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| Course Title | Agri-Science I |
| Department and Curriculum Writing Team Members | Agri-Science & Technology:<br>Karolyn Jordan<br>Laura Manzi-Smith<br>Devon O'Keefe<br>Matthew Smith<br>Robert Williams |
| Course Overview | Agri-Science I is an introductory class for first year Agri-Science students. The purpose of Agri-Science I is to introduce students to the field of agriculture and to provide a basis from which they may continue to learn about agriculture and agribusiness. The units that make up Agri-Science I will help students focus on an agricultural career path as well as provide them with the tools they need to become productive workers.<br>Students also have the opportunity to learn about record-keeping, safe work habits, leadership skills, and to develop a Supervised Agricultural Experience (SAE) program. Agri-Science I is offered as a series of units throughout the year. Students rotate from teacher to teacher to work in each of the areas of agriculture: Agricultural Mechanics, Animal Science, Aquaculture, Horticulture, and Natural Resources. This coursework will enable the students to make informed decisions about future classes and careers. |
| Length of Course | ☑ Full year<br>☐ Semester |
| Type of Course | ☐ Humanities Required Credit<br>☐ STEM Required Credit<br>☐ Humanities Elective Credit<br>☑ STEM Elective Credit<br>☐ PE/Health Required Credit<br>☐ Other |
| Grade Level | ☑ 9<br>☐ 10<br>☐ 11 |

Approved by Instructional Council June 15, 2024

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| | ☐ 12 |
| Prerequisites | N/A |
| Ledyard High School Vision of the Graduate | Ledyard High School is a learning community dedicated to the cultivation of skills essential for our students' success in a rapidly-evolving society. At Ledyard High School, we believe our graduates should demonstrate the following:<br>☑ Collaboration - Colonel Graduates will demonstrate an ability to work effectively with others, sharing ideas, acknowledging one another's strengths, and collaborating to produce presentations, projects, performances, or events.<br>☐ Communication- Colonel Graduates will demonstrate an ability to communicate information clearly and effectively through a variety of media, including written, oral, visual, musical, and/or video productions.<br>☐ Problem-Solving- Colonel Graduates will demonstrate an ability to solve problems of varying complexity across a variety of content areas.<br>☐ Critical Thinking - Colonel Graduates will demonstrate critical thinking skills to find solutions, support arguments, and overcome challenges in a variety of content areas.<br>☐ Perseverance - Colonel Graduates will demonstrate perseverance in academic and extracurricular settings by working through and past obstacles in pursuit of goals.<br>☐ Creativity - Colonel Graduates will demonstrate creativity through their participation in fine arts courses as well as through their inventive approaches to learning activities in a variety of settings. |
| VOG Portfolio Component | |

# Ledyard Agri-Science & Technology Program

# Agri-Science I Curriculum

Approved by Instructional Council June 15, 2024

# Agri-Science I

Agri-Science I is an introductory class for first year Agri-Science students. The purpose of Agri-Science I is to introduce students to the field of agriculture and to provide a basis from which they may continue to learn about agriculture and agribusiness. The units that make up Agri-Science I will help students focus on an agricultural career path as well as provide them with the tools they need to become productive workers.

Students also have the opportunity to learn about record-keeping, safe work habits, leadership skills, and to develop a Supervised Agricultural Experience (SAE) program. Agri-Science I is offered as a series of units throughout the year. Students rotate from teacher to teacher to work in each of the areas of agriculture: Agricultural Mechanics, Animal Science, Aquaculture, Horticulture, and Natural Resources. This coursework will enable the students to make informed decisions about future classes and careers.

**Units**

| |
|---|
| Introduction to Food Science |
| Introduction to Animal Science |
| Introduction to Natural Resources |
| WorkSafe/SAE |
| Introduction to Aquaculture |
| Introduction to Horticulture |
| Safe Operation of Agricultural Equipment |

Approved by Instructional Council June 15, 2024

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| Introduction to FFA |
| Introduction to BioTechnology |

| **Course Title** | **Agri-Science I** |
|---|---|
| **Agriculture Pathway** | Career Clusters |
| **Length of Course** | One credit |
| **Ledyard High School Vision of the Graduate** | Collaboration - Colonel Graduates will demonstrate an ability to work effectively with others, sharing ideas, acknowledging one another's strengths, and collaborating to produce presentations, projects, performances, or events. |
| **Course Overview** | Agri-Science I is an introductory class for first year Agri-Science students. The purpose of Agri-Science I is to introduce students to the field of agriculture and to provide a basis from which they may continue to learn about agriculture and agribusiness. The units that make up Agri-Science I will help students focus on an agricultural career path as well as provide them with the tools they need to become productive workers. |
| **Units of Study** | 1. Introduction to Food Science<br>2. Introduction to Animal Science<br>3. Introduction to Natural Resources<br>4. WorkSafe/SAE |

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| | 5. Introduction to Aquaculture<br>6. Introduction to Horticulture<br>7. Safe Operation of Ag Equipment<br>8. Introduction to FFA |

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| **Unit 1** | Introduction to Food Science |
| **Essential Questions** | 1. How do you maintain safety procedures while working in food science?<br>2. Who regulates our food products and why should we care? |

**Priority Standards Assessed in Learning**

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| **Connecticut Agriculture, Food, and Natural Resources Standards** | FPP.01.02.01.a. Examine and identify contamination hazards associated with food products and processing (e.g., physical, chemical and biological).<br>FPP.01.02.04.a. Describe the effects food-borne pathogens have on food products and humans.<br>FPP.01.03.01.a. Identify and summarize purposes of food storage procedures (e.g., first in/first out, temperature regulation, monitoring, etc.).<br>FPP.02.02.02.a. Identify common food additives and identify their properties (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors, etc.).<br>FPP.02.03.01.a. Examine and explain the importance of food labeling to the consumer.<br>FPP.03.01.04.a. Identify and describe foods derived from different classifications of food products (e.g., meat, egg, poultry, fish, dairy, fruits, vegetables, grains, legumes, oilseeds, etc.).<br>FPP.03.02.03.a. Identify methods of food preservation and give examples of foods preserved by each method.<br>FPP.03.03.02.a. Examine the various paths food products take to get from food processing centers to consumers.<br>FPP.04.02.02.a. Identify and explain environmental and safety concerns about the food supply.<br>FPP.04.03.01.a. Examine and summarize the purposes of organizations that influence or regulate the food products and processing industry. |

