
Animal & Plant Sciences

Curriculum Map

School Year: 2020-2021

School: Southern Cayuga Jr. High School

Program: Agriculture Sciences

Teacher: Ms. Wasson

Course Rationale:

This course is designed expose students to agriculture, animal science, plant science and related career options. Students participating in the course will have experiences in various animal and plant science concepts with hands-on activities, projects, and problems. Students' experiences in animal science will involve the study of animal anatomy, physiology, behavior, nutrition, reproduction, health, selection, and marketing. Student experiences in plant science will include the study of plant anatomy and physiology, classification, and the fundamentals of production and harvesting. Throughout the course, students will consider the perceptions and preferences of individuals within local, regional, and world markets.

The Animal & Plant Sciences course is intended to build a foundation on the Introduction to Agriculture Sciences course. The course is structured to enable all students to have a variety of experiences that will provide an overview of the animal and plant industries.

Standards:

Life Sciences

LS1.A: Structure and Function

LS1.B: Growth and Development of Organisms

LS3.A: Inheritance of Traits

LS3.B: Variation of Traits

LS4.B: Natural Selection

LS4.C: Adaptation

Physical Sciences

PS3.B: Conservation of Energy and Energy Transfer

PS3.D: Energy in Chemical Processes and Everyday Life

English Language Arts

RL.9-10.1: Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

RL.9-10.2: Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.

RL.9-10.4: Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone

Course Outline:

Title or Topics / Essential Questions	Content Skills (Activities to cover Essential Questions)	Vocabulary	Major Assessments	Time Frame
<p>History and Use of Animals</p> <p>How do animals contribute to daily life?</p> <p>What are the differences between animal production, processing, marketing, and regulation?</p> <p>Why are animals domesticated?</p> <p>How do animals benefit from domestication?</p> <p>What are the benefits to humans by domesticating animals?</p>	<p>Select an animal to research throughout the course and develop a format for developing a management guide.</p> <p>Determine and analyze usage of various animal products.</p> <p>Conduct behavioral and historical research on a variety of animals.</p> <p>Compare domestic and wild animals using the characteristics of domestication.</p> <p>Examine the development and domestication of a common animal over time.</p> <p>Design a timeline recording the history of an animal.</p> <p>Present to the class historical data collected regarding a selected animal species.</p>	<p>By-Products, Companion, Disposition, Domesticated, Feral, Fight Zone, Flight Zone, Production, Social Hierarchy, Species, Tame, Taxonomic, Temperament, Wild</p> <p>Collaborate, Compare, Contrast, Describe, Determine, Discuss, Evaluate, Identify, Interpret, and Summarize.</p>	<p>Evaluation Rubric: Animals Everyday</p> <p>Evaluation Rubric: By-Products</p> <p>Evaluation Rubric: Domesticated Versus Wild</p> <p>Project Rubric: Timeline of Domestication Project</p> <p>Post-Test: Use and History of Animals</p>	<p>3 Weeks</p>
<p>Animal Basic Needs</p> <p>What are the basic needs of animals?</p> <p>How does environment influence the design of animal facilities?</p>	<p>Research the basic feed, water, and shelter requirements for animals.</p> <p>Determine the average environmental conditions for animals</p> <p>Conduct experiments to determine the risk levels related to spreading pathogens in a farm scenario</p>	<p>Biosecurity, Care, Facility, Handling, Pathogens, Protocols, and Risk.</p> <p>Compare, Contrast, Describe, Determine, Discuss, Evaluate, Identify, and Summarize.</p>	<p>Evaluation Rubric: Animal Care</p> <p>Evaluation Rubric: Evaluating Risk</p> <p>Evaluation Rubric: Animal Facility Design Project</p>	<p>2 Weeks</p>

