction.

UNIT LEARNING SCALE LG2

4	In addition to score 3 performances, the student can use evaluations and predictions to plan breeding outcomes of their animals.
3	The student can: <ul style="list-style-type: none"> use genetic probability to evaluate and predict traits between generations of animals; describe traits that are valuable to production of animals and their products; create plans to use breeding lines to achieve desired traits; identify and contrast breeding systems and the use of molecular vs organism biotechnology.
2	The student can: <ul style="list-style-type: none"> describe traits that are valuable to production of animals and their products; identify and contrast breeding systems and the use of molecular vs organism biotechnology.
1	The student can describe traits that are valuable to production of animals and their products.
0	Even with help, the student does not exhibit understanding reproduction and genetics.

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
EU1: The best breeding techniques should be employed so that we can meet or exceed future demands, while addressing the public's ethical concerns.	EQ1: How do we determine the most ethical and efficient breeding programs for animals?
EU2: Animals should be bred and produced for the best traits and characteristics that are determined by use and environment.	EQ2: How can a natural reproductive cycle be manipulated for economic and quality increases?
EU3: Genetic traits can be monitored and predicted with breeding records, pedigrees, or with modern DNA technologies.	EQ3a: What's the best and most ethical way to monitor and predict genetic traits? EQ3b: What happens when we don't monitor breeding?

NJCCCS & COMMON CORE STANDARDS

NGSS:

HS-LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

HS-LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

HS-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

HS-LS4-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

HS-LS4-3 Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

HS-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

NJCCCS:

9.3.12.AG-ANI.1 Analyze historic and current trends impacting the animal systems industry.

9.3.12.AG-ANI.2 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.

9.3.12.AG-ANI.3 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.

9.3.12.AG-ANI.4 Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.

9.3.12.AG-ANI.5 Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.

9.3.12.AG-ANI.6 Classify, evaluate and select animals based on anatomical and physiological characteristics.

9.3.12.AG-ANI.7 Apply principles of effective animal health care.

9.3.12.AG-FD.4 Explain the scope of the food industry and the historical and current developments of food products and processing.

9.3.12.AG-NR.1 Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.

9.3.12.AG-NR.2 Analyze the interrelationships between natural resources and humans.

9.3.12.AG-NR.3 Develop plans to ensure sustainable production and processing of natural resources.

9.3.12.AG-NR.4 Demonstrate responsible management procedures and techniques to protect or maintain natural resources.

9.3.12.AG-BIZ.1 Apply management planning principles in AFNR businesses.

NJCCCS & COMMON CORE STANDARDS

9.3.12.AG-BIZ.4 Develop a business plan for an AFNR business.

9.3.12.AG-BIZ.5 Use sales and marketing principles to accomplish AFNR business objectives.

CCSS:

11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades

11-12.RST.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11-12.RST.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

11-12.RST.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11-12.WHST.1 Write arguments focused on discipline-specific content.

11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

11-12.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

11-12.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

COMMON ASSESSMENT	
ALIGNMENT	DESCRIPTION
LG1, LG2 EU1, EQ1a, b EU2, EQ2 EU3, EQ3 HS-LS3-1,2,3 HS-LS4-1,2,3,4,5,6 HS-ETS1-2, 3 9.3.12.AG-ANI.1-7 9.3.12.AG-FD.4. 9.3.12.AG-NR.1-4 9.3.12.BIZ-1,4,5 11-12.RST.2, 4, 5, 8 11-12.WHST.1, 2, 5, 6 DOK 3	<p>Students create a “matchmaker” manual for how to select animals with different breeding needs. It will include breeding and selection criteria as well as the gestational periods and production facilities. It should also include possible methods to reduce or prevent unwanted breeding.</p>
LG1, LG2 EU1, EQ1a, b EU2, EQ2 EU3, EQ3 HS-LS3-1,2,3 HS-LS4-1,2,3,4,5,6 HS-ETS1-2, 3 9.3.12.AG-ANI.1-7 9.3.12.AG-FD.4. 9.3.12.AG-NR.1-4 9.3.12.BIZ-1,4,5 11-12.RST.2, 4, 5, 8 11-12.WHST.1, 2, 5, 6 DOK 3	<p>Students will select a set of animals from commercial producers with particular traits of their choosing that should prove economically viable. They will then have to draw up predictive crosses to see if the traits are dominant, recessive, codominant or incompletely dominant and then justify their selections.</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Name that Part: Students are given a set of diagrams for their animal of choice and are asked to use two different colors to color code male and female parts of the reproductive track. Then students are given a list of structures to label and a function sheet to complete. The information may be added to their producers' manual.</p>	<p>cervix Cowper's gland cryptorchidism endocrine system epididymis estrogen estrus fallopian tubes hormone infundibulum ligament maturation ovum (egg) ovary oviduct parturition penis prostate reproduction reproductive system scrotum semen seminal vesicle seminiferous tubules sex character sigmoid flexure sperm testicle testosterone urethra uterus vagina vas deferens vulva</p>	<p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 2</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Is Natural Best? Students take a survey assessing their views on breeding techniques using a Poll Anywhere, Google form, Edmodo poll or similar platform, and discuss the results of their anticipated views. Then students read about the benefits and evidence for or against the natural course of breeding and artificial systems. Discussion or formal debate can conclude the lesson.</p>	<p>artificial insemination cloning crossbreeding embryo transfer estrus synchronization hand breeding (hand mating) heat heterosis hybrid vigor inbreeding line breeding mate morphology motility natural breeding pasture breeding (pasture mating)</p>	<p>Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information</p> <p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Write arguments focused on discipline-specific content</p> <p>DOK 3</p>