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| **Common Core State Standards** | RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.<br>WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.<br>MP 4 Model with mathematics. |

**Supporting Standards**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | CS.03.04.01.a. Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools and equipment (e.g. PPE, etc.).<br>ABS.05.03.01.a. Identify and explain marketing principles used in AFNR businesses (e.g., 4 P's- product, place, price, promotion; attention, interest, desire, action, etc.). |
| **Common Core State Standards** | SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Identify and apply food safety procedures prior to, during and after food processing/preservation activities | • Identify and describe foodborne hazards and diseases<br>• Select and use appropriate food storage procedures<br>• Participate in a mock food safety scenario<br>• Research current foodborne outbreaks and discuss how these outbreaks affect human health | FPP.01.02.01.a.<br>FPP.01.02.04.a.<br>FPP.01.03.01.a.<br>RST.9-10.4<br>SL.9-10.4 |
| Discuss the food path from a farm to a processing facility then to the consumer | • Research and create a poster on where our food comes from--birth to harvest/seedling to vegetable<br>• Explore the transportation route from harvest to our table<br>• Research and report on who regulates our food | FPP.03.03.02.a.<br>FPP.04.02.02.a.<br>FPP.04.03.01.a.<br>RST.9-10.4<br>WHST.9-10.9<br>SL.9-10.4 |

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| Create and test a variety of food preservation products | • Make ice cream, pickles & butter<br>• Dehydrate fruit<br>• Design a food label for preserved products<br>• Taste test a variety of samples made by the class | FPP.02.02.02.a.<br>FPP.02.03.01.a.<br>FPP.03.01.04.a.<br>FPP.03.02.03.a.<br>CS.03.04.01.a.<br>ABS.05.03.01.a.<br>MP 4 |

**Vocabulary:**

| | | | | |
|---|---|---|---|---|
| Additive | Essential nutrient | Fungi | Food-borne illness | Dehydrate |
| Allergy | Lactose | Microorganism | Food contact surface | |
| Aroma | Preservative | Outbreak | Botulism | |
| Bacteria | Salmonella | Contamination | Canning | |
| Bitterness | Taste panel | Cross contamination | Critical temperature zone | |

**Assessments:**
Food Safety Quiz
Food Preservation Lab

**Connections to College/Career Readiness:**
Knowledge will help them with the Farm to Fork and Farm to Table class

**Resources/Materials:**
Serv Safe
Principles of Food Science textbook

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| Centers of Disease and Control<br>Ice cream maker<br>Butter maker<br>Dehydrator<br>Ingredients to make foods for preservation |

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|---|---|
| **Unit 2** | Introduction to Animal Science |
| **Essential Questions** | 1. Why are animals important to humans? |

**Priority Standards Assessed in Learning**

| | |
|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | AS.01.01.01.b. Evaluate and describe characteristics of animals that developed in response to the animal's environment and led to their domestication.<br>AS.02.01.02.a. Research and summarize the challenges involved in working with animals and resources available to overcome them (e.g., tools, technology, equipment, facilities, animal behavior signals, etc.).<br>AS.02.01.03.a. Distinguish between animal husbandry practices that promote animal welfare and those that do not.<br>AS.02.01.04.a. Identify domestic livestock and companion animal behaviors and list safety procedures for working with those species.<br>AS.06.01.01.b. Explain how animals are classified using a taxonomic classification system.<br>AS.06.01.02.a. Compare and contrast major uses of different animal species (e.g., agricultural, companion, etc.). |
| **Common Core State Standards** | RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. |

| Supporting Standards | |
|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | AS.01.02.01.a. Identify and categorize terms and methods related to animal production (e.g., sustainable, conventional, humanely raised, natural, organic, etc.)<br>AS.01.01.02.a. Research and summarize major components of animal systems (e.g., livestock, poultry, companion animals, etc.).<br>AS.06.01.03.a. Identify and summarize common classification terms utilized in animal systems (e.g., external and internal body parts, maturity, mature male, immature female, animal products, breeds, etc.).<br>AS.06.03.03.a. Research and summarize the use of products and by-products derived from animals. |
| **Common Core State Standards** | WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.<br>SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Demonstrate safety when working with and around Agri-Science program animals. | • Create a list of animal behaviors that indicate warning<br>• Compose a list of acceptable student behaviors when working with and around animals<br>• Provide basic husbandry to Agri-Science program animals<br>• Demonstrate basic handling techniques to allow for beginner level animal care | AS.02.01.02.a.<br>AS.02.01.03.a.<br>AS.02.01.04.a.<br>WHST.9-10.9 |
| Identify uses of animals. | • Define categories (food, clothing, other products, work/service, recreation, research) of animal uses within the animal science industry<br>• Conduct research to create lists of uses within the categories<br>• Play charades or pictionary to define specific uses of animals | AS.01.01.02.a.<br>AS.01.02.01.a.<br>AS.06.01.02.a.<br>AS.06.03.03.a. |
| Differentiate between natural and artificial selection. | • Explore the origins of animal domestication<br>• Exemplify artificial selection through the fish breeding activity<br>• Exemplify natural selection through the bean gathering activity | AS.01.01.01.b.<br>RST.9-10.4 |

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| | • Distinguish between animals that have been fully domesticated versus those that are tame<br>• Watch PBS documentary Dogs Decoded and facilitate group discussion on how dogs evolved from wolves using question prompts | |
| Demonstrate an understanding of animal science specific terminology. | • Complete animal terminology chart<br>• Prepare species specific slides to review types and breeds of animals in the Agri-Science program | AS.06.01.01.b.<br>AS.06.01.03.a.<br>RST.9-10.4<br>SL.9-10.4 |