How can biosecurity concerns be reduced at animal facilities?	Design a model animal facility.		Post-test: Animal Basic Needs	
What are the areas needed in an animal facility?				
Introduction to Animal Anatomy & Physiology	Identify common external animal parts and explain the purpose of each.	Artery, Carbon Dioxide, Circulatory, Digestion, Dissection, Endocrine, External, Internal, Ligament, Nervous, Organ, Oxygen, Respiratory, Tendon, Tissue, and Vein	Evaluation Rubric: External Animal Parts	4 - 5 Weeks
What common external parts are found on all livestock species?	Identify unique external parts specific for livestock and poultry species and explain the purpose of each part.		Evaluation Rubric: Internal Animal Parts	
What is the largest internal organ in the body of an animal?	Examine two types of muscle tissue and describe the differences.		Evaluation Rubric: Chicken Wing Lab	
How do multiple organs work together in the body of an animal?	Dissect a chicken wing and observe how tendons and ligaments provide movement to the structure of the skeleton.	Collaborate, Compare, Contrast, Describe, Determine, Discuss, Evaluate, Identify, Interpret, and Summarize.	Evaluation Rubric: Fetal Pig Lab	
What is the relationship between external body parts and internal systems?	Dissect a fetal pig and identify internal parts and organs that comprise systems.		Evaluation Rubric: Blood Flow Travel Brochure Project	
What organs make up the respiratory system, digestive system, circulatory system, nervous and endocrine system?	Identify and explain the function of the parts of the respiratory and circulatory systems.		Evaluation Rubric: Body Systems Map Project	
	Design a travel brochure that highlights the flow of blood throughout the body.		Post-Test: Anatomy & Physiology of Animals	
	Map the functions of body systems, specifically the nervous and endocrine systems in order to demonstrate their connection to each other and other systems in the body.			

<p>Introduction to Animal Nutrition</p> <p>What is a ruminant?</p> <p>What is a monogastric?</p> <p>What is the difference between a monogastric, ruminant, and avian digestion system?</p> <p>What are the six essential nutrients for all animals?</p> <p>What is a ration?</p> <p>How is the Pearson Square method used in formulating a ration?</p>	<p>Define the terminology commonly used in digestive anatomy.</p> <p>Label, identify, and explain the function of various parts of animal digestive systems.</p> <p>Build a model of a digestive system</p> <p>Evaluate nutrient requirements of various animals at different stages.</p> <p>Categorize feedstuffs into the nutrient group each feedstuff provides.</p> <p>Describe the characteristics of a good ration.</p> <p>Formulate a ration and make a recipe using the Pearson Square.</p> <p>Develop a balanced ration for livestock by hand.</p>	<p>Abomasum, Absorption, Calorie, Carbohydrates, Concentrates, Digestive, Deficiency, Energy, Fats, Feedstuff Monogastric, Nutrients, Omasum, Protein, Ration, Reticulum, Rumen, Roughages, Ruminant, Supplements, and Vitamins.</p> <p>Compare, Contrast, Describe, Determine, Evaluate, Identify, Interpret, and Summarize.</p>	<p>Evaluation Rubric: Functions of Animal Digestive System</p> <p>Evaluation Rubric: Digestion System Model Project</p> <p>Evaluation Rubric: Nutritional Requirements Lab</p> <p>Evaluation Rubric: Feedstuff Lab</p> <p>Evaluation Rubric: Feed Label Analysis</p> <p>Evaluation Rubric: Pearson Square Ration Lab</p> <p>Post-Test: Animal Nutrition</p>	<p>3 Weeks</p>
<p>Introduction to Genetics</p> <p>What is genetic inheritance?</p> <p>How are probabilities used in animal agriculture?</p>	<p>Use Punnett Squares to predict the probability of genetic frequencies.</p> <p>Complete a Punnett Square with a dihybrid cross.</p> <p>Calculate a contemporary group ratio</p> <p>Compare animals based on their expected progeny differences (EPDs).</p>	<p>Dominant, Genomics, Genetics, Genetic Heritance, Meiosis, Mitosis, Pedigree, Punnett Square, Qualitative Traits, Quantitative Traits, and Recessive</p> <p>Contrast, Describe, Determine, Discuss, Evaluate, Identify, and Interpret.</p>	<p>Evaluation Rubric: Mitosis Plant & Animal Lab</p> <p>Evaluation Rubric: Computer Stimulation Genetic Heritance</p> <p>Evaluation rubric: Punnett Square</p>	<p>2 Weeks (time permitting)</p>

