

# LIVESTOCK SCIENCE AND AGRICULTURAL SUSTAINABILITY CURRICULUM

## AGRICULTURAL PRODUCTION



## LIVESTOCK SCIENCE & AGRICULTURAL SUSTAINABILITY



**Grade Level(s):** 11-12

**Curriculum Author(s):** Kathleen Gorman

### **Course Description:**

This course focuses on livestock production and management principles and practices, emphasizing animal breeding, nutrition, health, and welfare. Students will learn how to optimize livestock systems to ensure high productivity and sustainability, including breed identification and species-specific care. By completing this course, students will comprehensively understand livestock production and management, identify major livestock breeds and provide species-specific care, develop marketing strategies for animal products, and explore sustainable and innovative livestock production and food processing practices. This course is designed to provide a holistic education in integrating livestock science and food science, preparing students for diverse careers in the agricultural and food industries. Every student must maintain and document an approved supervised agriculture experience (SAE) project and actively participate in the Woodbury FFA Chapter to develop premier leadership, personal growth, and career success through attending FFA meetings and participating in chapter events and planning.

## Year At A Glance

| Unit Title                                             | Overarching Essential Question                                                                                                                                                        | Overarching Enduring Understanding                                                                                                                                                                                                                                                               | <u>Vision of A Learner "I Can" Statements</u>                      |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <a href="#">Introduction to the Livestock Industry</a> | How does exploring the livestock industry deepen our understanding of the complexities and opportunities within modern agricultural systems?                                          | Diverse segments within the livestock sector, the influential role of leading states, industry trends, and the presence of alternative livestock species develop a comprehensive perspective on sustainable agricultural practices and economic considerations in the modern livestock industry. | TCC2(9-12), TCC4(9-12), CCE4(9-12), DE4(9-12), AA4(9-12)           |
| <a href="#">Biosecurity Fundamentals</a>               | How can professionals in the animal production industry implement and maintain biosecurity measures to protect livestock from diseases and ensure sustainable agricultural practices? | Understanding and implementing comprehensive biosecurity measures are crucial for protecting livestock from infectious diseases, ensuring animal welfare, and maintaining agricultural operations' sustainability and economic viability.                                                        | TI3(9-12), TCC1(9-12), TCC3(9-12), TCC4(9-12), DE1(9-12), P1(9-12) |

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| <a href="#">Livestock Nutrition Management</a>     | What strategies can producers use to manage livestock to ensure optimal health, growth, and productivity while balancing economic and environmental considerations? | Effective livestock nutrition management promotes animal health, growth, and productivity. It requires a comprehensive understanding of the nutritional needs of different species, the compositions of various feedstuffs, and the principles of ration formulation. Balancing these factors with economic and environmental considerations is crucial for sustainable and profitable livestock production. | TCC1(9-12), TCC3(9-12), CCE4(9-12), P2(9-12), P4(9-12), AA1(9-12), AA2(9-12)   |
| <a href="#">Species Specific Care: Beef Cattle</a> | How can producers apply species-specific knowledge and management practices to ensure beef cattle's health, welfare, and productivity throughout their lifecycle?   | Proper beef cattle management requires a thorough understanding of their specific health, nutritional, and welfare needs at each stage of their lifecycle. By applying this knowledge, producers can optimize their herds' growth, productivity, and overall well-being, leading to more efficient and sustainable beef production.                                                                          | TI1(9-12), TCC2(9-12), TCC3(9-12), TCC4(9-12), CCE4(9-12), DE2(9-12), P2(9-12) |
| <a href="#">Species Specific Care: Swine</a>       | How can producers apply species-specific knowledge and management practices to ensure swine health, welfare, and productivity throughout their lifecycle?           | Proper swine management requires a thorough understanding of the animals' specific health, nutritional, and welfare needs at each stage of their lifecycle. By applying this knowledge, producers can optimize the animals' growth, productivity, and overall well-being, leading to more efficient and sustainable pork production.                                                                         | TI2(9-12), TCC2(9-12), TCC3(9-12), CCE2(9-12), P2(9-12), AA1(9-12)             |

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| <a href="#">Species Specific Care: Small Ruminant</a> | How can producers apply species-specific knowledge and management practices to ensure small ruminants' health, welfare, and productivity throughout their lifecycle? | Proper small ruminant management requires a thorough understanding of their specific health, nutritional, and welfare needs at each stage of their lifecycle. By applying this knowledge, producers can optimize herd growth, productivity, and overall well-being, leading to a more efficient and sustainable meat and fiber industry.  | TI2(9-12), TI4(9-12), TCC2(9-12), CCE2(9-12), CCE4(9-12), P2(9-12)                   |
| <a href="#">Livestock Breeding and Genetics</a>       | What principles of genetics and breeding can be applied to improve livestock populations' health, productivity, and sustainability?                                  | Understanding and applying the principles of genetics and breeding is essential for improving livestock populations' health, productivity, and sustainability. Through selective breeding and genetic management, we can enhance desirable traits, reduce disease prevalence, and ensure the long-term viability of livestock operations. | TI1(9-12), TI2(9-12), CCE4(9-12), P2(9-12), P3(9-12), P4(9-12), AA1(9-12), AA3(9-12) |
| <a href="#">Livestock Selection &amp; Judging</a>     | What role does effective livestock selection and judging play in enhancing herd quality and ensuring successful livestock operations?                                | Mastering the techniques of livestock selection and judging is crucial for identifying animals that meet specific production goals, improving herd genetics, and ensuring the sustainability and profitability of livestock operations.                                                                                                   | TI2(9-12), TCC3(9-12), CCE1(9-12), CCE3(9-12), CCE4(9-12)                            |

## Unit 1 - INTRODUCTION TO THE LIVESTOCK INDUSTRY

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food and Natural Resources Framework

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.

**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.

**AS.01.03** Analyze laws and sustainable practices that impact agriculture from a local, tribal, state, national, and global perspective.

**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoning and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies when interacting with others in formal and informal settings.

**CRP.06.01** Synthesize information, knowledge, and experience to generate original ideas and challenge assumptions in the workplace and community.

**CRP.07.02** Evaluate the validity of sources and data used when considering the adoption of new technologies, practices, and ideas in the workplace and community.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**ABS.01.02** Evaluate and create statements of purpose and business goals for AFNR businesses.

**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investment, taxes, etc.).

**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.

##### Common Core State Standards

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical contents relevant to grades 11-12 texts and topics.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RI.11-12.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSS.ED.C.7** Interpret the slope (rate of change) and intercept (constant term) of a linear model in context of the data.

**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.

**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

**MATH.CONTENT.HSF.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

**MATH.CONTENT.HSF.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimated the rate of change from a graph.

**MATH.CONTENT.HSA.CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

#### Next Generation Science Standards

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

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

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

**TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.

**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**DE4(9-12):** I can work respectfully with all members of my community and support the needs of others.