SUGGESTED STRATEGIES		
ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
Evaluating viability: Students complete an assessment of gametes and use a differential stain and morphology guide to determine viability and quality. Students will conduct scaled calculation to determine total viability in the proof.	anestrus calving diestrus estrogen estrous cycle estrus farrowing foaling follicle stimulating hormone gestation period heat hormone kidding lactation lambing littering luteinizing hormone menstrual cycle metestrus parturition polyestrous proestrus progesterone puberty wean whelping	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information DOK 3, 4

SUGGESTED STRATEGIES		
ACTIVITIES		PROCEDURAL KNOWLEDGE
 <p>Hormones: Students use web quest format to search the hormone levels of different species in their estrous cycle. Students may use a hand drawn cycle map, or digital platforms to draw and label the hormones and the stages of the cycle. Students must also include external indications, such as temperature or behavior that would indicate states of the cycle based on research sources.</p>		<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p>
DECLARATIVE KNOWLEDGE		
<p>allele anaphase, interphase, metaphase, prophase, telophase balanced EPDs chromatid chromosome co-dominance complete dominance contemporary group crossbreeding DAYS EPD dihybrid cross diploid dominant, recessive gene economic index egg environment Expected Progeny Difference (EPD) fertilization frequency gamete gene genetics genomics genotype haploid heredity heritability heterozygous, homozygous incomplete dominance</p>	<p>index inheritance lethal gene LW 21 EPD meiosis mitosis MM EPD monohybrid cross mutation NBA EPD nucleus ovum pedigree phenotype polled probability progeny Punnett square qualitative, quantitative trait ratio recessive sex-linked trait WW EPD YW EPD zygote</p>	<p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes</p> <p>Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 4</p>

UNIT OVERVIEW

UNIT LEARNING GOALS

Students will monitor health indicators so they may improve or maintain high level of quality of animals, animal products, or performances.

UNIT LEARNING SCALE

4	In addition to score 3 performances, the student can apply an animal health management plan in their own animals with success in their supervised agricultural experience.
3	The student can: <ul style="list-style-type: none"> • identify the parts of the disease triangle and identify ways to manipulate it; • identify sources of disease and parasites and indications in animals that they are present; • cite the monitoring systems that help them evaluate health of animals; • describe a problem-solving process used to identify disease symptoms, causes and offer prescriptive solutions.
2	The student can: <ul style="list-style-type: none"> • identify sources of disease and parasites and indications in animals that they are present; • cite the monitoring systems that help them evaluate health of animals.
1	The student can identify sources of disease and parasites and indications in animals that they are present.
0	Even with help, the student does not exhibit understanding animal health or how they may affect it.

ENDURING UNDERSTANDINGS

ESSENTIAL QUESTIONS

EU1: A manager can manipulate aspects of the disease triangle (pest/disease, susceptible host, and favorable environment) to reduce disease.

EQ1: Is it possible to ever keep an animal disease-free?

EU2: An integrated, holistic approach to animal care considers aspects of how an animal is interacting with its environment to evaluate its susceptibility to disease.

EQ2: What other aspects of care can positively and negatively affect the health of animals?

EU3: Constant monitoring of individual behaviors and physiological indicators is imperative to maintaining animal health.

EQ3: How can I tell if an animal is sick if it can't communicate with me?

NJCCCS & COMMON CORE STANDARDS

NGSS:

HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

HS-LS2-3 Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

HS-LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

NJCCCS:

9.3.12.AG-ANI.1 Analyze historic and current trends impacting the animal systems industry.

