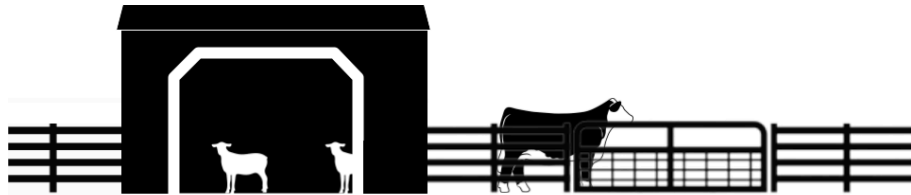


LARGE ANIMAL SCIENCE CURRICULUM

NONNEWAUG



AGRICULTURAL PRODUCTION



Grade Level(s): 10

Curriculum Author: Kathleen Gorman

Course Description:

Students will explore a wide variety of experiences related to the science, art, and practical methods of caring for, improving, and managing livestock, as well as concepts of food science and technology. Course topics will include livestock behavior, handling, and restraints; livestock business facility maintenance; and livestock products and processing. Students will be using the Nonnewaug High School Education Farm laboratory spaces to complete hands-on, skill-based laboratory experiences. Every student is required to maintain and document an approved supervised agriculture experience (SAE) project, as well as participate in FFA activities and event planning.

SEMESTER AT A GLANCE

| Unit Title | Overarching Essential Question | Overarching Enduring Understanding | Vision of A Learner “I Can” Statements |
|---|--|---|--|
| Livestock Husbandry | How can individuals work safely and efficiently while working with livestock production animals? | Productive livestock producers develop skills over time to become trusted and respected professionals. | TI4, TCC2, TCC4, CCE1, CCE3, CCE4, P3 |
| Livestock Facility Design | How can animal producers raise animals in a way that balances production as well as economic, environmental, and societal needs? | Livestock producers must consider legal, economic, environmental, and societal needs when designing their livestock businesses. | TCC3, CCE2, CCE4, P4, AA1 |
| Animal Products | What products and services do animals provide to society? | Animal products are the largest sector of the agriculture industry with a multitude of possible careers. | TI3, TCC4, CCE3, AA1, AA3 |



UNIT 1 - LIVESTOCK HUSBANDRY

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

Connecticut Agriculture, Food and Natural Resources Framework

AS.02.01.01.b Design programs that assure the welfare of animals and prevent abuse or mistreatment.

AS.02.01.02.b Analyze documented animal welfare procedures used to ensure safety and maintain low stress when moving and restraining animals.

AS.02.01.03.b Interpret domestic livestock and companion animal behaviors and outline safety procedures for working with those species.

AS.02.01.05.b Explain the importance of biosecurity in relation to domestic livestock and companion animals.

AS.02.02.01.b Utilize tools, technology, and equipment to perform animal husbandry and welfare tasks.

AS.05.02.01.b Analyze animal facilities to determine if standards have been met.

AS.06.01.01.b Explain how animals are classified using a taxonomic classification system.

AS.06.01.03.b Analyze the visual characteristics of an animal or animal product and select correct classification terminology when referring to companion and production animals.

AS.08.02.02.b Implement and evaluate the effectiveness of methods to ensure optimal environmental conditions for animals.

AFNR.NRS.03.03.01.b Apply cartographic skills, tools, and technologies (e.g., land surveys, geographic coordinate systems, etc.) to locate natural resources.

Common Core State Standards

CCSS.ELA-Literacy.W.9-10.9b Delineate and evaluate a text's argument and specific claims, assessing whether the reasoning is valid and the evidence is relevant and sufficient: identify false statements and fallacious reasoning.

Next Generation Science Standards

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

Vision of A Learner Attributes: Students will be able to independently use their learning to...

TI: TAKE INITIATIVE

TI4: I can apply my strengths and anticipate challenges to reach my current and future goals.

TCC: THINK CRITICALLY AND CREATIVELY

TCC2: I can evaluate evidence from multiple perspectives and recognize its limitations and implications in order to justify new conclusions.