**AA4(9-12):** I can create opportunities to extend my learning by remaining open-minded in any situation.

**Understandings:** Students will understand that...

- The current commercial status of the livestock industry is vastly different from the historical views of the production industry.
- Regional dynamics and agricultural factors shape the leading

**Essential Questions:**

- Why aren't livestock all raised on the farm in the same way?
- What factors contribute to certain states emerging as leaders in the livestock industry, and how does this dominance affect

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| <p>states in the livestock industry, influencing production, market dominance, and economic impact.</p> <ul style="list-style-type: none"> <li>• Various factors, including economics, environment, and technology, affect the dynamics of the livestock industry and its impact on agriculture and the United States food supply.</li> <li>• Alternative or non-commodity livestock are considered unconventional because they are not well-known in society and often lack the supplies, management knowledge, and even veterinarian expertise to care for them similarly to livestock species.</li> </ul> | <p>agricultural practices, economy, and regional development?</p> <ul style="list-style-type: none"> <li>• How have inventory numbers for beef cattle, dairy cattle, hogs, and chickens in the United States changed from 2000 to 2030, and what factors might be driving these trends?</li> <li>• How do alternative animals contribute to human society?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>• The production path of beef cattle, swine, small ruminants, and dairy cattle in the livestock industry.</li> <li>• The key characteristics that create an ideal location for a particular livestock industry.</li> <li>• Appropriate methods to analyze data and identify trends in data.</li> <li>• How to assess data quality and accuracy of predicted data.</li> <li>• The phases and economic scope of the alternative animal industry.</li> </ul>                                                                         | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>• Trace the production path of livestock production animals - beef cattle, swine, small ruminants, and dairy cattle.</li> <li>• Create a presentation to teach peers the characteristics present in specific states that allow the highlighted states to be leaders in a particular livestock industry.</li> <li>• Use USDA data to analyze trends in the production livestock industry.</li> <li>• Create a graph representing the USDA data on livestock production animal numbers.</li> <li>• Make data-based investment recommendations regarding segments of the livestock production industry.</li> <li>• Describe the various phases and economic scope of the alternative animal industry.</li> </ul> |
| <p><b>Key Vocabulary:</b><br/> alternative animal, analysis, backgrounders, beef, commodity, consumer, cow/calf operation, dairy, diversified, expertise, farrow, farrow-to-finish, feeder pig, feeding lamb, feedlot, finishing, geological attributes, head, inventory, investment, market factors, monopoly, natural resources, niche market, non-commodity, population density, projection, purebred breeders, small ruminant, stock sheep, swine, trend, unconventional</p>                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>Assessment Evidence</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>Performance Tasks:</b><br/> <i>Classwork:</i> Work in groups to research and create a presentation on a leading livestock industry state that covers the history, current trends, key players, economic impact, and challenges facing that segment.</p>                                                                                                                                                                                                                                                                                                                                                | <p><b>Other Evidence:</b><br/> <i>Interim:</i> Written interim (quiz) assessment.<br/> <i>Classwork:</i> Compare and contrast different livestock production</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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| <p><b>CCE4</b></p> <p><i>Classwork:</i> Conduct a trend analysis of current and projected livestock production numbers for a specific species at the national or global level using data from reliable sources, such as the USDA, FAO, or industry reports to identify trends over the past decade and forecast future production levels. <b>TCC4</b></p> <p><i>Pre-Assessment:</i> Gauge prior knowledge and understanding of the topic of alternative agriculture animals in the United States livestock industry. <b>DE4</b></p>                                                                                                                            | <p>systems to analyze the advantages and disadvantages of each system in terms of sustainability, animal welfare, economics and consumer preferences. <b>AA4</b></p> |
| <p style="text-align: center;"><b>Learning Plan</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Students will identify the key livestock industry segments for different species of livestock. <b>TCC2</b></li> <li>• Students will create a presentation about the leading production states of specific production species. <b>CCE4</b></li> <li>• Students will analyze trends in the livestock animal production industry. <b>TCC4</b></li> <li>• Students will identify the different animals considered part of the alternative livestock industry. <b>DE4</b></li> <li>• Students will evaluate their role, and the role of agriculture, in the sustainability of the world around them. <b>DE4</b></li> </ul> |                                                                                                                                                                      |
| <p><b>Teacher Resources:</b><br/> Teacher Created Resources<br/> Modern Livestock and Poultry Production 9th Edition textbook</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                      |

## Unit 2 - BIOSECURITY FUNDAMENTALS

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food and Natural Resources Framework

**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.

**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from local, tribal, state, national, and global perspectives.

**AS.02.01** Explain management techniques that ensure animal welfare.

**AS.02.02** Analyze procedures that ensure that animal products are safe for consumption.

**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.

**AS.07.01** Design programs to prevent animal diseases, parasites, and other disorders and ensure animal welfare.

**AS.07.02** Analyze biosecurity measures utilized to protect the welfare of animals and health of humans on local, state, national, and global level.

**AS.08.02** Evaluate the effects of environmental conditions on animals.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies when interacting with others in formal and informal settings.

**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.

**CRP.05.02** Make, defend, and evaluate decisions at work and in the community using information about the potential environmental, social, and economic impacts.

**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals, and preferences.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**BS.01.02** Evaluate the roles, scope, and implications of regulatory agencies on applications of biotechnology in agriculture and the protection of public interests (e.g., health, safety, environmental issues, etc.).

**BS.02.01** Read, document, evaluate, and secure accurate laboratory records of experimental protocols, observations, and results.

**BS.02.03** identify and apply standard laboratory procedures and equipment maintenance to create and maintain reliable data.

##### Common Core State Standards

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering

vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

**ELA-LITERACY.RST.11-12.3** 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.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSF.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

**MATH.CONTENT.HSA.CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.

**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.

**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.

### Next Generation Science Standards

**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.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TI3(9-12):** I can formulate and investigate probing questions to further my learning.

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.

**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.

**TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.

**DE1(9-12):** I can acknowledge, process, and respond appropriately to others’ comments and perspectives.

**P1(9-12):** I can self-reflect and seek feedback to build upon my strengths, apply those strengths to overcome obstacles, and share my strategies with others.

**Understandings:** Students will understand that...

- Recognition of clinical signs, symptoms, and modes of

**Essential Questions:**

- What vaccinations must livestock animals be given?