**Vocabulary:**

| | | | | |
|---|---|---|---|---|
| Barrow | Doe | Heifer | Mare | Wether |
| Bitch | Drove | Hob | Parturition | Whelping |
| Boar | Ewe | Intact | Pullet | |
| Buck | Farrow | Jack | Queen | |
| Bull | Filly | Jenny | Ram | |
| Business | Foal | Jill | Spay | |
| Calf | Gelding | Kidding | Sounder | |
| Capon | Gestation | Kindling | Sow | |
| Castration (neuter) | Gib | Lactation | Stallion | |
| Clowder | Gilt | Lambing | Tom | |

**Assessments:**
Unit Quiz
Laboratory Activities
Animal Care Tasks

**Connections to College/Career Readiness:**
Knowledge from this course will prepare students for SAE, AG 2, 3, and 4 courses.

| **Resources/Materials:** |
|---|
| Chromebooks<br>Assignments<br>Quizzes<br>Safety equipment<br>Agri-Science program animals and facilities<br>Animal handling tools<br>PBS Documentary Dogs Decoded |

| **Unit 3** | Introduction to Natural Resources |
|---|---|
| **Essential Questions** | 1. What kinds of resources does the earth provide?<br>2. How can we responsibly use and maintain the earth's resources?. |

| **Priority Standards Assessed in Learning** |
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| **Connecticut Agriculture, Food, and Natural Resources Standards** | CS.03.04.03.a. Read and interpret operating instructions related to operation, storage and maintenance of tools and equipment related AFNR tasks.<br>NRS.01.01.01.a. Summarize and classify the different kinds of natural resources using common classification schemes (e.g., living versus nonliving, renewable versus nonrenewable, native versus introduced, etc.).<br>NRS.01.01.02.a. Summarize the components that comprise all ecosystems.<br>NRS.02.02.01.a. Summarize the relationship between natural resources, ecosystems and human activity.<br>NRS.03.02.01.a. Summarize how to use maps and technologies to identify directions and land features, calculate actual distance and determine the elevations of points.<br>NRS.04.01.03.a. Identify and categorize characteristics of a healthy wildlife habitat.<br>NRS.04.03.02.a. Identify and classify invasive species common to a particular region. |
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| **Common Core State Standards** | RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. |

**Supporting Standards**

| | |
|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | AS.01.02.04.b. Research and summarize local wildlife populations, challenges and ecological measures that are being utilized.<br>AS.01.02.04.c. Devise and evaluate plans to manage wildlife populations to achieve optimal ecological health.<br>NRS.01.02.07.b. Apply identification techniques to determine the types of non-living resources in an area.<br>NRS.01.06.02.a. Research and summarize examples of invasive species.<br>NRS.02.02.03.a. Examine and describe the manner in which modern lifestyles are related to the depletion of natural resources.<br>NRS.03.02.01.b. Apply cartographic skills and tools and technologies (e.g., land surveys, geographic coordinate systems, etc.) to locate natural resources.<br>NRS.03.03.03.a. Describe basic applications of global positioning systems in natural resources.<br>NRS.04.01.02.a. Identify and categorize characteristics of a healthy forest.<br>NRS.05.05.01.b. Demonstrate the proper use for the following tools in natural resources: GPS unit, diameter tape, telemetry unit, seines, aquatic net, water meter, animal tag or band, Biltmore stick, Secchi disk, analog refractometer, and hydrometer.<br>NRS.05.05.02.c. Demonstrate the safe use of tools, materials and equipment for use in natural resources |
| **Next Generation Science Standards** | HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. |
| **Common Core State Standards** | RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.<br>SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.<br>WHST.9-10.8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.<br>WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.<br>MP 2 Reason abstractly and quantitatively. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Identify and categorize natural resources, their possible uses and importance to the environment. | • View a video such as ESS3A - Natural Resources, noting key terms such as: natural resource, renewable, non-renewable, biotic and abiotic. Research and identify examples of each type and their uses.<br>• Walk the campus, writing down natural resources seen categorizing them as biotic or abiotic, renewable or nonrenewable.<br>• Harvest, process and use a natural resource product using resources such as Native Plant Dyes, Native Plant Materials, and Eat The Invaders. | CS.03.04.03.a.<br>NRS.01.01.01.a.<br>NRS.01.01.02.a.<br>NRS.01.02.07.b.<br>NRS.02.02.01.a.<br>NRS.02.02.03.a.<br>RST.9-10.3<br>RST.9-10.4<br>WHST.9-10.8<br>WHST.9-10.9 |
| Identify local plants, fungi and animals, their uses by humans and their interactions in the environment. | • Use field guides and online resources such as BirdNET Sound ID, USDA Plants Database and Connecticut Invasive Plant Working Group website to identify plants, fungi and animals in the field and their interactions with their environment..<br>• Survey the campus grounds for invasive species and take measures to control them.<br>• Use resources such as Snow Tracking 101 - Animal Tracks, Reading Animal Tracks in the Snow – February 7, 2022 or Key Common Mammal Tracks to identify wildlife tracks on campus and the adjacent Burton property.<br>• Studying online sources on wildlife habitat ( Wildlife Habitats \| Georgia Forests II, Wildlife Habitat \| Natural Resources Conservation Service ) to determine the habitat requirements of wildlife. Evaluate an area as a wildlife habitat. Identify positive and negative factors and suggest improvements.<br>• Setup and monitor trail cameras to monitor for the presence of wildlife and their use of resources in their habitat. | AS.01.02.04.b.<br>AS.01.02.04.c.<br>NRS.01.06.02.a.<br>NRS.04.01.02.a.<br>NRS.04.01.03.a.<br>NRS.04.03.02.a.<br>HS-LS2-7.<br>RST.9-10.3<br>RST.9-10.4<br>SL.9-10.4 |
| Utilize skills and tools needed to work in natural | • Conduct a scavenger hunt in which the clues to locations are | CS.03.04.03.a. |