TCC4: I can integrate my learning to adapt to experiences in the classroom, career, and life.

CCE: COLLABORATE AND COMMUNICATE EFFECTIVELY

CCE1: I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively

listening to others, and responding thoughtfully with peer-reviewed evidence that is free of bias.

CCE3: I can show initiative in prompting group discourse, fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.

CCE4: I can communicate and express my understanding in an authentic, respectful, and relevant way, using the most effective mode of expression.

P: PERSEVERE

P3: I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.

Understandings: Students will understand that...

- Livestock terminology is the universal language animal production professionals use to communicate their business stock and needs.
- Meeting the needs of livestock species requires attention to detail to meet animal health and wellness standards.
- The design of a livestock production facility determines the ease of maintenance and quality of care.
- Animal restraints must be applied while considering animal and handler safety.

Essential Questions:

- How can understanding Latin Names, adjectives, and gender terminology be valuable in the agriculture production industry?
- What animal health and wellness requirements need to be met to care for animals meeting animal welfare standards?
- How can a livestock facility be designed to have ease of maintenance for livestock producers to increase animal's quality of care?
- How dangerous is working with livestock animals, and what can you do to reduce the risks to ourselves and others?
- How does the type of animal determine what type of restraint is needed?



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| <p>Students will know...</p> <ul style="list-style-type: none"> ● Industry terminology for common livestock species. ● The animal welfare requirements of livestock animals. ● Industry tools utilized in livestock facilities to meet animal welfare requirements. ● Facility design characteristics utilized in livestock facilities to meet animal welfare requirements. ● The story of the Wilodrado FFA Chapter and their students' groundbreaking work in the first student-led cattle company in the United States. ● Animal behavior identifying markers. ● Safety risks associated with working with livestock. ● Common knots used to complete tasks when working with livestock animals. ● The ideal methods to restrain livestock animals including, but not limited to: poultry, cattle, camelids, sheep, goats, and swine. | <p>Students will be able to...</p> <ul style="list-style-type: none"> ● Match Latin and English terms common to livestock animal species. ● Meet the needs of livestock species by demonstrating animal care techniques - pen cleaning, feeding, and water. ● Create a map identifying essential facility design characteristics and tools by applying mapping essentials such as scale, legends, and a north indicator. ● Write a reflection sharing their future goals for their career and how their time as a Woodbury FFA member can be an asset to that future. ● Create a public safety announcement informing the public of safety risks associated with working with livestock animals. ● Demonstrate common knots used to work with livestock animals. ● Perform animal restraints safely and effectively on poultry, cattle, small ruminants, and swine. |
| <p>Key Vocabulary: aggression, animal communication, behavior cues, biohazards, blind spot, bowline knot, clove hitch, double half hitch knot, flight zone, livestock senses, livestock species gender terminology, livestock species Latin name terminology, mechanoreception, overcrowding, point of balance, quick release knot, restraints, square knot, temperament, the five freedoms, visual fields</p> | |
| <p>Assessment Evidence</p> | |
| <p>Performance Tasks: <i>Summative:</i> Demonstration of animal restraints on poultry, cattle, small ruminants and swine. TCC4</p> | <p>Other Evidence: <i>Interim:</i> Design of a map depicting the Nonnewaug High School Education Farm, including essential features of a map - scale, legends, and a north indicator. CCE3</p> <p><i>Interim:</i> Complete an interim (quiz) assessment on Livestock Terminology</p> <p><i>Classwork:</i> Creation of a video project for a public service announcement to inform the public about safety when working with livestock animals. CCE4</p> <p><i>Classwork:</i> Demonstrate knot-tying skills that are performed on a</p> |



Learning Plan

- Demonstrate animal restraints on the following species: poultry, cattle, small ruminants, and swine. **TCC4**
- Review industry standard terminology of the livestock industry. **CCE1**
- Present a public service announcement to peers or the community about youth safety in the livestock industry. **CCE4**

Teacher Resources:

▶ WILDORADO (2019) – an I Am Angus Documentary (HD)

Teacher Created Resources



UNIT 2 - LIVESTOCK FACILITY DESIGN

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

Connecticut Agriculture, Food and Natural Resources Framework

AS.01.02.01.b Analyze the impact of animal production methods on end product quantities (e.g., price, sustainability, marketing, labeling, animal welfare, etc.).