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| <p>transmission of common diseases prevents the spread of infection between animals and people.</p> <ul style="list-style-type: none"> <li>• Zoonotic diseases pose a potential risk to human health.</li> <li>• Safety practices and procedures are used to control the spread of pathogenic agents.</li> <li>• Pathogenic control differs in regions throughout the world.</li> <li>• Good biosecurity plans minimize risks to animals and humans.</li> <li>• Pathogenic outbreaks impact local, state, national, and global economies.</li> <li>• Disease outbreaks may result in the mass slaughter of animals to halt epidemics and protect the greater population of animals.</li> <li>• Good biosecurity practices minimize the risk of contracting illness through zoonotic diseases and adulterated food.</li> </ul> | <ul style="list-style-type: none"> <li>• How does an “outbreak” occur?</li> <li>• What types of diseases can be spread from livestock animals to humans?</li> <li>• Do large farming operations (CAFOs specifically) tend to promote or discourage the spread of disease?</li> <li>• What are the biosecurity challenges that the average American farmer faces?</li> <li>• What are the advantages and disadvantages of commercial animal husbandry regarding biosecurity issues?</li> <li>• Given our increasingly globalized world, are people or animals at greater risk for epidemic influenza disease?</li> </ul>                                                                                                                           |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>• Common signs and symptoms of sickness in animals.</li> <li>• The methods of transmission for diseases.</li> <li>• Zoonotic disease and its signs, symptoms, and level of contagiousness to humans.</li> <li>• Common entry points for disease.</li> <li>• The environmental, economic, and governmental factors affect the prevalence of pathogens and biosecurity.</li> <li>• The factors a good biosecurity plan at the farm level must address.</li> <li>• Why wildlife surveillance programs are needed to help prevent outbreaks in domestic animals.</li> <li>• The importance of quarantine and disease monitoring to prevent disease spread.</li> </ul>                                                                                  | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>• Use reliable resources to research common diseases that affect livestock animals.</li> <li>• Identify diseases based on their transmission methods.</li> <li>• Create educational materials to educate themselves and others on methods to prevent the spread of zoonotic disease.</li> <li>• Recognize and implement common disease prevention protocols.</li> <li>• Evaluate the quality of written biosecurity plans.</li> <li>• Determine how breeches in biosecurity can be prevented or lessened using animal husbandry or management techniques.</li> <li>• Develop and defend a disease control program design based on a disease outbreak.</li> </ul> |
| <p><b>Key Vocabulary:</b><br/> adherent, adulterant, aerobic, antimicrobial, APHIS, biosecurity, CAFO, carrier, coliform, colostrum, cross-protection, depreciation, diagnosis, diffusely, endemic, euthanasia, euthanize, fomite, host, HPAI, husbandry, immunodeficiency, indemnity, infectious disease, LPAI, microorganism, mitigation, morbidity, mortality, natural selection, necropsy, pathogen, prevalence, prognosis, quarantine, reservoir, signs, source, swill, symptoms, transmission, treatment, uremia, USDA, vector, zoonotic disease</p>                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p style="text-align: center;"><b>Assessment Evidence</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Performance Tasks:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Other Evidence:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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| <p><i>Summative:</i> Create a comprehensive biosecurity plan for a livestock facility, including strategies for preventing disease entry, controlling disease spread, and emergency response protocols addressing key areas such as animal movement, visitor access, equipment sanitation, and staff training. <b>TCC1</b></p> <p><i>Classwork:</i> Conduct a risk assessment for a fictional or real livestock operation identifying potential biosecurity threats such as disease transmission, wildlife interaction, or human activity, and assess the likelihood and potential impact of these risks. <b>TI3</b></p> <p><i>Classwork:</i> Analyze a real-world case study involving a biosecurity breach in a livestock operation identifying factors that led to the breach, evaluate the response, and propose alternative strategies that could have prevented the incident. <b>TCC4, P1, DE1</b></p> | <p><i>Interim:</i> Participate in an interactive disease lab to determine the factors operating during the spread of disease and what professionals can do to counter them. <b>TI3, TCC4</b></p> <p><i>Interim:</i> Written interim (quiz) assessment.</p> <p><i>Interim:</i> Play the board game, “Chickens to the Fair,” to apply biosecurity practices to protect a poultry flock. <b>TCC3</b></p> |
| <p style="text-align: center;"><b>Learning Plan</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>• Students will identify common livestock diseases that can affect production. <b>P1</b></li> <li>• Students will assess methods to protect livestock production herds and flocks from disease and transmission. <b>TI3</b></li> <li>• Students will apply biosecurity protocols to protect livestock herds and flocks from disease and transmission. <b>TCC3</b></li> <li>• Students will evaluate the economic, social, and animal welfare implications of a failure to apply biosecurity protocols. <b>TCC4, P1, DE1</b></li> </ul>                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>Teacher Resources:</b><br/> Teacher Created Resources<br/> USDA FHA: Health Farms, Healthy Agriculture</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                       |



## Unit 3 - LIVESTOCK NUTRITION MANAGEMENT

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food and Natural Resources Framework

**AS.02.01** Explain management techniques that ensure animal welfare.

**AS.03.01** Analyze the nutritional needs of animals.

**AS.03.02** Analyze feed rations and assess if they meet the nutritional needs of animals.

**AS.03.03** Utilize tools, equipment, techniques, and technology to make animal nutrition decisions.

**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.

**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.

**AS.08.01** Design management practices related to animal agriculture to enhance the environment.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies when interacting with others in formal and informal settings.

**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.

**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.

**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**PS.01.01** Determine the influence of environmental factors on plant growth.

##### Common Core State Standards

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RST.11-12.3** 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.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.WHST.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and

information clearly and accurately through the effective selection, organization, and analysis of content.

**ELA-LITERACY.WHST.11-12.9** Draw evidence from informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.

**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.

**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

### Next Generation Science Standards

**HS-LS4-4** Construct an explanation based on evidence of 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-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-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

**HS-LS2-6** Evaluate claims, evidence, and reasoning that the complex interaction 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.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.

**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.

**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**P4(9-12):** 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.

**AA1(9-12):** I can evaluate different approaches and justify the best pathway to success.

**AA2(9-12):** I can assess my past successes and mistakes to change my approach.

**Understandings:** Students will understand that...

- Understanding animal digestive systems allows caregivers to create balanced and appropriate rations to feed and maintain animals for food, fiber, and companionship.

**Essential Questions:**

- Why is it important to be knowledgeable about animal digestive systems when raising and caring for animals?
- How are different nutrients essential to livestock and other

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <ul style="list-style-type: none"> <li>• Feed materials vary based on an animal's digestive system and nutritional requirements.</li> <li>• Commercial feeds come in many different forms, but all feed comprises the same six basic nutrients.</li> <li>• Different types of livestock feeds play specific roles in animal nutrition, and their proper classification and use are crucial for maintaining livestock health and productivity.</li> <li>• Mistakes in pasture composition can lead to poor-quality pastures that do not aid animal nutrition.</li> <li>• Humans have raised livestock on grassy land for generations worldwide; when managed effectively, this land can be sustainable and continuously productive.</li> <li>• Weeds steal moisture and nutrients from new seedlings, shade out other plants, decrease the nutritional value of forage, and may even kill or injure livestock or people.</li> <li>• Nutrients are found in various livestock feedstuffs, and knowing their composition will help producers create balanced rations that meet nutritional requirements.</li> <li>• Feedstuffs can be tested for the presence of starches, sugars, protein, and fats to locate feeds that are examples of sources of the required basic nutrients for growth.</li> <li>• Balanced rations are essential for optimizing livestock well-being and performance while ensuring cost-effective and sustainable farming practices.</li> <li>• Feed tags provide essential information about a food's nutritional content, ingredients, feeding directions, and safety guidelines.</li> </ul> | <p>agricultural animals?</p> <ul style="list-style-type: none"> <li>• How do different classifications of livestock feedstuffs contribute to the overall nutrition and well-being of animals in the livestock industry?</li> <li>• What methods are applied to successfully manage vegetation in a pasture grazing system?</li> <li>• How can ecosystem and biome management support livestock requirements effectively?</li> <li>• How can we manage weeds to protect humans and livestock?</li> <li>• How are different nutrients essential to livestock and other agricultural animals?</li> <li>• How can you formulate a balanced ration that meets the specific nutritional needs of different livestock species, ensuring optimal health, growth, and productivity while considering the cost, availability, and sustainability of feed ingredients?</li> <li>• How can a feed tag be used to manage a feed plan for a livestock animal?</li> </ul> |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>• The anatomy and physiology of the digestive tract of an avian, monogastric, and ruminant digestive system.</li> <li>• The six essential nutrients in feed.</li> <li>• Feedstuffs classification, categories, and characteristics.</li> <li>• Nutritive characteristics of the feedstuff categories.</li> <li>• Characteristics of various plant species suitable for pasture.</li> <li>• Six common Connecticut plant species that are considered harmful to livestock.</li> <li>• Thirty common feedstuffs that are used to feed livestock.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>• Compare and contrast avian, monogastric, and ruminant digestive systems.</li> <li>• Explain the function of the six essential nutrients as they relate to monogastric and ruminant digestive systems.</li> <li>• Visually identify different feedstuffs.</li> <li>• Visually identify the ten key pasture species of Connecticut.</li> <li>• Use math and problem-solving skills to determine the number of animals that can sustainably graze on 100 acres of land.</li> <li>• Evaluate a pasture grazing system to determine improvements</li> </ul>                                                                                                                                                                                                                                                                                                                  |