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| resources | latitude and longitude coordinates. Use GPS units or phones with GPS apps to navigate to each of the locations.<br>• Study maps of the area around campus (How do I find, download, or order topographic maps? \| U.S. Geological Survey) identify key symbols and map characteristics and their meanings.<br>• Use maps to identify geographic features of interest : steep drops, water features, etc…. Using the map coordinates and GPS navigate to points on or near campus.<br>• Calculate pace factor ( Distance Measurement) and use pace to determine distance.<br>• Use a Biltmore stick to measure diameter at breast height. And harvestable logs. HOW TO USE A BILTMORE STICK<br>• Estimate the value of living trees. National Tree Benefit Calculator, i-Tree | NRS.01.02.07.b.<br>NRS.03.02.01.a.<br>NRS.03.02.01.b.<br>NRS.03.03.03.a.<br>NRS.05.05.01.b.<br>NRS.05.05.02.c.<br>RST.9-10.3.<br>RST.9-10.4.<br>SL.9-10.4<br>MP 2 |

**Vocabulary**

| | | | |
|---|---|---|---|
| Abiotic | Consumer | Heterotroph | Mast |
| Introduced | Diameter at breast height | Invasive | Producer |
| Autotroph | Decomposer | Native | Renewable |
| Biodiversity | Diameter tape | Natural resource | Trophic levels |
| Biltmore stick | Decomposer | Nonrenewable | |
| Biotic | Diameter tape | Noxious | |
| Carnivore | Food web | Omnivore | |

**Assessments:**
Field Work
Habitat Improvement Assessment
Unit Quiz

**Connections to College/Career Readiness:**

Knowledge from this course will prepare students for SAE, AG 2, 3, and 4 courses, provide skills needed to participate in Environmental and Natural Resources CDE and Forestry CDE and familiarize students with skills needed in careers within the environmental and natural resources sector.

**Resources/Materials:**
Campus grounds and the Burton Property (adjoining woodland)
USDA Plants Database website
Website: Connecticut Invasive Plant Working Group
Text: A Field Guide to Eastern Forests. Kricher and Morrison. Houghton Mifflin, 1998.
Text: A Field Guide to Trees and Shrubs. Petrides. Houghton Mifflin, 1972.
Text: A Field Guide to Mushrooms. McKnight and McKnight. Houghton Mifflin, 1987.
Equipment for measuring standing trees: Tape measures, Biltmore sticks, tree calipers and diameter measuring tape.
Topographic Maps of the area around campus and the Burton property.
Trail cameras, batteries, SD cards and card readers
Handheld GPS units or cell phones with GPS capability

| **Unit 4** | WorkSafe/SAE |
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| **Essential Questions** | 1. How do you stay safe working in the industry?<br>2. Why is it important to maintain records of agricultural work? |

**Priority Standards Assessed in Learning**

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| **Connecticut Agriculture, Food, and Natural Resources Standards** | CRP.10.02.02.a. Identify methods for setting goals for personal improvement and continuous growth in a career area (e.g., SMART goals, training, professional development, etc.).<br>CRP.10.04.02.a. Summarize common processes involved in pursuing a career (e.g., interviews, applications, networking, etc.) and the appropriate tools used for completing each.<br>CS.03.01.02.a. Summarize the importance of safety, health and environmental management in the workplace.<br>CS.03.01.01.a. Research and explain the implications of regulatory, safety and health standards on AFNR systems (e.g., SDS, |

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| | bioterrorism, etc.). |
| **Common Core State Standards** | WHST.9-10.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.<br>SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. |

**Supporting Standards**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | CRP.04.02.01.a. Research and summarize the purpose of different forms of written and visual communication in formal and informal settings (e.g., letters, emails, reports, social media, graphics, diagrams, etc.).<br>CS.03.03.04.c. Create a plan to mitigate the level of contamination or injury identified as a risk in the workplace.<br>CRP.06.02.01.a. Identify and categorize the types of processes and procedures used in workplaces and the community (e.g., health and safety, email, compliance, etc.). |
| **Common Core State Standards** | RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Prepare a plan for future SAE Programming. | ● Using the SAE planning sheet, write potential SAE projects, assistance and materials needed.<br>● Write a short term and a long term SMART goal for an SAE project.<br>● In writing, develop a plan for an SAE project that is a paid placement, unpaid placement, entrepreneurship, research or school-based project.<br>● Execute a planned SAE and using the SAE record book, document SAE hours, expenses and income | CRP.10.02.02.a.<br>CRP.10.04.02.a.<br>CRP.04.02.01.a.<br>WHST.9-10.4.<br>SL.9-10.4 |
| Identify workplace safety equipment and hazards | ● Working in a group, identify safety hazards, chemical hazards, biological hazards and zoonotic hazards in an | CS.03.01.02.a.<br>CS.03.03.04.c. |

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| | agricultural workplace.<br>● Play the Disaster Blaster board game<br>● Discuss how to control hazards on the job to promote a safe workplace.<br>● Read a workplace scenario and discuss the steps necessary to avoid a workplace emergency.<br>● Watch a video on hearing protection and determine the effects of not wearing protection can affect future years. | CS.03.01.01.a.<br>WHST.9-10.4.<br>SL.9-10.4<br>CRP.06.02.01.a. |
| Identify government agencies that enforce child labor laws and safety laws | ● Read and discuss the Child Labor Laws and how they apply to high school workers.<br>● Read given workplace scenarios and categorize them as ethical or unethical behaviors.<br>● Read the OSHA regulations for safety, health and the environment for the workplace.<br>● Discuss the importance of worker's compensation and how to obtain the insurance.<br>● Use a Venn diagram to compare and contrast OSHA regulations and the Child Labor Laws.<br>● Participate in the Labor Law Bingo Game<br>● Watch a video on safety laws with children. Determine laws that were broken and how the injured party has been affected. | CS.03.01.02.a.<br>CS.03.03.04.c.<br>CS.03.01.01.a.<br>WHST.9-10.4.<br>SL.9-10.4 |

**Vocabulary:**

| | | |
|---|---|---|
| Community Service | Income | Research |
| Biological Hazards | Injury | SAE |
| Chemical | Labor Laws | Safety |
| Disability | LED 21-23 | SDS |
| Discrimination | LED 75-1 | Unethical |
| Employment | Non-Profit | Unpaid |
| Entrepreneurship | OSHA | Virus |
| Ethical | Other Hazards | Volunteer |
| Expenses | Physical Hazards | WorkSafe |
| Hazard | Placement | Zoonotic |

**Assessments:**
Unit test
Disaster Blaster board game
SAE Quiz
SAE Planning sheet

**Connections to College/Career Readiness:**
Knowledge from this course will prepare students for SAE, AG 2, 3, and 4 courses.