AS.01.03.02.b Analyze sustainable animal agriculture practices' local and global impact on human-environmental systems.

AS.02.01.b Utilize tools, technology, and equipment to perform animal husbandry and welfare tasks.

AS.05.01.c Design an animal facility focusing on animal requirements, economic efficiency, sustainability, safety, and ease of handling.

AS.05.02.c Select, use, and evaluate equipment, technology, and handling procedures to enhance sustainability and production efficiency.

AS.05.02.01.b Analyze animal facilities to determine if standards have been met.

Common Core State Standards

CCSS.ELA-LITERACY.W.9-10.9b Apply grades 9-10 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and evidence is relevant and sufficient; identify false statements and fallacious reasoning").

CCSS.ELA-LITERACY.RI.9-10.1 Cite textual evidence to support analysis of explicitly what the text says and inferences drawn from the text.

Next Generation Science Standards

HS-ETS1-1 Analyze a major global challenge to specific 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.

Vision of A Learner Attributes: Students will be able to independently use their learning to...

TCC: THINK CRITICALLY AND CREATIVELY

TCC3: I can integrate relevant information to produce multiple valid solutions.

CCE: COLLABORATE AND COMMUNICATE EFFECTIVELY

CCE2: I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others, and responding thoughtfully with peer-reviewed evidence that is free of bias.

CCE4: I can communicate and express my understanding in an authentic, respectful, and relevant way, using the most effective mode of expression.

P: PERSEVERE

P4: I can take on challenges and continuously engage in my own long-term strategies to overcome them to demonstrate through

personal experience that failures are more instructive than discouraging.

AA: ADAPT AND ADJUST

AA1: I can evaluate different approaches and justify the best pathway to success.

Understandings: Students will understand that...

- Livestock facilities are legally obligated to meet animal quality of care standards but are restricted by the available space and finances.
- Agricultural production is deeply rooted in American culture and tradition.
- Within each livestock species, specific breeds have been developed to meet the needs of humans more effectively.
- The essential needs of animals are under the obligation of the livestock producer to provide.
- Farm layout decisions affect operational efficiency.
- Agricultural engineers assist producers in designing livestock handling areas using the research from Dr. Temple Grandin.
- Land management is crucial to the success of a farm business and the well-being of the environment.
- The increasing costs of production, with a lack of corresponding increase in revenue in the livestock production industry.

Essential Questions:

- How can a facility be designed to meet animal welfare needs while maintaining finances and space limitations?
- Who are the individuals behind our food supply?
- What are common large animal species and breeds?
- How can producers provide for the essential needs of animals while still raising them for production purposes?
- How do farm managers and producers utilize topography, natural resources, and space to create an efficient farm?
- How has Dr. Temple Grandin's work altered the way in which agricultural engineers and producers create livestock management facilities?
- How does land management affect the larger life cycle of the animal industry?
- Do the majority of farmers make a profit each year?

Students will know...

- The legal requirements of livestock animal production facilities.
- The priorities and concerns of the modern agricultural producer.
- Common breeds and species in the United States livestock animal industry.
- The essential needs of livestock animals.
- Methods to provide the essential needs of livestock animals.
- Concepts of indirect measurement.
- Common land management best practices such as rotational grazing.
- The definitions of income and expense.
- Facility design components that modern agricultural producers apply to ensure animal and human welfare.

Students will be able to...