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| <ul style="list-style-type: none"> <li>• Formulation equations to calculate feed ingredient proportions in a balanced ration.</li> <li>• The information provided to a producer on the feed tag of a feed bag.</li> <li>• The legally required components of a feed tag.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>that can be made.</p> <ul style="list-style-type: none"> <li>• Create a guide to six common poisonous plants specific to one livestock species in the Connecticut area.</li> <li>• Visually identify thirty common feedstuffs used to feed livestock.</li> <li>• Conduct a food nutrients laboratory to identify the presence or absence of nutrients in various animal feeds.</li> <li>• Apply mathematical skills to calculate the proportions of different feed ingredients needed to create a balanced ration.</li> <li>• Solve practical problems related to livestock nutrition and feed formulation, considering cost, availability, and nutritional value.</li> <li>• Apply the information provided to create a feed tag that includes all required elements.</li> </ul> |
| <p><b>Key Vocabulary:</b><br/> animal protein, anthelmintic, antibiotic, antimicrobial, balanced ration, basal metabolism, bomb calorimeter, carbohydrate, cell, chemobiotic, coccidiostat, commercial feed tag, commercial protein supplement, conception rate, crude protein, deficiency, diet, digestible energy, digestible protein, dry weight, energy feed, fat, feed additive, feed additive compendium, fetus, fiber, full feed, gross energy, growth promotant, hormone, legume, marbling, melengestrol acetate (MGA), metabolizable energy, micronutrients, mineral, NE<sub>m</sub>, net energy, nitrogen-free extract (NFE), nutrient, nutrient sparing, oil, organ, ossein, osteocyte, palatable, probiotic, protein, protein supplement, quadruped, ration, subclinical disease, subtherapeutic, system, tankage, trace organic compounds, urea, vegetable protein, vitamin, withdrawal period</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p style="text-align: center;"><b>Assessment Evidence</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Performance Tasks:</b></p> <p><i>Interim:</i> Create a comprehensive guide identifying common poisonous plants found in Connecticut pastures that pose risks to livestock including images, descriptions, toxic components, symptoms of poisoning and preventative measures. <b>CCE4</b></p> <p><i>Interim:</i> Conduct a nutrient analysis of several common feedstuffs used in livestock diets, such as corn, soybean meal, alfalfa, and mineral supplements. <b>TCC1, TCC3</b></p> <p><i>Interim:</i> Design a feed tag for a specific livestock feed production including the product name, guaranteed analysis, ingredient list, feeding directions, warning, and company contact information. <b>TCC3</b></p> <p><i>Summative:</i> Use the Pearson Square method or other ration</p>                                                                                                                | <p><b>Other Evidence:</b></p> <p><i>Interim:</i> Written interim (quiz) assessment.</p> <p><i>Classwork:</i> Identification of feedstuff components and pasture plant species. <b>P4</b></p> <p><i>Classwork:</i> Design a comprehensive feed management plan for a livestock operation including feeding schedules, methods of feed delivery, storage considerations, and strategies for minimizing feed waste. <b>P4, AA1</b></p>                                                                                                                                                                                                                                                                                                                                                  |

formulation tools to create a balanced diet for a specific type of livestock; calculating the proportions of each feed ingredient needed to meet the animal's nutritional requirements. **P2, AA2**

### Learning Plan

- Students will label the organs of the avian, monogastric, and ruminant digestive systems. **P4**
- Students will create a source guide for plant species found in livestock pastures in the Connecticut area. **CCE4**
- Students will evaluate the nutrient content of certain feedstuff products. **TCC1, TCC3**
- Students will formulate a ration using the Pearson Square method. **P2, AA2**
- Students will identify the components of a livestock feed label. **P4, AA1**

#### Teacher Resources:

Teacher Created Resources

Modern Livestock and Poultry Production 9th Edition textbook

## Unit 4 - SPECIES SPECIFIC CARE: BEEF CATTLE

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food and Natural Resources Standards

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.

**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.

**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.

**AS.02.01** Explain management techniques that ensure animal welfare.

**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.

**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.

**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.

**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).

**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.

**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.

**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.

**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.

**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.

**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support

decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).

**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.

**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.

**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.

**PST.04.01** Create plans for AFNR structures.

**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

### **Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.

**ELA-LITERACY.RST.11-12.3** 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.

**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.

**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.

**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.

**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.

**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

### Next Generation Science Standards

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

### HS-LS3-2

**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-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.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TI1(9-12):** I can implement a realistic plan and adapt when necessary to achieve my goals.

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.

**TCC4(9-12):** I can integrate my learning to adapt to the experiences in the classroom, career and life.

**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**DE2(9-12):** I can honor my own feelings and show empathy toward others through my actions.

**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**Understandings:** Students will understand that...

- The beef industry comprises distinct segments, including cow-calf operations, stocker/backgrounding, feedlot finishing, and processing/packaging. Each segment plays a crucial role in the production chain, contributing to the efficient and sustainable production of beef.
- Beef cattle breeds exhibit distinct characteristics that make them suitable for various environments, management systems, and production goals. Understanding these breed-specific traits is crucial for selecting the right cattle to enhance productivity, meat quality, and adaptability in beef production operations.
- Cattle breeds have been designed through years of strategic breeding programs.

**Essential Questions:**

- Why aren't all beef cattle raised on the same farm and in the same way?
- How do the specific characteristics of different beef cattle breeds influence their sustainability for various production goals and environmental conditions?
- How did the development of the Santa Gertrudis cattle breed at King Ranch demonstrate the importance of selective breeding in creating a resilient and productive cattle breed suited to specific environmental conditions?
- Why is knowledge of small ruminant external anatomy essential for effective care, management, and disease prevention in beef cattle?

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <ul style="list-style-type: none"> <li>• Communication is key if producers want to get medical attention for animals in their care, describe an animal for sale or breeding, and understand where products from the animal come from. Accurately describing traits, characteristics, and markings is important for many aspects of animal production.</li> <li>• The ruminant digestive system is uniquely adapted to process fibrous plant materials efficiently through a complex four-chambered stomach. Understanding this system is essential for optimizing feed efficiency, ensuring animal health, and improving productivity in ruminant animals.</li> <li>• Effective disease and parasite management in beef cattle is critical for maintaining herd health, productivity, and welfare.</li> <li>• Careful planning of facilities and equipment for beef cattle enterprises is important to the success of an operation.</li> <li>• Effective marketing strategies for beef cattle involve understanding market trends, consumer preferences, and value-added opportunities. By applying these strategies, producers can enhance the profitability and competitiveness of their cattle in the marketplace.</li> </ul> | <ul style="list-style-type: none"> <li>• What are the key functions of each chamber in the ruminant digestive system, and how do they contribute to the efficient digestion of fibrous plant materials?</li> <li>• How can producers identify, prevent, and manage common diseases and parasites in beef cattle to ensure the health and productivity of the herd?</li> <li>• How can beef facilities be designed to optimize cattle health, productivity, and operational efficiency while ensuring safety and sustainability?</li> <li>• How can beef cattle producers develop and implement effective marketing strategies to maximize profitability and meet market demands?</li> </ul>                                                                                                                                                                                                  |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>• The characteristics of the beef industry</li> <li>• The breeds of beef cattle, their origin, and breed characteristics.</li> <li>• The methodology applied to create the Santa Gertrudis cattle breed at the King Ranch.</li> <li>• External anatomy terminology used in the beef cattle industry.</li> <li>• The parts and functions of the ruminant digestive system.</li> <li>• The importance of maintaining healthy beef cattle.</li> <li>• Prevention and treatment methods for beef cattle diseases and parasites common in Connecticut.</li> <li>• The steps in planning for facilities and equipment for beef enterprises.</li> <li>• The supply and demand cycles for beef and explain how they affect market price.</li> <li>• The proper husbandry and handling techniques are used to prevent losses when marketing beef cattle.</li> <li>• The use of the futures market with beef cattle.</li> </ul>                                                                                                                                                                                                                                 | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>• Trace the path of beef cattle grown in the beef industry from birth to processing.</li> <li>• Identify the various breeds of beef cattle by viewing pictures or live animals.</li> <li>• Create a creative project presenting student's research findings.</li> <li>• Identify the external anatomy of cattle with correct terminology.</li> <li>• Label the parts of the ruminant digestive system.</li> <li>• Explain the steps in which food moves through the ruminant digestive system.</li> <li>• Recognize and suggest controls for common nutritional health disorders of beef cattle locally.</li> <li>• Design a beef facility, including necessary equipment, to create a sustainable beef facility.</li> <li>• Identify and describe the market classes and grades of beef cattle.</li> </ul> |