**Resources/Materials:**
Chromebooks
Assignments
Quizzes
Safety equipment
theAET.com
Talking Safety Curriculum for Connecticut
Government websites on child labor laws

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| **Unit 5** | Introduction to Aquaculture |
| **Essential Questions** | 1. What are the techniques and methods used in the production of aquatic organisms?<br>2. What are the procedures and tasks that are necessary to maintain a healthy aquatic system? |

**Priority Standards Assessed in Learning**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources** | AQ.01.01.01.a. Identify and summarize the origin, significance, distribution and commercial importance of different aquatic Species.<br>AQ.02.01.02.a. Research and summarize the challenges involved in working with aquatic animals and resources available to |

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| **Standards** | overcome them (e.g., tools, technology, equipment, facilities, animal behavior signals, etc.).<br>AQ.03.01.02.a. Classify species of aquatic organisms as fresh water, marine, or diadromous, and by their genus and species<br>AQ.04.02.01.b. Compare and contrast desirable anatomical and physiological characteristics of aquatic plants and animals within and between species.<br>AQ.07.01.01.a. List and describe various hatchery systems; ponds, raceways, tanks, etc.<br>AQ.09.01.02.a. Identify equipment and handling facilities used in modern aquaculture production.<br>AQ.09.01.03.b. Explain the basic electrical, plumbing and mechanical components of aquaculture systems.<br>AQ.14.03.01.a. Identify water quality factors that are important in aquaculture systems.<br>AQ.14.03.06.c. Analyze management practices that will reduce TAN in aquaculture systems.<br>CS.03.04.01.a. Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools and equipment (e.g. PPE, etc.).<br>CS.03.04.03.a. Read and interpret operating instructions related to operation, storage and maintenance of tools and equipment related AFNR tasks. |
| **Common Core State Standards** | WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research. |

**Supporting Standards**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | AQ.05.02.01.a. Explain the importance of biosecurity to the aquaculture industry.<br>AQ.08.01.01.a. Describe the world's water supplies and discuss the many uses of water<br>AQ.09.01.01.a. Identify the following types of aquaculture systems: raceways, ponds, recirculating systems, and net pens or cages.<br>AQ.14.03.02.c. Demonstrate methods of correcting dissolved oxygen deficiency in aquaculture systems. |
| **Common Core State Standards** | RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.<br>MP 4 Model with mathematics. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Define aquaculture and describe its importance as a part of the agriculture industry. | • Identify the origins of aquaculture and its development through history. | AQ.01.01.01.a.<br>AQ.07.01.01.a. |

| | | |
|---|---|---|
| | • Identify and label common species and uses in aquaculture production.<br>• Discuss the importance of aquaculture within the agriculture industry. | AQ.08.01.01.a.<br>AQ.09.01.01.a. |
| Compare and contrast the methods and systems used in aquaculture. | • Identify and describe common aquaculture methods and species used in aquaculture.<br>• Compare and contrast the various methods of aquaculture. | AQ.07.01.01.a.<br>AQ.08.01.01.a.<br>AQ.09.01.01.a. |
| Identify common aquatic organisms and equipment used in aquaculture. | • List common aquaculture species and their uses.<br>• Identify species raised in the aquaculture lab and aquariums.<br>• Identify and explain the equipment used in an aquatic system. | AQ.01.01.01.a.<br>AQ.09.01.03.b. |
| Identify and demonstrate procedures to control and improve water quality in aquariums. | • Demonstrate safe and effective maintenance procedures on aquariums in relation to fish health and water quality.<br>• Work safely and efficiently in an aquaculture classroom and lab.<br>• Demonstrate appropriate techniques and proper equipment use in aquarium maintenance.<br>• Identify equipment used to run and maintain an aquarium. | AQ.02.01.02.a.<br>AQ.03.01.02.a. |
| Determine the health of a system based on the water quality results and the physical state of the system. | • Observe and discuss the potential factors that may lead to poor water quality in an aquatic system, specifically ammonia.<br>• Perform ammonia tests on designated aquariums.<br>• Write an analysis based on the water quality test and physical state of the system.<br>• Discuss the health of a system based on the physical state of an aquarium and ammonia test results.<br>• Diagnose and suggest solutions to common aquarium problems. | AQ.05.02.01.a.<br>AQ.14.03.01.a.<br>AQ.14.03.06.c.<br>AQ.14.03.02.c.<br>WHST.9-10.4 |
| Safely and successfully determine specific water parameters in an aquatic system through chemical water tests. | • Demonstrate safe water testing techniques during acquisition, procedure and disposal of water samples.<br>• Follow instructions in an ammonia test kit to determine the chemical levels in an aquarium. | AQ.14.03.01.a.<br>CS.03.04.01.a.<br>CS.03.04.03.a.<br>RST.9-10.4 |

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|---|---|---|
| | • Demonstrate safety through proper handling and use of safety equipment during water testing. | MP 4 |
| Identify safety hazards and proper handling of chemicals and solutions used in water testing through the use of Material Safety Data Sheets | • Identify SDS and discuss their importance.<br>• Locate SDS in the classroom.<br>• Identify the chemical properties and treatment of specific. chemicals used in water testing through SDS information. | CS.03.04.01.a.<br>CS.03.04.03.a. |
| Label, define and discuss the anatomical characteristics of a finfish | • Compare and contrast the anatomy of a fish to the other major animal groups.<br>• Label and define the external anatomical features of a finfish.<br>• Define the unique internal and external anatomical functions of a finfish. | AQ.03.01.02.a.<br>AQ.04.02.01.b.<br>WHST.9-10.4 |

**Vocabulary:**

Air Diffuser
Air Bladder
Algae Scraper
Ammonia
Aquaculture
Biological filtration
Carbon
Channel Catfish (*Ictalurus punctatas*)
Chemical filtration
Chemoreception
Chlorine
Dissolved Oxygen
External Power Filter
Filter Media
Gravel vacuum
Koi (*Cyrpinus rubrofuscus*)
Lateral Line
Mariculture
Safety Data Sheets (SDS)
Mechanical Filtration
Nile Tilapia (*Oreochromus niloticus*)
Rainbow Trout (*Oncorhynchus mykiss*)
Recirculating system
Siphon

**Assessments:**

Water Testing Safety Assessment
Assignments
Fish Identification Quiz
Practical Work Rubric
Unit Test
Aquarium Assessment

**Connections to College/Career Readiness:** Knowledge from this course will prepare students for AG 2, 3, and 4 aquaculture courses.