- Plan the animal welfare tools and facilities that would need to be purchased to start a livestock production business.
- Interpret demographic data about cattle ranchers.
- Create a mission statement for a livestock production business.
- Match animal characteristics and descriptions to the name of the breed.
- Use property maps to create a scale and draw an example livestock production facility map.
- Apply concepts of flight zones to design a corral system that uses the research of Dr. Temple Grandin.
- Use a pasture map to select land and define grazing plots.
- Modify an income statement to calculate profit margins.
- Create a business proposal portfolio of a livestock agricultural business that includes a business profile, description of proposed breeds, expense planner, blueprint design, location



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| | <ul style="list-style-type: none"> analysis, and a physical scale model. Present a business proposal to peers in a mock bank loan request of a board of managers. |
| <p>Key Vocabulary: animal rights, animal welfare, breed, business loan, business profile, culture, demographic, engineering process, economic requirements, environmental needs, ethics, expense, gross revenue, income, income statement, mission statement, native grasses, net income, overgraze, personal loan, revenue, rotational grazing, societal needs, specie, stocking density, sustainability, sustainable agriculture, total operating expenses, ventilation</p> | |
| Assessment Evidence | |
| <p>Performance Tasks: <i>Summative:</i> Presentation of student’s livestock production business - business portfolio and diorama - to peers. CCE4</p> | <p>Other Evidence: <i>Classwork:</i> Participation during in-person and virtual farm tours to investigate animal business profiles. CCE2</p> <p><i>Classwork:</i> Group assignment to design an animal chute system using the engineering process and students’ knowledge of animal behavior. TCC3</p> <p><i>Summative:</i> Creation of a business portfolio including a business profile, description of proposed breeds, expense planner, blueprint design, and location analysis. P4</p> |
| Learning Plan | |
| <ul style="list-style-type: none"> Students attend a minimum of one livestock industry field trip at a local business. CCE2 Students will complete a livestock business project to design their own livestock facility meeting best management practices while considering financial, environmental and social restrictions. AA1 | |
| <p>Teacher Resources: Teacher Created Resources</p> | |



UNIT 3 | ANIMAL PRODUCTS

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

Connecticut Agriculture, Food and Natural Resources Framework

FPP.01.02.01.b Outline procedures to eliminate possible contamination hazards associated with food products and processing.

FPP.02.03.01.b Examine, interpret, and explain the meaning of required components on a food label.

FPP.03.02.02.b Outline appropriate methods and prepare foods for sale and distribution for different markets.

FPP.04.02.03.b Evaluate desirable and undesirable outcomes of emerging technologies used in the food products and processing systems.

FPP.04.03.01.b Assess and summarize the application of industry standards in the food products and processing industry.

Common Core State Standards

CCSS.ELA-LITERACY.W.9-10.9b Apply grades 9-10 Reading standards to literary nonfiction (e.g., “Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and evidence is relevant and sufficient; identify false statements and fallacious reasoning”).

CCSS.ELA-Literacy.W.9-10.9b Delineate and evaluate a text's argument and specific claims, assessing whether the reasoning is valid and the evidence is relevant and sufficient: identify false statements and fallacious reasoning.

Vision of A Learner Attributes: Students will be able to independently use their learning to...

TI: TAKE INITIATIVE

TI3: I can formulate and investigate probing questions to further my learning.

TCC: THINK CRITICALLY AND CREATIVELY

TCC4: I can integrate my learning to adapt to the experiences in the classroom, career, and life.

CCE: COLLABORATE AND COMMUNICATE EFFECTIVELY

CCE3: I can show initiative in prompting group discourse, fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.

AA: ADAPT AND ADJUST

AA1: I can evaluate different approaches and justify the best pathway to success.

AA3: I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.

Understandings: Students will understand that...

- Food safety is the responsibility of many individuals in the food industry.
- There are a variety of properties that fat provides in milk.
- Labeling and marketing in the agriculture industry is a professional skill.

Essential Questions:

- What are the essential food safety rules to prevent foodborne illness?
- Why does raw milk need to be processed prior to consumption?
- What types of products can be made from milk?
- What are the characteristics that define a cheese?