NJCCCS & COMMON CORE STANDARDS

- 9.3.12.AG-ANI.2 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.
- 9.3.12.AG-ANI.3 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.
- 9.3.12.AG-ANI.4 Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.
- 9.3.12.AG-ANI.5 Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.
- 9.3.12.AG-ANI.6 Classify, evaluate and select animals based on anatomical and physiological characteristics.
- 9.3.12.AG-ANI.7 Apply principles of effective animal health care.
- 9.3.12.AG-FD.4 Explain the scope of the food industry and the historical and current developments of food products and processing.
- 9.3.12.AG-NR.1 Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.
- 9.3.12.AG-NR.2 Analyze the interrelationships between natural resources and humans.
- 9.3.12.AG-NR.3 Develop plans to ensure sustainable production and processing of natural resources.
- 9.3.12.AG-NR.4 Demonstrate responsible management procedures and techniques to protect or maintain natural resources.
- 9.3.12.AG-BIZ.1 Apply management planning principles in AFNR businesses.
- 9.3.12.AG-BIZ.4 Develop a business plan for an AFNR business.
- 9.3.12.AG-BIZ.5 Use sales and marketing principles to accomplish AFNR business objectives.

- CCSS:**
- 11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
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 - 11-12.RST.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
 - 11-12.WHST.1 Write arguments focused on discipline-specific content.
 - 11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
 - 11-12.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
 - 11-12.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

COMMON ASSESSMENT	
ALIGNMENT	DESCRIPTION
LG1 EU1, EQ1 EU2, EQ2 EU3, EQ3 HS-LS1-3 HS-LS2-3, 6 HS-ETS1-2, 3 9.3.12.AG-ANI.1-7 9.3.12.AG-FD.4. 9.3.12.AG-NR.1-4 9.3.12.BIZ-1,4,5 11-12.RST.2, 4, 5, 8, 9 11-12.WHST.1, 2, 5, 6 DOK 3	<p>Students will create an “extension service” or “vet journal” style fact sheet that will outline the most common, dangerous and economically important infections and non-infectious diseases of animals. The fact sheets will include available preventative and therapeutic treatments and examinations of the disease triangle in order to monitor indicator signs or symptoms so as to prevent to each of the diseases.</p>

SUGGESTED STRATEGIES		
ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
<p>Popular Pathogens: Students create a simulated classroom outbreak based on an airborne pathogen. The focus of the lesson should include roles for correct and incorrect PPE use, proximity, quarantine and contact.</p>	<p>APHIS bacteria bacteriophage carrier CDC contagion contagious disease CPSC EPA eukaryote FDA fomite foot-&-mouth disease FSIS fungus host infection infectious disease mold noninfectious disease OSHA pathogen prion prokaryote protozoa quarantine regulatory systemic USDA vector verdant virus</p>	<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3</p>

SUGGESTED STRATEGIES		
ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
<p>Vital Signs: Students research vital signs for themselves and their chosen animal species. Students create a collaborative digital document cataloging the differences in vitals for different species. Also, students may choose to include behaviors and other measurable indicators of proper vitals and signs and symptoms of illness.</p>	<p>acute disease alertness balling gun bolus chronic disease clinical disease contentment diagnosis diagnostician disease drench fever health heart rate inject intramuscular oral rales respiration rate subclinical disease subcutaneous symptoms temperature topical treat vital signs zoonosis</p>	<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3, 4</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Rounds, Rods, and Spirals: Students use microscopes and digital research to classify diseases into morphological and phylogenic categories. Students will create a list of characteristics that can be used to identify pathogens in a sample and select categories of treatment and infection/re-infection prevention protocols.</p>	<p> ascarid bots external parasite flatworm flukes fly gross examination grubs helminth host internal parasite ivermectin lice life cycle mange nematode parasite roundworm specific gravity strongyle symbiosis tapeworm tick </p>	<p>Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3</p>

SUGGESTED STRATEGIES		
ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
<p>Give Me One More Shot: Students create an injection script. They record PPE and cautionary steps to be aware of. The students may select the type of injection to give a grapefruit or similar sample or they can draw a card informing them of their shot selection.</p>	<p>abscess active immunity antibiotic antibody antigen aspirate condemned cross contamination gauge hypodermic needle immunity immunize immunology inoculation intramuscular intravenous killed vaccine lesion modified live vaccine passive immunity prevention subcutaneous syringe vaccination vaccine</p>	<p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades</p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes</p> <p>DOK 3</p>

UNIT OVERVIEW

UNIT LEARNING GOALS

Students will analyze market demands for animals and animal products and create a plan to meet the need for high demand and market value-added products.

UNIT LEARNING SCALE

4	In addition to score 3 performances, the student can recall the parts of a supply chain and narrate how a product moves through the market, and/or create a “brand animal” or animal products and the plan to bring them to market safely and cost effectively.
3	The student can: <ul style="list-style-type: none"> • can create a marketing plan for their animals, their products or services; • identify and compare value added aspects of products; • identify market demands and design product that meet or exceed those demands.
2	The student can: <ul style="list-style-type: none"> • identify and compare value added aspects of products; • identify market demands and design product that meet or exceed those demands.
1	The student can identify market demands and design product that meet or exceed those demands.
0	Even with help, the student does not exhibit understanding of the marketing of animals, animal products or services.