**Resources/Materials:**
Text: Aquaculture Science, Second Edition. Parker. Delmar, 2002
Water Test Kits
SDS Binder
Assorted Aquariums and Aquarium Species
Aquarium Maintenance Equipment
Production fish: Catfish, Koi, Trout and Tilapia
www.srac.msstate.edu - Southeastern Regional Aquaculture Center

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|---|---|
| **Unit 6** | Introduction to Horticulture |
| **Essential Questions** | 1. How do you identify the parts of a plant?<br>2. How do you design using plants? |

**Priority Standards Assessed in Learning**

| | |
|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | PS.02.01.02.a. Describe the morphological characteristics used to identify agricultural and herbaceous plants (e.g., life cycles, growth habit, plant use and as monocotyledons or dicotyledons, woody, herbaceous, etc.).<br>PS.02.02.01.a. Identify and describe the function(s) of the following plant parts: leaf, blade, petiole, flower, stamen, pistil, stem, nodes, roots, and root hairs.<br>PS.02.03.01.a. Summarize the importance of photosynthesis to plant life on earth and the process of photosynthesis, including the types (c3, c4, Cam), its stages (e.g., light-dependent and light independent reactions), and its products and byproducts.<br>PS.04.02.02.a. Research and summarize the principles and elements of design for use in plant systems.<br>CRP.10.01.02.a. Examine career clusters and identify potential career opportunities based on personal interests, talents, goals and preferences. |
| **Common Core State Standards** | WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.<br>SL.9-10-.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. |

**Supporting Standards**

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| **Connecticut Agriculture, Food, and Natural Resources Standards** | PS.01.04.01.a. Identify the essential nutrients for plant growth and development and their major functions (e.g., nitrogen, phosphorous, potassium, etc.).<br>PS.02.01.03.a. Explain the life cycle of annuals, biennials, and perennial plants.<br>PS.04.02.03.a. Identify and categorize tools used for design (e.g., computer landscape software, drawing tools, florist tools, etc.).<br>CRP.10.01.01.a. Determine personal interests, talents, goals and preferences for potential careers.<br>CRP.10.02.01.a. Categorize career advancement requirements for potential careers (e.g., degrees, certification, training, etc.). |
| **Common Core State Standards** | RST.9-10.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.<br>WHST.9-10.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Identify the difference between monocot plants and Dicot plants. | • Identify different plants as monocot or dicot based on their physical appearance.<br>• Sow monocot and dicot plants and track their growth differences<br>• Complete the Invent a Plant project which shows the characteristics of a monocot or dicot plant. | PS.02.01.02.a.<br>PS.02.02.01.a.<br>WHST.9-10.7<br>SL.9-10-.4<br>RST.9-10.4.<br>WHST.9-10.4. |
| Explain the different functions of plants. | • Identify the different male and female reproductive tracts through plant dissections.<br>• Complete a webquest on Photosynthesis.<br>• Draw the photosynthesis cycle. | PS.02.02.01.a.<br>PS.02.03.01.a.<br>PS.01.04.01.a.<br>WHST.9-10.7<br>SL.9-10-.4<br>RST.9-10.4.<br>WHST.9-10.4. |
| Create designs using plants. | • Complete a floral arrangement utilizing proper tools.<br>• Identify different landscaping techniques through the use of a webquest.<br>• Work on school gardens with learned landscaping techniques.<br>• Identify proper tools to be used in specified designs (landscape and floral design) | PS.04.02.02.a.<br>PS.01.04.01.a.<br>PS.02.01.03.a.<br>PS.04.02.03.a.<br>WHST.9-10.7<br>RST.9-10.4.<br>WHST.9-10.4. |
| Identify careers related to horticulture. | • Complete the career of the day project identifying horticultural careers.<br>• Showcase a career in a walk about presentation. | CRP.10.01.02.a.<br>CRP.10.01.01.a.<br>CRP.10.02.01.a.<br>WHST.9-10.7<br>SL.9-10-.4<br>RST.9-10.4.<br>WHST.9-10.4. |

**Vocabulary:**

| | | | |
|---|---|---|---|
| Annual | Flat | Perennial | Sprouting |
| Anther | Flower | Perfect Flower | Stamen |
| Biennial | Fruit | Petal | Stem |
| Carpel | Germination | Photosynthesis | Stigma |
| Cell packs | Growing Media | Pistil | Style |
| Cutting | Imperfect flower | Principles of Design | Vegetable |
| Dicotyledon | Monocotyledon | Respiration | Water Breaker |
| Elements of Design | Ovary | Root | |
| Filament | Ovule | Seeding | |

**Assessments:**
Invent a Plant project
Quizzes
Tracking Growth project
Lab Grades
Class Assignments

**Connections to College/Career Readiness:**
Knowledge from this course will prepare students for AG 2, 3, and 4 horticulture courses.