**Key Vocabulary:**

artificial insemination, auction market, backgrounding, bovine spongiform encephalopathy (BSE), bull, bullock, burdizzo, calf, carrying capacity, castration, cattle, cattle guard, commission, cow, cow-calf system, creep feeding, dark cutting beef, demand, dewlap, dipping vat, elastrator bands, feed composition table, feeder calf, fillback period, headgate, heifer, hot carcass weight, husklage, integrated resource management (IRM), preconditioning, puberty, quality grade, rotation grazing, slaughter calf, staggy, steer, stockyard, supply, synchronization of estrus, systemic insecticide, tilting table, vealers, yardage, yearling feeder

| Assessment Evidence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                  |
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| <p><b>Performance Tasks:</b><br/> <i>Interim:</i> Create a timeline presentation to present findings about the development of the Santa Gertrudis breed on the King Ranch. <b>TCC3</b></p> <p><i>Summative:</i> Analyze a case study of a beef cattle program evaluating breeding goals, selection criteria and outcomes, and then suggest improvement or alternative strategies to enhance progress and herd performance. <b>TCC4, DE2</b></p> <p><i>Classwork:</i> Design a beef cattle facility that includes pens, feeding areas, water sources, and handling systems that consider animal welfare, biosecurity, and efficient management practices. <b>TCC2</b></p> <p><i>Classwork:</i> Using provided nutritional guidelines, students will formulate a balanced ration for a specific category of beef cattle based on body weight and production goals. <b>CCE4</b></p> | <p><b>Other Evidence:</b><br/> <i>Interim:</i> Written interim (quiz) assessment.</p> <p><i>Classwork:</i> Trace the beef supply chain from farm to table to identify various stages, including production, processing, distribution, and retail. <b>T11</b></p> |

| Learning Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
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| <ul style="list-style-type: none"> <li>Students will review the most influential beef breeds currently being raised in the beef industry. <b>P2</b></li> <li>Students will research a minimum of one beef cattle breed to create a presentation to present to peers. <b>TCC3</b></li> <li>Students will identify the external anatomy of a beef cattle animal. <b>P2</b></li> <li>Students will design cattle handling facilities using best management practices. <b>TCC2</b></li> </ul> |  |

**Teacher Resources:**

Teacher Created Resources

## Unit 5 - SPECIES SPECIFIC CARE: SWINE

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food and Natural Resources Standards

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.

**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.

**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.

**AS.02.01** Explain management techniques that ensure animal welfare.

**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.

**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.

**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.

**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).

**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.

**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.

**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.

**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.

**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.

**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).

**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.

**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.

**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.

**PST.04.01** Create plans for AFNR structures.

**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

### **Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.

**ELA-LITERACY.RST.11-12.3** 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.

**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.

**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.

**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.

**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.

**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it

describes.

**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

### Next Generation Science Standards

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

**HS-LS3-2**

**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-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.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**T12(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitation and implications, in order to justify new conclusions.

**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.

**CCE2(9-12):** I can receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.

**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**AA1(9-12):** I can evaluate different approaches and justify the best pathway to success.

**Understandings:** Students will understand that...

- The swine industry comprises several interconnected segments: breeding, farrowing, nursery, finishing, and processing. Understanding each segment's role and contribution to the overall production system is crucial for optimizing efficiency, ensuring animal welfare, and meeting market demands.
- Swine breeds vary in characteristics, such as growth rate, meat quality, and adaptability to different environments. Understanding these breed-specific traits is essential for selecting the appropriate pigs to meet production goals and enhance the efficiency and profitability of swine operations.

**Essential Questions:**

- Why aren't all swine raised on the same farm and in the same way?
- How do the distinct characteristics of various swine breeds impact their suitability for different production systems and market demands?
- How does knowledge of swine external anatomy aid in assessing health, managing care, and improving overall productivity?
- What are the key components of the monogastric digestive system, and how does each component contribute to the