How are Punnett Squares used in animal agriculture?	Evaluate the quantitative traits of livestock using EPDs.		Evaluation Rubric: Meiosis Sketch-Up	
How would you utilize EPDs in genetic selection?	Trace genetic inheritance through a pedigree.		Evaluation Rubric: Computer Stimulation Traits	
What is a pedigree?			Post-Test: Animal Genetics	
Animal Health				
What is a pathogen?	Simulate the spread of a contagious disease and trace the route the disease takes through a population.	Bacteria, Biosecurity, Contagious, Disease, Health, Illness, Intramuscular, Parasite, Protozoa, Subcutaneous, Vaccination, Viruses, and Zoonotic	Evaluation Rubric: Signs and Symptoms	4 Weeks
What is a disease?	Identify and sketch bacteria, mold, and protozoa from prepared slides.		Evaluation Rubric: Case Studies – Diseases and Parasites	
How do you distinguish between an infectious disease, a contagious disease, and a noninfectious disease?	Research governmental regulatory agencies and identify primary purposes and responsibilities each agency has regarding disease prevention and control.	Compare, Contrast, Describe, Determine, Discuss, Evaluate, Identify, Interpret, and Summarize.	Evaluation Rubric: Life Cycle Diseases and Parasites Project	
How are diseases transmitted?	Argue the role of a regulatory agency in a disease outbreak scenario.		Evaluation Rubric: Preventative Care Plan	
What are the differences in bacteria, viruses, fungi, protozoa, and prions?	Research and record key facts and symptoms of two animal-related diseases.		Post-Test: Animal Health and Care	
What is quarantine?	Determine what disease an animal has from case studies.			
	Research diseases and parasites of an animal and the preventative controls of the diseases and parasites.			

What role does the CDC play in limiting the spread of disease?	Develop a preventative care plan for their animal.			
Animal Products and Marketing	Research an animal product and develop a presentation on that animal product.	Breakout, Candling, Consumer, Fresh, Food Safety, Grading, Market, Palatability, Product, Processed, Sensory Evaluation, and Sell.	Evaluation Rubric: Animal Product Presentation	3 Weeks
What is an animal product?	Conduct sensory evaluation trials on meat samples and evaluate the samples.		Evaluation Rubric: Sensory Evaluation Trails	
What major product do consumers receive from each type of agricultural animal?	Identify samples of cheese based on appearance and taste.	Collaborate, Compare, Contrast, Describe, Determine, Discuss, Evaluate, Identify, and Summarize.	Evaluation rubric: Grading Lab	
What is the difference between fresh and processed products?	Grade eggs based on their interior qualities using the candling and breakout methods.		Evaluation Rubric: Local Marketplace Project	
What are food safety concerns in animal products?	Compare similar products based on their features, pricing, distribution, and promotion.		Post-Test: Animal Products and Markets	
Why is marketing beneficial in agriculture?	Determine a target market and potential products based on the local community.			
How are products developed and marketed?	Develop a plan to market a product			
History and Use of Plants	Explain and analyze the contributions of plants and plant use in cultures, civilization, and communities.	Origins, Derived, Demand, Distribution, and Preferences, Perception.	Evaluation Rubric: Origins of Plants and Plant Products Project	2 Weeks
How were plants introduced to cultures and civilization?	Identify and compare cultural and production practices in the cultivation, research, processing, and distribution of plants for human and animal use.	Collaborate, Compare, Contrast, Determine, Explain, Identify, and Interpret.	Evaluation Rubric: Origins of Plants and Plant Products Presentation	
Why are plants essential to life?			Post-test: The Value of Plants to Society	

How has consumer preferences evolved the plant industry?	Investigate factors that lead to consumer preferences, perceptions, choice, access, and affordability of plants, plant derived products.			
<p>Introduction to Plant Anatomy & Physiology</p> <p>How can a complete plant be distinguished from an incomplete plant?</p> <p>How does the anatomy of the plant aid in processes?</p> <p>What environmental factors are essential in processes that occur throughout the plant?</p> <p>How does the physiology of the plant aid in processes?</p>	<p>Evaluate flower structures and analyze the impact of plant structure on plant breeding, production and use.</p> <p>Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.</p> <p>Compare and contrast the effects of transpiration, translocation and assimilation on plants.</p> <p>Analyze how various environmental factors will affect the rate of photosynthesis.</p> <p>Apply knowledge of plant physiology and energy conversion to plant systems</p>	<p>Complete, Cellular Respiration, Dicotyledons, Herbaceous, Hierarchical Classification, Imperfect, Incomplete, Meiosis, Mitosis, Perfect, Photosynthesis, Transpiration, and Translocation.</p> <p>Collaborate, Determine, Evaluate, Explain, Identify, and Interpret.</p>	<p>Evaluation Rubric: Plant Structures Dissection Lab</p> <p>Post-test: Plant Structures Evaluation Rubric: Plant Structures Project</p> <p>Evaluation Rubric: Investigating Photosynthesis Lab</p> <p>Evaluation Rubric: Hunt for Glucose Lab</p> <p>Evaluation Rubric: Coffee Production Project</p> <p>Post-test: Plant Processes</p>	4 Weeks
<p>Introduction to Plant Reproduction</p> <p>What is the difference between asexual and sexual propagation?</p> <p>What are the techniques to propagating a plant?</p>	<p>Discuss the importance of sexual propagation in plants.</p> <p>Summarize optimal conditions for asexual propagation.</p> <p>Demonstrate techniques used to propagate plants by cuttings, division, separation, layering, budding and grafting.</p> <p>Manage the plant environment to support asexual reproduction.</p>	<p>Asexual propagation, Budding, Cross-Pollination, Cutting, Division, Germination, Grafting, Layering, Pollination, Propagate, Separation, Viability and Vigor.</p> <p>Collaborate, Compare, Contrast, Determine, Explain, Identify, and Interpret.</p>	<p>Evaluation Rubric: Propagation Lab</p> <p>Evaluation Rubric: Plants on the Move – Transplanting Lab</p> <p>Evaluation Rubric: Propagate Like a Pro Project</p> <p>Evaluation Rubric: Practices of Grafting Application Lab</p>	3 Weeks