**Resources/Materials:**
Soil, plants, seeds, floral tools, landscaping tools
Paper
Growth charts
Colored pencils

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| **Unit 7** | Safe Operation of Ag Equipment |

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| **Essential Questions** | 1. What are the safety protocols during the pre-operation, operation and post operation of an agricultural machine?<br>2. What are the necessary skills needed to safely operate the controls and implements on a farm tractor? |

**Priority Standards Assessed in Learning**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | CS.06.02.01.a. Use proper safety practices/personal protective equipment.<br>PST.02.02.01.a. Identify power unit and equipment controls and instruments, along with their functions.<br>PST.02.02.01.b. Perform start-up and shut-down procedures on power units and equipment as specified in technical manuals.<br>PST.02.02.02.a. Perform pre-operation inspection according to manufacturers' specifications and/or prevailing industry standards.<br>PST.02.02.02.b. Demonstrate safe practices and regulations in the operation of power units and equipment. |
| **Common Core State Standards** | RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. |

**Supporting Standards**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | PST.03.01.01.a. Identify components and systems of internal combustion engines.<br>PST.03.01.02.a. Describe the operation of internal combustion engines by types of fuel used. |
| **Common Core State Standards** | WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|

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| Identify and discuss the safety hazards involved with working with farm equipment. | • List and describe the proper attire recommended for specific agricultural jobs and tasks.<br>• Identify the basic parts of and functions of a tractor's operational platform.<br>• Discuss the safety concerns during the operation of an agricultural machine and associated implements.<br>• Discuss and demonstrate the proper mounting, seating and dismounting of an agricultural machine | CS.06.02.01.a.<br>PST.02.02.01.a. |
| Identify and describe the differences between farm equipment and road vehicles, engine types and fuel types. | • Compare and contrast the farm tractor with automobiles and other familiar pieces of equipment.<br>• Describe in writing the difference between 2- stroke, 4-stroke and diesel fuels and the engines that use them.<br>• Determine the appropriate fuel mixtures and types based on engine type and application. | PST.02.02.01.a,<br>PST.03.01.01.a,<br>PST.03.01.02.a<br>WHST.9-10.4 |
| Identify the function of power, motion and implement controls and employ them appropriately in the operation of a farm tractor. | • Identify key controls of a tractor and describe their function.<br>• Identify and describe the function/warning of the key symbols and indicator lights on a typical tractor instrument panel.<br>• Perform key functions of motion such as starting, stopping, clutch use, stopping, steering control, throttle and implement movement. | PST.02.02.01.a |
| Perform a pre-operational and post operational inspection of a tractor, identifying and correcting any operation concerns or hazardous conditions. | • Perform a pre-operational safety inspection of a tractor including checking fluids, implements and surroundings.<br>• Perform a post operational safety inspection of a tractor including parking brake, implements and surroundings.<br>• Write both a pre and post operational checklist. | CS.06.02.01.a<br>PST.02.02.02.a.<br>WHST.9-10.4 |
| Safely and properly start a tractor, maneuver it through a course, stop, secure and shut down. | • Safely start a tractor and maneuver it through a course.<br>• Demonstrate operational skills such as steering, acceleration, deceleration, forward and reverse.<br>• Perform the proper operation of the clutch and brake for stopping and starting.<br>• Perform the proper operation of the tractor implements including the three point hitch and loader controls. | CS.06.02.01.a<br>PST.02.02.01.b.<br>PST.02.02.02.b<br>WHST.9-10.4 |

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| | • Formulate, in writing, an operator's checklist. | |
| Assess scenarios during tractor operation that may pose a safety risk to operators and bystanders. | • Identify hazardous conditions that might be encountered while operating a tractor and develop appropriate responses to eliminate or minimize risks.<br>• Read and respond to case studies and scenarios of tractor driving situations, evaluating the actions of the participants from the standpoint of safety | CS.06.02.01.a<br>PST.02.02.02.b<br>RST.0-10.4<br>WHST.9-10.4 |

**Vocabulary:**

2 Stroke Engine
4 Stroke Engine
Ammeter
Brake
Clutch
Compression
Coolant
Diesel Engine
Drawbar
Exhaust
Guard
Hydraulic
Ignition
Implement
Intake
Loader Control
Neutral
Parking Brake
PTO (Power Take Off)
ROPS (Roll Over Protection Structure)
RPM (Rotations Per Minute)
Shift Lever
SMV (Slow Moving Vehicle)
Transmission
Three Point Hitch
Throttle

**Assessments:**
Operators Checklists
Assignments
Skills Checklists for the Operation of Tractor
Operator Skills Rubric
Instrument Identification
Tractor Safety Scenarios
Unit Assessment

**Connections to College/Career Readiness:** Knowledge and skills gained from this course will prepare students for AG 2, 3, and 4 agricultural mechanics courses as well as other areas of agriculture associated with machine operation.

**Resources/Materials:**
Kubota and Ford Owner Manuals
Kubota and Ford Tractor
National Safe Tractor and Machinery Operation Program
Hazardous Occupations Safety Training In Agriculture Training Materials

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| **Unit 8** | Introduction to FFA |
| **Essential Questions** | 1. How will being a member of the FFA make me a better leader?<br><br>2. Which requirements do I need to meet in order to earn my greenhand degree? |

**Priority Standards Assessed in Learning**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | CRP.13.01.01.a. Recite and explain the FFA mission, motto, creed and code of ethics.<br>CRP.13.01.02.a. Identify important dates in FFA history.<br>CRP.13.01.03.a. Identify the components of the FFA emblem and FFA jacket.<br>CRP.13.01.04.a. Identify the different FFA degrees.<br>CRP.13.01.06.c. Demonstrate duties of any FFA Officer position.<br>CRP.13.01.07.c. Conduct an FFA Chapter or Committee meeting<br>CRP.13.02.01.a. Explain the purpose of using parliamentary procedure in FFA meetings |
| **Common Core State Standards** | RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.<br>SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. |

**Supporting Standards**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | CPR.13.01.01.c. Explore and participate in FFA opportunities.<br>CRP.13.01.05.a. Explain the components of a Program of Activities.<br>CRP.04.01.01.a. Identify and categorize strategies for ensuring clarity, logic, purpose and professionalism in verbal and non-verbal communication (e.g., vocal tone, organization of thoughts, eye contact, preparation, etc.). |
| **Common Core State Standards** | WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research. |

| Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Demonstrate knowledge and skills to meet the qualifications of the FFA Greenhand degree. | • Explain and describe basic information about the National FFA Organization, including the motto, mission, official dress, important historical dates, colors and the FFA salute<br>• Invite older students to model and explain official dress<br>• Play an FFA game such as FFA Jeopardy or FFA Who Wants to be a Millionaire<br>• Explain the significance of the FFA creed and recite it<br>• Explain how a portion of the FFA creed relates to your life<br>• Analyze and explain parts of the FFA emblem | CRP.13.01.01.a.<br>CRP.13.01.02.a.<br>CRP.13.01.03.a.<br>CRP.13.01.04.a.<br>CRP.13.01.05.a.<br>SL.9-10.4<br>WHST.9-10.9 |
| Demonstrate public speaking skills. | • Students perform opening and closing ceremonies and reflect upon their performance<br>• Describe FFA duties | CRP.13.01.06.c.<br>CRP.04.01.01.a.<br>RST.9-10.4<br>SL.9-10.4 |
| Explain and demonstrate specific principles of parliamentary procedure. | • Student learn basic elements of parliamentary law such that they can write an agenda and conduct a meeting<br>• Students perform skits of good and poor examples of FFA meetings | CRP.13.01.07.c.<br>CRP.13.02.01.a.<br>CRP.04.01.01.a. |
| Identify and explain the benefits of participating in different career and leadership development events. | • Students participate in mock FFA CDE and LDE contests | CPR.13.01.01.c.<br>CRP.04.01.01.a.<br>WHST.9-10.9 |

**Vocabulary:**
CDE (career development event)
Creed
Emblem
FFA
LDE (leadership development event)
Mission
Motto

Official Dress
Parliamentary Procedure
Salute
Stations

**Assessments:**
Greenhand Test
Quizzes
Public Speaking Rubrics

**Connections to College/Career Readiness:**
Knowledge from this course will encourage students to actively engage with FFA opportunities which are an integral part of an AgSci program.
CDE/LDE events help students develop content specific as well as transferable speaking and leadership skills

**Resources/Materials:**
FFA Manuals and/or handbooks
https://www.ffa.org/
FFA meeting supplies: US flag, officer station markers
Georgia Ag Ed Website Quiz Games - General

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|---|---|
| **Unit 9** | Introduction to Biotechnology |
| **Essential Questions** | 1. How is biotechnology used in agriculture?<br>2. How can you prepare for a career in biotechnology? |

**Priority Standards Assessed in Learning**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | BS.01.01.01.a. Research and summarize the evolution of biotechnology in agriculture.<br>BS.01.01.04.a. Compare and contrast the benefits and risks of biotechnology compared with alternative approaches to improving agriculture.<br>BS.02.02.02.a. Categorize and identify laboratory equipment according to its purpose in scientific research.<br>BS.02.04.01.a. Classify different types of personal protective equipment and demonstrate how to properly utilize the equipment.<br>BS.02.05.01.a. Differentiate types of organisms and demonstrate safe handling to maintain organism purity and personal safety (e.g., plant and animal tissue, cell cultures, microbes, etc.). |
| **Common Core State Standards** | WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.<br>RST.9-10.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. |

**Supporting Standards**

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|---|---|
| **Connecticut Agriculture, Food, and Natural Resources Standards** | BS.01.02.03.a. Explain the relationship between regulatory agencies and the protection of public interests such as health, safety and the environment.<br>BS.02.01.01.a. Compare and contrast common record-keeping methods used in a laboratory (e.g., paper notebook, electronic notebook, etc.). |

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| | BS.02.02.01.a. Identify, interpret, and implement standard operating procedures for laboratory equipment.<br>PS.02.02.01.b. Compare and contrast mitosis and meiosis.<br>AS.06.02.02.b. Analyze the processes of meiosis and mitosis in animal growth, development, health and reproduction. |
| **Common Core State Standards** | WHST.9-10.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. |

| Learning Objectives | Activities | CT AFNR, CCSS |
|---|---|---|
| Identify the uses of biotechnology in agriculture | ● Develop a timeline showing different biotechnology uses and how it has changed over time.<br>● Create a video explaining what a GMO is and how it differs from non-GMO plants and animals<br>● Create a poster project highlighting a biotechnology use in animals, plants, medicine or the environment | BS.01.01.01.a.<br>BS.01.01.04.a.<br>BS.01.02.03.a.<br>WHST.9-10.9<br>RST.9-10.4.<br>WHST.9-10.4. |
| Demonstrate proper use of biotechnology equipment | ● Identify and label all personal protective equipment and biotechnology equipment used.<br>● Identify cell structures using microscopes<br>● Extract and collect DNA using available equipment<br>● Complete a mini lab using standard operating procedures and complete a write up in your record book. | BS.02.01.01.a.<br>BS.02.02.01.a.<br>BS.02.02.02.a.<br>BS.02.04.01.a.<br>WHST.9-10.9<br>RST.9-10.4.<br>WHST.9-10.4. |
| Understand how DNA is utilized in biotechnology | ● Create a model comparing and contrasting plant and animal cells<br>● Explain the differences of mitosis and meiosis utilizing a mitosis and meiosis lab<br>● Present finding on how GMOs are created through the use of DNA replication | PS.02.02.01.b.<br>AS.06.02.02.b.<br>BS.02.05.01.a<br>WHST.9-10.9<br>RST.9-10.4.<br>WHST.9-10.4. |

**Vocabulary:**

Artificial Selection
Bioengineered
Biotechnology
Cloning
DNA
Electrophoresis
Genetic Engineering
Genetically Modified Organism
Meiosis
Microscopes
Micropipette
Mitosis
Mutagenesis

**Assessments:**
Unit assessment
Microscope lab
Equipment uses assessments

**Connections to College/Career Readiness:**
https://agexplorer.ffa.org/focus/biotechnology-systems
Objectives of this course align with those in the UConn ECE Fundamentals of Horticulture course that students can take for credit through Ag 3 and Ag 4 Plant System classes.

**Resources/Materials:**
Introduction to Biotechnology - William J. Thieman, Michael A Palladino
Genetics, Agriculture, and Biotechnology - Walter Suza
https://www.isaaa.org/resources/publications/agricultural_biotechnology/download/agricultural_biotechnology.pdf
https://www.usda.gov/topics/biotechnology/biotechnology-frequently-asked-questions-faqs
Microscope, Microscope slides
Gel electrophoresis kit and machine
Pipettes
Chromebooks
Test tubes

Approved by Instructional Council June 15, 2024

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