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| <ul style="list-style-type: none"> <li>• Communication is key if producers want to be able to get medical attention for animals in their care, describe an animal for sale or breeding, and understand where products from the animal come from. Accurately describing traits, characteristics, and markings is important for many aspects of animal production.</li> <li>• The monogastric digestive system, characterized by a single-chambered stomach, is designed to process a diverse range of feedstuffs efficiently. Understanding its structure and function is crucial for optimizing nutrition, improving feed conversions, and ensuring monogastric livestock's overall health and performance.</li> <li>• Effective management of diseases and parasites in swine requires a thorough understanding of their symptoms, transmission, and prevention strategies. Identifying and addressing these health challenges is crucial for maintaining herd health, optimizing growth, and ensuring overall productivity in swine operations.</li> <li>• The design and management of swine facilities and the proper use of equipment are essential for ensuring animal welfare, optimizing production efficiency, and maintaining biosecurity standards. Well-designed facilities and appropriate equipment contribute to swine operations' overall health and productivity.</li> <li>• Effective marketing strategies for swine involve understanding consumer demands, production costs, and market trends. Producers can maximize profitability and meet industry standards by targeting the right markets and employing strategic marketing practices.</li> </ul> | <p>efficient digestion and absorption of nutrients from various feed sources?</p> <ul style="list-style-type: none"> <li>• How can recognizing the signs of common diseases and parasites in swine and implementing effective control measures improve herd health and productivity?</li> <li>• How do the design and management of swine facilities and the proper selection and use of equipment impact animal welfare, production efficiency, and biosecurity in a swine operation?</li> <li>• How can swine producers develop and implement marketing strategies that align with consumer preferences, market conditions, and production goals to achieve optimal profitability?</li> </ul> |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>• The characteristics of the swine industry.</li> <li>• The major breeds of swine by body characteristics.</li> <li>• External anatomy terminology used in the swine industry.</li> <li>• The parts and functions of the monogastric digestive system.</li> <li>• The importance of maintaining good swine health.</li> <li>• The causes, symptoms, prevention, and control of common swine diseases and parasites.</li> <li>• Best management practices when designing a swine facility and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>• Trace the path of swine grown in the pork industry from birth to processing.</li> <li>• Summarize the origin and development of the common breeds of swine.</li> <li>• Identify the external anatomy of swine with correct terminology.</li> <li>• Label the parts and functions of the monogastric digestive system.</li> <li>• Create a presentation demonstrating the analogy between a</li> </ul>                                                                                                                                                                                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                |
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| selecting equipment. <ul style="list-style-type: none"> <li>• The three methods of marketing hogs.</li> <li>• Grades of market hogs and feeder pigs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | monogastric digestive system and an amusement park. <ul style="list-style-type: none"> <li>• List good management practices that help to prevent swine diseases and parasites.</li> <li>• Design a swine facility with best management practices to ensure animal welfare, optimize production, and maintain biosecurity standards.</li> </ul> |
| <b>Key Vocabulary:</b><br>artificial insemination (AI), behavior, biosecurity, blind spot, boar, breeding systems, by-products, carbon footprint, crossbreeding, domesticated, dominant, expected progeny difference (EPD), farrowing, farrow-to-feeder, farrow-to-finish, feed efficiency, feed ration, flight zone, gene, genetics, genotype, gestation, gilt, gross income, grow/finish, hereditary, heritage breeds, heterosis (hybrid vigor), lean, manure management plan, marbled, monogastric, organic, pasture pork, phenotype, polygastric, progeny, purebred breeding, rate of gain, rebreeding interval, recessive, sow, sustainability, terminal/parental sire, terminal crossbreeding program, trait, vertically integrated, wallowing, weaned      |                                                                                                                                                                                                                                                                                                                                                |
| <b>Assessment Evidence</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                |
| <b>Performance Tasks:</b><br><i>Classwork:</i> Select and research breeds of swine creating a detailed report covering the breed's history, physical characteristics, production traits, and common uses in the swine industry. <b>TI2</b><br><br><i>Interim:</i> Design a modern swine production facility floor plan and written explanation that includes areas for housing, feeding, breeding, farrowing, and waste management considering animal welfare, biosecurity, environmental impact, and efficiency. <b>TCC2</b><br><br><i>Classwork:</i> Analyze the symptoms, identify the possible causes, suggest diagnostic tests, and recommend treatment and prevention strategies of a case study involving a health issue in a swine herd. <b>AA1, CCE2</b> | <b>Other Evidence:</b><br><i>Interim:</i> Written interim (quiz) assessment.<br><br><i>Summative:</i> Written summative (test) assessment.                                                                                                                                                                                                     |
| <b>Learning Plan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>• Students will review the most influential swine breeds currently being raised in the pork industry. <b>TI2</b></li> <li>• Students will identify the external anatomy of a swine animal. <b>P2</b></li> <li>• Students will design swine handling facilities using best management practices. <b>TCC2</b></li> <li>• Students will discuss best management and sustainability strategies currently applied by producers in the pork industry. <b>TCC3, AA1</b></li> </ul>                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                |
| <b>Teacher Resources:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                |



## Unit 6 - SPECIES SPECIFIC CARE: SMALL RUMINANT

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food and Natural Resources Standards

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.

**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.

**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.

**AS.02.01** Explain management techniques that ensure animal welfare.

**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.

**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.

**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.

**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).

**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.

**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.

**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.

**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.

**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.

**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).

**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.

**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.

**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.

**PST.04.01** Create plans for AFNR structures.

**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

### **Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.

**ELA-LITERACY.RST.11-12.3** 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.

**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.

**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.

**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.

**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.

**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

### **Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

**HS-LS3-2**

**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-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.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**T12(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

**T14(9-12):** I can apply my strengths and anticipate challenges to reach my current and future goals.

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

**CCE2(9-12):** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revision for success.

**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**Understandings:** Students will understand that...

- Different sheep breeds have unique characteristics and are suited for various purposes such as wool production, meat production, and dairy. Understanding these breed-specific traits is essential for selecting the right breed to meet specific agricultural goals and optimize flock productivity.
- Goat breeds possess unique traits that make them well-suited for specific purposes such as meat, milk, and fiber production. Understanding these breed characteristics is essential for selecting the right goats to achieve desired production outcomes and to ensure optimal care and management in diverse farming systems.
- Communication is key if producers want to be able to get medical attention for animals in their care, describe an animal for sale or breeding, and understand where products from the animal come from. Accurately describing traits, characteristics, and markings is important for many aspects of animal production.

**Essential Questions:**

- How do the unique characteristics of different sheep breeds influence their suitability for various production purposes such as wool, meat, and dairy?
- How do the specific traits of different goat breeds determine their effectiveness in meat, milk, and fiber production, and how can these traits meet specific farming goals?
- Why is knowledge of small ruminant external anatomy essential for effective care, management, and disease prevention in sheep and goats?
- How does the FAMACH system enable producers to accurately assess anemia in small ruminants and make informed decisions about parasite control?
- What are the benefits and challenges of using public lands for grazing small ruminants, and how can these practices be managed sustainably to balance agricultural needs with environmental stewardship?
- How can producers effectively market wool and mohair to

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| <ul style="list-style-type: none"> <li>FAMACHA is a diagnostic tool that helps small ruminant producers identify which animals need anthelmintic treatment for barber's pole worm infection.</li> <li>Socioscientific issues are controversial, socially relevant, real-world problems that are informed by science and often include an ethical component.</li> <li>Markets for sheep, goats and the products from these animals are not as well developed as markets for other livestock.</li> </ul>                                                                                                                                                                                                                                          | <p>maximize their value and meet the demands of diverse consumer markets?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>The major breeds of sheep, given their origin and breed characteristics.</li> <li>The common breeds of goats, given their origin and breed characteristics.</li> <li>External anatomy terminology used in the small ruminant industry.</li> <li>The life cycle of the barber pole internal parasite.</li> <li>The FAMACHA standards determine an animal's need for a parasite treatment plan.</li> <li>How ranchers raise food and fiber on federally owned land.</li> <li>The viewpoints concerning public lands use and public lands grazing.</li> <li>Terminology used in marketing sheep, goats, wool and mohair.</li> <li>Grades of wool and mohair.</li> </ul> | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>Identify and summarize important features of various breeds of sheep by viewing pictures or live animals.</li> <li>Create a creative presentation to share the origins, advantages and disadvantages, and top traits of assigned sheep breeds.</li> <li>Identify and summarize important features of various breeds of sheep by viewing pictures or live animals.</li> <li>Identify the external anatomy of small ruminants with the correct terminology.</li> <li>Perform the FAMACHA technique to evaluate a small ruminant's barber pole parasite load.</li> <li>Use maps to analyze public lands in the western United States.</li> </ul> |
| <p><b>Key Vocabulary:</b><br/> accelerated lambing, apparel wool, band, banding instinct, breeding sheep, browse, buck, cabrito, caping, carpet wool, cashmere, causative agent, chevon, clip, convulsion, cutability, doe, doeling, down, drench, dual-purpose breed, encephalitis, ewe, extension hurdle, feathering, grease, hank, hothouse lambs, kemp, kid, lamb, milkstone, mohair, myotonic, National Sheep Improvement Program (NSIP), native ewe, niche market, pelt, prolapsed uterus, ram, shearer lamb, spinning count, staple, tagging, toxemia, type, virus, wattle, western ewe, weather, woolen, wool top, worsted, yearling</p>                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>Assessment Evidence</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>Performance Tasks:</b><br/> <i>Classwork:</i> Research breeds of small ruminants to create a detailed comparison report that includes the history, physical characteristics, production traits, and common uses for each breed. <b>CCE4</b><br/> <i>Classwork:</i> Design a small ruminant production facility floor plan and</p>                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>Other Evidence:</b><br/> <i>Interim:</i> Written interim (quiz) assessment.<br/><br/> <i>Summative:</i> Develop a marketing plan for a small ruminant production including target market identification, pricing strategy, promotional</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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| <p>written explanation, considering areas for housing, feeding, breeding, and healthcare to address animal welfare, biosecurity, environmental impact, and efficiency. <b>TCC2</b></p> <p><i>Classwork:</i> Create an information brochure or poster that educates small ruminant producers on prevention, diagnosis, and treatment of a specific small ruminant health issue. <b>CCE4</b></p> <p><i>Interim:</i> Complete the FAMACHA certification process to learn about managing parasites in small ruminants. <b>TI4, P2</b></p> | <p>methods, and distribution channels. <b>CCE2</b></p> |
| <p style="text-align: center;"><b>Learning Plan</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                        |
| <ul style="list-style-type: none"> <li>• Students will complete FAMACHA training to receive an industry certification. <b>TI4, P2</b></li> <li>• Students will review the most influential small ruminant breeds currently being raised in the small ruminant industry. <b>TI2</b></li> <li>• Students will identify the external anatomy of the small ruminant animal. <b>P2</b></li> <li>• Students will design small ruminant handling facilities using best management practices. <b>TCC2</b></li> </ul>                          |                                                        |
| <p><b>Teacher Resources:</b><br/> Teacher Created Resources<br/> University of Rhode Island FAMACHA Certification online program</p>                                                                                                                                                                                                                                                                                                                                                                                                  |                                                        |