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| <ul style="list-style-type: none"> • Cheesemaking is a science, art, and craft that requires specifically honed skills dependent on the specialty cheese being created. • The characteristics of a fiber are determined by the type of fiber used and the weave or knitting technique used. • Meat is the muscle tissue of animals. • The poultry industry is the primary source of animal protein in the United States. • Determining the qualities sought by consumers in products allows professionals to identify high-quality products. • Safety procedures must be followed to protect the quality and efficacy of a consumer product. | <ul style="list-style-type: none"> • How are the properties of fibers different from each other? • How can the characteristics of a fiber determine its uses in the textile industry? • How can areas depend on a specific industry but still be forgotten by most consumers? • Why do we need regulations for processing and labeling meat products in the United States? • Why are grading and evaluation of products important to the poultry industry? • How can knowledge of the quality indicators of further processed poultry products be used to select high-quality products? • How can meat be processed to protect food safety? |
| <p>Students will know...</p> <ul style="list-style-type: none"> • Types of foodborne illness, their prevention, and the people and organizations that are involved in food safety. • The lactation process. • How fluid milk is processed for consumption. • The types of available dairy products and the method by which they are processed. • The steps to create mozzarella cheese. • The types and sources of different fibers. • The difference between natural and synthetic fibers. • The steps to animal processing and procedures developed to ensure a wholesome product for consumers. • The primal and retail cuts of livestock species. • The grading components applied to poultry products. • The grading specifications used to determine the quality of further processed poultry products. • The steps to safely prepare sausage. | <p>Students will be able to...</p> <ul style="list-style-type: none"> • Inoculate petri dish samples to properly grow bacterial cultures. • Analyze reactions in fluid dairy product samples to determine milk fat content in each sample. • Analyze dairy product labels to identify marketing strategies applied. • Follow a recipe to process milk in order to create mozzarella cheese. • Analyze clothing labels to identify fibers and other consumer information. • Perform scientific analysis to evaluate the differences between natural and synthetic fibers. • Identify the required elements of a meat package label. • Grade eggs using the USDA quality standards. • Organize, write, and present a set of oral reasons. • Prepare sausage using meat processing equipment. |
| <p>Key Vocabulary: agar plate, air cell, albumen, alveoli, bacterial colony, beef, broilers, bulk tank, butterfat, by-products, candling, chalaza, chevon, colostrum, contamination, curds, Dairy Class I, Dairy Class II, Dairy Class III, Dairy Class IV, dehide, dry eggs, evisceration, exsanguination, fiber, foodborne illness, food safety, Food Safety and Inspection Service (FSIS), germinal disc/blastoderm, gland cistern, homogenization, hot carcass weight, Humane Slaughter Act, inoculate, lactation, layers, liquid eggs, marbling, microorganism, mutton, oxytocin, parasite, pasteurization, pathogen, pork, poultry, primal, quarters, rennet, retail cuts, slaughter, stunning, table eggs, teat, textile, udder, virus, warp, weft, whey, yolk</p> | |



Assessment Evidence

Performance Tasks:

Classwork: Process milk into mozzarella cheese. **AA3**

Classwork: Process meat into sausage. **AA1**

Interim: Utilize the USDA and National FFA standards to evaluate and grade further processed poultry and present those reasons orally to peers. **CCE3**

Other Evidence:

Classwork: Conduct an experiment to determine the fat content of milk samples. **TI3**

Interim: Complete an interim (quiz) assessment on Dairy Products.

Learning Plan

- Students will identify food safety procedures to apply in the food laboratory setting. **AA1**
- Students will investigate the United States dairy industry. **TCC4**
- Students will evaluate the quality of different milk products. **TCC4**
- Students will learn the primary cuts of beef and poultry. **TCC4**
- Students will evaluate the quality of poultry products - meat and eggs. **TI3**

Teacher Resources:

Teacher Created Resources