ENDURING UNDERSTANDINGS

ESSENTIAL QUESTIONS

EU1: There are culturally specific and economically efficient ways to bring animals and animal products to market.

EQ1: How do we produce, qualify and ensure high quality animal products and deliver them to market?

EU2: Animal producers can add value to their products by matching their products to meet the trends, needs, and desires of consumers in the market.

EQ2: How can you predict and therefore meet trends, needs and desires of consumers?

EU3: Consumer opinions about animal products vary, based on price, quality, and health concerns.

EQ3: How do you satisfy fickle consumers?

NJCCCS & COMMON CORE STANDARDS

NGSS:

HS-LS2-2 Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

NJCCCS:

9.3.12.AG-ANI.1 Analyze historic and current trends impacting the animal systems industry.

9.3.12.AG-ANI.2 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.

9.3.12.AG-ANI.3 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.

9.3.12.AG-ANI.4 Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.

NJCCCS & COMMON CORE STANDARDS

- 9.3.12.AG-ANI.5 Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.
- 9.3.12.AG-ANI.6 Classify, evaluate and select animals based on anatomical and physiological characteristics.
- 9.3.12.AG-ANI.7 Apply principles of effective animal health care.
- 9.3.12.AG-FD.4 Explain the scope of the food industry and the historical and current developments of food products and processing.
- 9.3.12.AG-NR.1 Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.
- 9.3.12.AG-NR.2 Analyze the interrelationships between natural resources and humans.
- 9.3.12.AG-NR.3 Develop plans to ensure sustainable production and processing of natural resources.
- 9.3.12.AG-NR.4 Demonstrate responsible management procedures and techniques to protect or maintain natural resources.
- 9.3.12.AG-BIZ.1 Apply management planning principles in AFNR businesses.
- 9.3.12.AG-BIZ.4 Develop a business plan for an AFNR business.
- 9.3.12.AG-BIZ.5 Use sales and marketing principles to accomplish AFNR business objectives.

- CCSS:**
- 11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
 - 11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades
 - 11-12.RST.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
 - 11-12.RST.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
 - 11-12.RST.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
 - 11-12.WHST.1 Write arguments focused on discipline-specific content.
 - 11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
 - 11-12.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
 - 11-12.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

COMMON ASSESSMENT

ALIGNMENT	DESCRIPTION
LG1 EU1, EQ1 EU2, EQ2 EU3, EQ3 HS-LS2-2, 7 HS-ETS1-2, 3 9.3.12.AG-ANI.1-7 9.3.12.AG-FD.4. 9.3.12.AG-NR.1-4 9.3.12.BIZ-1,4,5 11-12.RST.2, 4, 5, 8, 9 11-12.WHST.1, 2, 5, 6 DOK 3	Students will select an animal or animal product and design or redesign a product or a value-added product, and review the market demands and outlined in the SWOT (strengths, weaknesses, opportunities and threats). They will then develop the rest of the marketing plan for the product or products.

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Products of Our Toil, From Field to Fridge: Students use web-based resources to present on animal products:</p> <ul style="list-style-type: none"> ○ Identify the animal from which the product is derived ○ Identify the external anatomy of the animal ○ Specify the wholesale and retail cuts (if applicable) ○ Explain the grades and indicators of quality ○ Identify the fresh products that are available ○ Identify the processed products ○ Identify the by-products ○ Explain the nutritional value to humans ○ Identify and give examples of food safety issues 	animal product beef breakout method candle carcass cheese chevon cured cut cutability dressing percent egg egg candling flavor fresh grade, grading juiciness lamb meat milk mutton odor palatability pork primal cuts process quality grade refrigeration retail cuts sensory evaluation steak taste tenderness veal wholesale cuts yield grade	<p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>DOK 2</p>

SUGGESTED STRATEGIES

ACTIVITIES	DECLARATIVE KNOWLEDGE	PROCEDURAL KNOWLEDGE
 <p>Selecting the Best: Students use teacher distributed materials with web based resources to develop a matrix of traits for their animal. The students will use their matrix to place example animal in to rankings.</p>	artificial insemination balance birth weight EPD breed character cannon capacity condition conformation criteria evaluation expected progeny difference femininity finish lean masculinity milk EPD muscularity quality selection sex character structural soundness style udder weaning weight EPD yearling weight EPD	<p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3</p>
 <p>Value added, Planning for Profit: Students will use internet sources and their management guide to create a market product outline. They will identify the “4 P’s” of their marketing plan and describe parts of the market they want to sell too.</p>	brand distribution distribution channel goods market marketing marketing mix niche-marketing 4 P’s (product, place, price, promotion) selling target marketing value-added	<p>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p> <p>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information</p> <p>DOK 3</p>