## Unit 7 - LIVESTOCK BREEDING & GENETICS

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food, and Natural Resource Standards

**AS.04.01** Evaluate animals for breeding readiness and soundness.

**AS.04.02** Apply scientific principles to select and care for breeding animals.

**AS.04.03** Apply scientific principles to animal breeding.

**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.

**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.

**AS.07.01** Design programs to prevent animal diseases, parasites, and other disorders to ensure animal welfare.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.

**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.

**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**BS.01.01** Investigate and explain the relationships in the timeline of developing biotechnology applications and techniques in agriculture (e.g., major innovators, historical developments, potential applications of biotechnology, etc.).

**BS.01.03** Analyze the relationships and implications of bioethics, laws, and public perceptions on applications of biotechnology in agriculture (e.g., ethical, legal, social, and cultural issues.)

**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.

**BS.03.04** Apply biotechnology principles, techniques, and processes to enhance plant and animal care and production (e.g., selective breeding, pharmaceuticals, biodiversity, etc.).

##### Common Core State Standards

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

**ELA-LITERACY.RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to

important distinctions the author makes and to any gaps or inconsistencies in the account.

**ELA-LITERACY.RST.11-12.3** 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.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.

**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.

**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.

**MATH.CONTENT.HSS.MD.A.3** Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.

### **Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

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

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

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**T11** I can implement a realistic plan and adapt when necessary to achieve my goals.

**T12** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

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

**P2** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome challenges.

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

**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.

**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.

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| <p><b>Understandings:</b> Students will understand that...</p> <ul style="list-style-type: none"> <li>• Traits are passed on as genes.</li> <li>• Mendelian genetics applies the principles of independent assortment and the law of segregation to utilize genetics to improve future animal generations effectively.</li> <li>• A Punnett Square is a tool for predicting the traits expressed in the offspring of two parents.</li> <li>• Breeders utilize expected progeny differences (EPD) data to select high-quality animals to breed that will assist in achieving specific management objectives in offspring.</li> <li>• An individual's reproductive anatomy and physiology determine the methodology and management decisions in the livestock industry.</li> <li>• Pregnancy prevention and promotion apply biotechnological approaches to reproduction involving animal science professionals.</li> <li>• Heat detection and ovulation prediction can impact the success rate of breeding, which is a key concept in livestock production.</li> <li>• Artificial insemination is a technique used in animal breeding for numerous reasons.</li> <li>• Artificial insemination (AI) is a critical reproductive technology that allows for the controlled and precise introduction of superior genetic material into livestock herds.</li> </ul> | <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>• How are genes passed on from parent to offspring?</li> <li>• How can the probability of an offspring having a certain trait be calculated using Punnett Square?</li> <li>• How can producers use Expected Progeny Differences (EPD) to select an animal for breeding?</li> <li>• How do reproductive structures influence the reproductive process?</li> <li>• Do producers purposefully schedule animal births? Why or why not? If so, how do they do this?</li> <li>• How does the estrous cycle affect breeding and production?</li> <li>• How can artificial insemination enhance livestock herds' genetic quality, reproductive efficiency, and productivity?</li> <li>• What are the essential techniques and best practices for performing artificial insemination in livestock?</li> </ul> |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>• The definition and use of the codominant inheritance pattern.</li> <li>• The importance of performing multiple trials during an experiment.</li> <li>• The differences between complete dominance, incomplete dominance, codominance, and sex-linked traits.</li> <li>• Common expected progeny difference traits in cattle, small ruminants, and swine.</li> <li>• The steps of conception.</li> <li>• Multiple types of reproductive biotechnology are used on male and female livestock species.</li> <li>• Reproductive hormone's role and function in standing heat and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>• Predict the results of genetic crosses involving codominant traits.</li> <li>• Use a Punnett Square to calculate the probability of offspring genotypes.</li> <li>• Complete a Punnett Square for a monohybrid and dihybrid cross.</li> <li>• Utilize Punnett Squares to make decisions regarding the breeding of animals.</li> <li>• Evaluate EPD value for cattle, swine, and small ruminants to determine ideal breeding pairs.</li> <li>• Name, locate, and describe the parts and functions of livestock</li> </ul>                                                                                                                                                                                                                                                                    |

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| <p>ovulation in livestock species.</p> <ul style="list-style-type: none"> <li>• The advantages and disadvantages of using artificial insemination.</li> <li>• Reproductive technologies applied in the livestock market.</li> <li>• Signs of early estrus, standing estrus, and late estrus.</li> <li>• The various tools used in heat detection and artificial insemination.</li> <li>• The signs a sow/gilt will show when it is ready to breed in standing heat.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>animals' male and female reproductive systems - swine, cattle, and small ruminants.</p> <ul style="list-style-type: none"> <li>• Describe and differentiate between heat cycle breeder types (seasonal, opportunistic, continuous).</li> <li>• Apply the phases of the estrous cycle to livestock production.</li> <li>• Select appropriate sires for breeding cattle based on expected progeny and predicted transmitting ability.</li> <li>• Perform the proper artificial insemination technique in cattle.</li> <li>• Compare the advantages and disadvantages between natural breeding and artificial insemination.</li> </ul> |
| <p><b>Key Vocabulary:</b><br/> additive gene effect, adenine, afterbirth, agricultural biotechnology, albino, alimentary canal, allele, anaphase, antibodies, asexual reproduction, atrophy, biotechnology, bladder, bovine somatotropin, breeding value, cell membrane, cervix, chromosome, clitoris, clone, close breeding, codominance, codon, colostrum, copulation, corpora lutea, cowper's gland, crossover, cryptorchidism, cyst, cytoplasm, cytosine, deoxyribonucleic acid (DNA), deoxyribose, diffusion, diploid, dominant gene, dystocia, embryo, environment, epididymis, estrogen, estrus, fertilization, fraternally related, funnel, gamete, gene, genetic engineering, genetics, genotype, gestation, grade, grading up, guanine, haploid, heritability, heritability estimate, heterosis, heterozygous gene pair, homologous, homozygous gene pair, hybrid, identical, inbreeding, incomplete dominance, incubation, infundibulum, isthmus, linebreeding, line crossing, linkage, locus, lysosome, magnum, meiosis, metaphase, mitosis, mutation, nonadditive gene effect, nucleotide, nucleus, oocyte, oogenesis, ootid, outcrossing, ovaries, oviducts, ovulation, ovum, papilla, parturition, penis, phenotype, placenta, polled, polynucleotide, progesterone, prophase, prostate gland, protoplasm, purebred, recessive gene, recombinant bovine somatotropin (rbST), reproduction, retractor muscle, ribonucleic acid (RNA), ribosome, ridgeling, scrotum, semen, semiconservative replication, seminal vesicles, sex-influenced genes, sex-limited genes, sex-linked genes, sexual reproduction, sheath, sigmoid flexure, somatotropin, sperm, spermatid, spermatocytes, spermatogenesis, spermatogonia, sterile, straight breeding, superovulation, telophase, testicles, testosterone, thymine, transgenic, umbilical cord, uracil, urethra, urine, uterus, vagina, vas deferens, vulva, zygote</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p style="text-align: center;"><b>Assessment Evidence</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Performance Tasks:</b><br/> <i>Interim:</i> Using Punnett Square simulates the inheritance of specific traits to predict the outcomes of various breeding scenarios, focusing on traits such as coat color, horn presence, or growth rate. <b>AA3</b></p> <p><i>Interim:</i> Participate in a hands-on workshop to learn the techniques and procedures involved in artificial insemination in livestock animals.<br/> <b>P3, P4</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Other Evidence:</b><br/> <i>Classwork:</i> Analyze hormonal data to determine the correct time to breed a female livestock animal. <b>AA1, CCE4</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