What are environmental factors that affect the success of asexual and sexual reproduction?	Demonstrate plant propagation techniques in plant system activities		Project Post-test: Plant Propagation	
Growing Environments What are the differences between hydroponics and aquaponics? How are hydroponics and aquaponics similar? What are advantages and disadvantages to using hydroponics and aquaponics? What are some of the requirements to maintaining the greenhouse environment for successful growth of plants?	Compare and contrast the types of systems used in hydroponic and aquaponics plant production. Identify advantages and disadvantages of plant production through hydroponics and aquaponics. Summarize the use of hydroponic and aquaponics systems for plant production. Design a hydroponic system incorporating the design principles of a specific type of system, such as nutrient flow, aggregate, water culture, or aeroponics. Maintain plants (watering, pruning, fertilizing, repotting, insect, disease and weed control). Demonstrate knowledge and use of greenhouse environment requirements and their control.	Acidity, Algae, Alkalinity, Ammonia, Aquaponics, Biofilter, Decompose, Density, Germination, Hydroponics, Nitrate, Peat, pH, Phosphorus, Soluble, Synthetic, and Urea. Collaborate, Compare, Contrast, Determine, Explain, Identify, and Interpret.	Evaluation Rubric: Growing Space – Hydroponics and Aquaponics Project Evaluation Rubric: Room to Grown Project Design Evaluation Rubric: Room to Grow Project Build Agriculture Project Post-test: Hydroponics & Aquaponics Systems Evaluation Rubric: Greenhouse Care and Maintenance	5 Weeks
Pest and Disease Management What are the benefits of IPM? How can IPM be implemented into greenhouse as a management technique?	Demonstrate knowledge of disease, insect, pest and weed control that affect greenhouse crops. Compare and contrast benefits of modern IPM. Identify and describe the use of greenhouse tools and equipment, including the calibration of sprayers and spreaders.	Integrated Pest Management, Growth Regulator, Plugs, Pruning, Repotting, Seedlings, Thinning, and Transplant. Collaborate, Determine, Explain, Identify, and Interpret.	Evaluation Rubric: Application of Plant Processes and Management Techniques	3 Weeks

What are the tools and equipment required to implement IPM?				
Plant Production & Marketing How do I market and advertise the Spring Plant Sale in my community? What are the community wants and needs for spring plants? How can the community needs be met with the spring plant sale?	Develop marketing and advertising plans for the spring plant sale. Identify clients' needs and wants for spring plants. Construct plant arrangements to meet the needs and wants of clients. Evaluate class communication with clients to determine success of sale.	Client, Advertising, Marketing, Needs, Retail, Sale, Wants, and Wholesale. Collaborate, Describe, Determine, Discuss, Evaluate, Identify, and Summarize.	Evaluation Rubric: Greenhouse Sale – Marketing & Advertising Plans Evaluation Rubric: Written Assignment Greenhouse Client Evaluation Rubric: Greenhouse Client Project	4 Weeks

References:

Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards. (2015). Retrieved from https://www.ffa.org/SiteCollectionDocuments/council_afnr_career_cluster_content_standards.pdf

Curriculum for Agricultural Science and Education. (2016-2020).