*Summative:* Participate in a mock auction where they will evaluate and bid on livestock breeding stock based on pedigree analysis. **T12**

### Learning Plan

- Use Punnett Squares and probability to determine the ability of a breeding pair to create an offspring that meets management needs. **AA3**
- Analyze expected progeny data to determine ideal breeding pairs to meet livestock management desires. **T11**
- Name, locate and describe the parts and functions of the male and female reproductive systems of livestock animals - swine, cattle, and small ruminants. **P2**
- Perform artificial insemination techniques accurately and with best practices. **P3, P4**

#### Teacher Resources:

Teacher Created Resources

## Unit 8 - LIVESTOCK SELECTION & JUDGING

### Desired Results - Goals, Transfer, Meaning, Acquisition

#### Established Goals:

##### Agriculture, Food, and Natural Resource Standards

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.

**AS.02.01** Explain management techniques that ensure animal welfare.

**AS.04.01** Evaluate animals for breeding readiness and soundness.

**AS.04.02** Apply scientific principles to select and care for breeding animals.

**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).

**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.

**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.

**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.

**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.

**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.

**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.

**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.

**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

##### Common Core State Standards

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.

**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**MATH.CONTENT.HSS.MD.A.3** Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.

### Next Generation Science Standards

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

**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 population.

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

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**T12(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.

**CCE1(9-12):** I can initiate discussion 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(9-12):** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.

**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**Understandings:** Students will understand that...

- Livestock evaluation is integral to improving animal quality and production efficiency.
- Understanding key terms and concepts is essential for effective evaluation.
- Conformation and anatomical features are crucial in assessing livestock quality and suitability.
- Each livestock species has specific conformation standards that influence evaluation.
- Evaluating cattle requires an understanding of breed-specific traits and general conformation standards.

**Essential Questions:**

- Why is livestock evaluation critical in agricultural practices?
- What are the fundamental terms and concepts used in livestock evaluation?
- How do anatomical features contribute to effective livestock evaluation?
- What are the conformation standards for different livestock species?
- What criteria are used to evaluate cattle effectively?
- How do breed standards influence cattle evaluation?
- What are the key evaluation criteria for sheep and pigs?

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| <ul style="list-style-type: none"> <li>• Accurate cattle evaluation involves applying established criteria to assess physical and performance traits.</li> <li>• Sheep and pigs have unique evaluation criteria that must be understood for accurate assessment.</li> <li>• Different livestock species require distinct approaches to evaluation based on their specific traits.</li> <li>• Practical application of livestock evaluation skills enhance understanding and proficiency.</li> <li>• Reflecting on evaluation performance is important for identifying areas of strength and improvement.</li> </ul>                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• How do evaluation methods differ among various livestock species?</li> <li>• How can evaluation skills be applied in real-world scenarios?</li> <li>• What insights can be gained from reflecting on the evaluation process and feedback?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Students will know...</b></p> <ul style="list-style-type: none"> <li>• The definition and significance of livestock evaluation.</li> <li>• Basic terminology and concepts related to livestock evaluation.</li> <li>• The key anatomical features and conformation standards for various livestock species.</li> <li>• How different anatomical features impact overall livestock quality.</li> <li>• The breed-specific evaluation criteria and standards for cattle.</li> <li>• How to assess cattle based on conformation and performance traits.</li> <li>• The evaluation criteria and standards for sheep and pigs.</li> <li>• How to assess and compare different species using appropriate evaluation methods.</li> <li>• How to effectively apply evaluation skills in a practical setting.</li> <li>• The importance of reflection and feedback in improving evaluation practices.</li> </ul> | <p><b>Students will be able to...</b></p> <ul style="list-style-type: none"> <li>• Define and use key terms associated with livestock evaluation.</li> <li>• Explain the role and importance of livestock evaluation in agricultural practices.</li> <li>• Identify and describe the anatomical features of different livestock species.</li> <li>• Use conformation standards to evaluate the physical qualities of livestock.</li> <li>• Apply breed-specific evaluation criteria to assess cattle.</li> <li>• Use evaluation forms to systematically document and justify assessments of cattle.</li> <li>• Conduct evaluations of sheep and pigs using specific criteria.</li> <li>• Compare and contrast evaluation approaches for different livestock species.</li> <li>• Demonstrate livestock evaluation skills through practical challenges.</li> <li>• Reflect on and evaluate their performance, incorporating feedback to enhance their evaluation abilities.</li> </ul> |
| <p><b>Key Vocabulary:</b><br/>breed, carcass, conformation, desirable traits, economics, evaluation, fat thickness, finish, frame score, genetics, growth rate, judging, loin eye area, market readiness, muscling, palatability, performance, quality grade, ribeye area, soundness, structural correctness, temperament, type, yield grade</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p style="text-align: center;"><b>Assessment Evidence</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Performance Tasks:</b><br/><i>Classwork:</i> Evaluate and rank a class of four animals based on specific</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Other Evidence:</b><br/><i>Classwork:</i> Written formative (classwork/homework) assessment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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| <p>criteria such as structure, muscling, and overall conformation. <b>TCC3, CCE1</b></p> <p><i>Classwork:</i> Identify various livestock breeds and describe their key characteristics, including strengths, weakness, and common uses. <b>CCE1</b></p> <p><i>Interim:</i> Organize and participate in a livestock evaluation mock contest. <b>TI2, CCE3</b></p> <p><i>Summative:</i> Demonstrate livestock evaluation understanding and communication skills by presenting oral reasons for their rankings of a class of livestock. <b>CCE4</b></p> |  |
| <b>Learning Plan</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <ul style="list-style-type: none"> <li>Students will evaluate live animals for desirable traits such as, but not limited to, conformation, growth rate, market readiness, performance and structural correctness. <b>CCE1</b></li> <li>Students will perform a set of oral reasons to a group of three or more peers or educational staff. <b>CCE4</b></li> </ul>                                                                                                                                                                                    |  |
| <p><b>Teacher Resources:</b><br/>Teacher Created Resources</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |