

AGRI-SCIENCE I

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. 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.

Title: Agri-Science I Supervised Agricultural Experience (SAE)

Overview:

SAE is an integral part of agricultural education. During Agri-Science I students begin to develop a plan for supervised work experience relating to their interests and career goals. All Agri-Science students must have an approved SAE program in place by July 1 at the start of the Agri-Science II year.

SAE advisors work with students, parents, work-site mentors, and employers to ensure student activities are appropriate and meet state child labor law requirements. All students work with their SAE advisors to complete the Universal Structured Work-Based Learning Plan. In addition, some students must complete the Connecticut Department of Labor forms LED 75-1 (Workplace Learning Experiences for Minor Students in Hazardous Occupations) or the LED 31-23 (Workplace Learning Experiences for Minor Students Ages 14 or 15 in Non-Hazardous Occupations), or Unpaid Work Experience forms.

Suggested Time:

On-going

Ledyard High School Expectations for Student Learning:

Employ problem solving skills effectively

Demonstrate critical thinking skills

Agriculture, Food, and Natural Resources Standards:

CS.06.02.01.a. Use proper safety practices/personal protective equipment.

CS.01.01.03.c. Implement an effective project plan.

CS.01.04.05.a. Practice self-discipline.

CS.02.03.03.b. Develop skills required for a specific career.

CS.02.04.02.c. Implement effective problem solving strategies.

CS.03.01.01.b. Select the appropriate form of technical and business writing or communication for a specific situation.

CS.03.02.03.b. Practice ethical behaviors.

CS.07.04.01.c. Apply general workplace safety precautions/procedures.

CS.08.01.01.c. Use tools and equipment appropriately to complete a specific task.

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

WHST.9-10.2a Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g. headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Develop an appropriate agriculturally related work experience aligned with student interest and career goals	<ul style="list-style-type: none"> • Research, develop, and implement plans for an agriculturally related work experience working with parents, mentors, and advisor • Follow all appropriate state and federal student labor, animal welfare, and environmental regulations 	CS.06.02.01.a. CS.01.01.03.c., CS.01.04.05.a., CS.02.03.03.b., CS.02.04.02.c., CS.03.01.01.b., CS.03.02.03.b., CS.07.04.01.c., CS.08.01.01.c. RST.9-10.4.
Keep accurate records	<ul style="list-style-type: none"> • Keep on-going records of activities, time, income, and expenses related to SAE • Document activities through photographs, video, and journal entries 	CS.03.01.01.b., WHST.9-10.2a

Vocabulary:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Community Service • Entrepreneurship • Expenses • Hazardous Occupations • Income • Liability • Non-Profit Entity | <ul style="list-style-type: none"> • Paid Placement • Placement • SAE • Scope • Structured Work-Based Learning Plan • Volunteer • Work-site Mentor |
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Assessments:

- Weekly record book reviews
- Monthly SAE summaries
- On-site visits

Resources/Materials:

- Binder
- SAE record sheets
- State Departments of Education and Labor student labor forms:
 - Structured Work-Based Learning Plan
 - LED 75-1 (Workplace Learning Experiences for Minor Students in Hazardous Occupations)
 - LED 31-23 (Workplace Learning Experiences for Minor Student Learners Ages 14 and 15 in Non-Hazardous Occupations)
 - Unpaid Work Experience in a Tax Exempt/Non-Profit Organization
- State and federal labor laws and regulations
- SAE rubrics

Title: Introduction to Agricultural Science

Unit Overview:

This unit is designed to introduce students to the Agri-Science program at Ledyard High School. Students will explore the relationships among components of agriculture by discussing the subject areas available through the program and participating in activities in each area offered by the program. Activities will familiarize students with the facility and educate them on the importance of working safely while performing tasks associated with agriculture.

Suggested Time: 10-12 days

Ledyard High School Expectations for Student Learning:

Read and write critically and effectively for a variety of purposes
Employ problem solving skills effectively

Agriculture, Food, and Natural Resources Standards:

- AS.06.01.01.a.** Discuss the dangers involved in working with animals.
- AS.01.01.01.a.** Identify the origin, significance, distribution and domestication of animal.
- NRS.01.02.01.b.** Identify trees and other woody plants.
- NRS.01.01.01.a.** Identify natural resources.
- NRS.02.01.01.b.** Demonstrate safety practices when working in an outdoor_environment.
- PS.04.01.01.a.** Define design and identify design elements.
- PS.04.01.02.a.** Discuss the applications of art in agriculture/horticulture.
- CS.02.03.01.a.** Explore various career interests/options.
- PST.01.03.01.a** Identify and demonstrate safe use and maintenance of measurement and layout tools.

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
- WHST.9-10.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
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Discuss and interpret each component of Agriculture Science Program	<ul style="list-style-type: none"> Define in writing each component of the Agri-Science program Compare and contrast the relationships between each program component. 	CS.02.03.01.a. NRS.01.01.01.a. WHST.9-10.4
Discuss and identify careers associated with specific areas of agriculture.	<ul style="list-style-type: none"> Complete a career explorer assignment specific to student interest using FFA.org career program. Discuss career paths including education, degrees, work experience, salary and career cluster. Identify various agricultural sectors during Big E scavenger hunt 	CS.02.03.01.a. RST.9-10.4 WHST.9-10.4
Identify and differentiate five native Connecticut tree species by fruit, flower, leave, bark and bud.	<ul style="list-style-type: none"> Nature hike in a stand of native hardwood tree species. Complete in-the-field notes on five native trees including leaf, bark and flower/cone. 	NRS.02.01.01.b. NRS.01.02.01.b WHST.9-10.4
Identify and discuss uses of 6 livestock species commonly used in agriculture	<ul style="list-style-type: none"> Visits to small and large animal facilities. Discussion on the origin, significance and species of livestock. In the field notes on species and use in agriculture. 	AS.06.01.01.a. AS.01.01.01.a WHST.9-10.4
Perform maintenance tasks to improve environmental conditions for domesticated animals.	<ul style="list-style-type: none"> Feed, water and spot clean animal stalls, kennels and cages in small and large animal facility. 	AS.06.01.01.b.
Identify and demonstrate three design elements of a round-mound centerpiece floral arrangement.	<ul style="list-style-type: none"> Identify and use common floral arrangement tools Create a floral centerpiece 	PS.04.01.01.a. PS.04.01.02.c
Demonstrate safe fish handling in an aquaculture lab.	<ul style="list-style-type: none"> Discuss safe handling of fish and aquaculture equipment Use safe handling techniques to correctly catch and handle aquaculture two production species. 	AS.06.01.01.b.
Discuss the importance of equipment sanitation	<ul style="list-style-type: none"> Outline and discuss potential dangers of 	AS.06.01.01.a.

in labs.	unsanitary and unsafe handling of aquatic species.	WHST.9-10.4
Identify safety features of an agricultural mechanics shop	<ul style="list-style-type: none"> • Visit to Agriculture Mechanics shop. • Identification of safety features, exits, and shop safety attributes. 	PST.01.03.01.a
Identify and safely use common hand tools in a wood shop	<ul style="list-style-type: none"> • Differentiate Softwood and Hardwood lumber • Safely Use Hammer and Framing Nails to fasten framing lumber 	PST.01.03.01.a

Vocabulary:

- Agricultural Mechanics
- Agriculture
- Animal Science
- Aquaculture
- Domestication
- Floriculture
- Horticulture
- Livestock
- Natural Resources
- Plant Science
- Re-Circulating system
- Sustainable agriculture

Assessments:

- Class participation rubric
- Project work rubric (Practical Activities)
- Career cluster computer assignment
- Tree identification in-the-field notes assignment
- Eastern States Exhibition scavenger hunt Quiz
- Quiz/Test

Resources/Materials:

- FFA.org, National FFA Website
- Text: Working in Horticulture. Richardson/Moore. Glencoe, 1991
- Text: Aquaculture Science, Second Edition. Parker. Delmar, 2002
- Text: Wildlife and Natural Resource Management; Thompson, Delmar Learning; 2003
- Text: Animal Science
- Agriculture Mechanics Equipment: Safety Glasses, Hammer, Hand Drill, Nails, Screws and Hand Saw
- Floral Materials: pompoms, leather leaf, carnations, Aster, design bowl, floral foam, floral shears
- Aquaculture Production Species: Channel Catfish, Tilapia
- Aquaculture Equipment: equipment sanitation liquid, Production Net, PVC Aprons
- Animal Species

Title: Introduction to FFA and Leadership Development

Unit Overview: The FFA is a national organization that “promotes premier leadership, personal growth and career success through agricultural education”. This unit is designed to introduce students to the National FFA Organization as an integral component of the Agri-Science program and to impress upon new students the opportunities and benefits of taking an active role in the organization.

Suggested Time: 10 – 12 days

Ledyard High School Expectations for Student Learning:

Speak clearly and communicate ideas accurately in a variety of settings.

Agriculture, Food, and Natural Resources Standards:

CS.01.01.04.b. Use appropriate and reliable resources to complete an action or project.

CS.01.02.02.b. Utilize communication skills to collaborate in a group setting.

CS.01.03.04.b. Demonstrate consensus building.

CS.01.05.02.a. Identify civic leadership role opportunities

CS.01.06.05.a. Describe the value of being a life-long learner and the need for continuous development.

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

WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

SL 9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Identify important historical and current facts regarding the history and status of the FFA in the country, in Connecticut, and in the local agriculture center	<ul style="list-style-type: none"> • Describe in writing how the FFA has influenced agriculture and agriculture education in the United States • Discuss the significance of the FFA Creed and colors • Recite the FFA Salute • Describe and explain the meaning of the various components of the FFA Emblem • Interpret the FFA mission, motto, and FFA Code of Ethics and their application to daily life • Describe official dress a member would wear 	CS.01.02.02.b., CS.01.05.02.a., CS.01.06.05.a., RST.9-10.4, WHST.9-10.4, SL 9-10.6
Run mock FFA meetings	<ul style="list-style-type: none"> • Recite the part in the FFA opening ceremony in which all members respond to the president in unison • Identify FFA leadership positions and the role of each • Demonstrate basic parliamentary abilities 	CS.01.02.02.b., CS.01.03.04.b, CS.01.05.02.a., RST.9-10.4, SL 9-10.6
Complete an application for FFA Chapter Greenhand Degree	<ul style="list-style-type: none"> • Interpret the FFA mission and motto and explain their application to daily life • Discuss the meaning of the FFA Creed • Name the FFA colors and cite their significance • Recite the FFA Salute • Describe and explain the meaning of the various components of the FFA Emblem • Develop a written plan for a Supervised Agricultural Experience 	CS.01.02.02.b., RST.9-10.4, WHST.9-10.4, SL 9-10.6
Demonstrate the importance of becoming involved in leadership activities	<ul style="list-style-type: none"> • List three major advantages of becoming a member of the FFA • Participate in at least one FFA meeting or activity 	CS.01.05.02.a., CS.01.06.05.a., RST.9-10.,4 WHST.9-10.4

Vocabulary:

- Career Development Event (CDE)
- FFA
- FFA Creed
- FFA Emblem
- Parliamentary Procedure
- Supervised Agricultural Experience (SAE)

Assessments:

- Quizzes and test
- Class participation rubric
- Participation in mock meeting and parliamentary procedure practice
- Completion of history worksheet
- Greenhand Degree application

Resources/Materials:

- Official FFA Manual
- The FFA Student Handbook
- Chapter and State Officers
- FFA jackets, ties, and scarves
- www.ffa.org
- www.ctffa.org
- www.caaonline.org

Title: Introduction to Animal Science

Overview:

This unit is designed to introduce students to the science of animals. It begins to place animals as the focus of study and to provide students with the basics of how animals work. After looking at simply the correct names for animals at various stages of life, it moves to the fundamentals of animal nutrition and reproduction. It also includes an introduction to safety and management of various species.

Suggested Time:

10 – 12 days

Ledyard High School Expectations for Student Learning:

Employ problem solving skills effectively
Employ effective research and study skills

Agriculture, Food, and Natural Resources Standards:

- CS.06.02.01.a.** Use proper safety practices/personal protective equipment.
- CS.08.01.01.c.** Use tools and equipment appropriately to complete a specific task.
- AS.02.01.01.a.** Explain the importance of the binomial system of nomenclature
- AS.02.02.06.a.** Describe the functions of the animal body systems and system components.
- AS.03.01.01.a.** Explain methods of determining animal health and disorders.
- AS.03.01.02.a.** Identify common diseases, parasites and physiological disorders that affect animals.
- AS.03.01.03.a.** Explain characteristics of causative agents and vectors of diseases and disorders in animals.
- AS.03.01.05.a.** Identify and describe zoonotic diseases.
- AS.04.01.01.a.** Compare and contrast common types of feedstuffs and the roles they play in the diets of animals.
- AS.05.01.01.a.** Explain the male and female reproductive organs of the major animal species.

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

WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Work safely and efficiently around domestic animals	<ul style="list-style-type: none"> • Move animals in and out of pens or cages • Feed animals and change water • Spot clean an animal stall • Demonstrate tying a quick release/safety knot 	CS.06.02.01.a. CS.08.01.01.c.
Identify key species of livestock and poultry	<ul style="list-style-type: none"> • Identify various agriculturally important animals • Explain in writing the importance of the binomial system of nomenclature • Differentiate between a dairy cow and a beef animal 	AS.02.01.01.a. AS.02.02.01.a. AS.02.02.06.a. WHST.9-10.4
Identify basic characteristics of animal cells, tissues, organs and body systems	<ul style="list-style-type: none"> • Describe the functions of the animal body systems and system components. 	WHST.9-10.4
Demonstrate knowledge of the anatomy and physiology of animals	<ul style="list-style-type: none"> • On a picture and a live animal identify key external anatomical features • Identify and describe the function of the organs of the mono-gastric, poly-gastric, pseudo-ruminant and avian digestive tracks. • Compare and contrast two different kinds of animal feed • Identify and give the function of the male and female reproductive tracts. 	AS.02.02.06.a. AS.04.01.01.a. AS.05.01.01.a. WHST.9-10.4

Recognize the indicators of health and disease in animals.	<ul style="list-style-type: none"> Identify the vital signs of various species of domestic livestock. Write a description of a healthy animal. 	AS.03.01.02.a. AS.03.01.03.a. AS.03.01.05.a. WHST.9-10.4
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Vocabulary:

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| <ul style="list-style-type: none"> Absorption Band Barrow Boar Bovine Buck Buck Kid Bull Bullock Calf Caprine Castration Colt Concentrate Cow Digestion Doe | <ul style="list-style-type: none"> Doe Kid Drove Equine Estrous cycle Estrus Ewe Ewe Lamb Filly Flock Foal Gelding Gilt Heifer Herd Kid Lactation Lamb | <ul style="list-style-type: none"> Mare Metabolism Ovine Ovulation Parturition Piglet Ram Ram Lamb Roughage Shoat Sow Stallion Steer Swine Taxonomy Weaning Wether |
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Assessments:

- Quizzes
- Unit Test
- Quick Release/ Safety Knot assessment

Resources/Materials:

Ensminger, M.E.; Animal Science; 1990

Cullison; Livestock Management; 2012

Barn livestock and poultry

Rope, halters, shovels, forks

Title: Introduction to Horticulture

Overview:

In this introduction to plant science students will review principles such as photosynthesis and learn new principles relating to growth of plants and their uses. Basic plant anatomy and physiology is presented as a critical component to further study and application of horticulture. Students will apply what they have learned in this unit by caring for plants in the Agri-Science greenhouse.

Suggested Time:

10 – 12 days

Ledyard High School Expectations for Student Learning:

Employ problem solving skills effectively

Agriculture, Food, and Natural Resources Standards:

CS.01.01.01.a Work productively with a group or independently.

CS.06.02.01.a. Use proper safety practices/personal protective equipment.

PS.01.02.02.a. Identify the components, the types and the functions of plant roots.

PS.01.02.03.a. Identify the components and the functions of plant stems.

PS.01.02.04.a. Discuss leaf morphology and the functions of leaves.

PS.01.02.05.a. Identify the components of a flower, the functions of a flower and the functions of flower components.

PS.01.02.06.a. Explain the functions and components of seeds and fruit.

PS.03.01.02.a. Demonstrate sowing techniques and provide favorable conditions for seed germination.

PS.03.02.01.a. Explain the importance of starting with pest- and disease-free propagation material.

PS.03.02.03.a. Demonstrate proper planting procedures and post-planting care.

PS.01.03.01.b. Explain requirements necessary for photosynthesis to occur and identify the products and byproducts of photosynthesis.

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

WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Work safely and efficiently in greenhouses, potting room, and lab	<ul style="list-style-type: none"> • Start seeds in open flats and cells; transplant seedlings into appropriate cell packs • Select and take cuttings of plants using stems and leaves 	CS.01.01.01.a., CS.06.02.01.a. PS.03.01.02.a., PS.03.02.01.a., PS.03.02.03.a. PS.03.01.02.a., PS.03.02.03.a
Apply knowledge of plant anatomy and functions of plant structures	<ul style="list-style-type: none"> • Identify plant parts and their functions • Create a table to compare the processes of photosynthesis and respiration • Read seed packages to determine appropriate seeding methods • Start seeds in open flats and cells; transplant seedlings into appropriate cell packs • Create an imaginary plant given general habitat information • Start seeds in open flats and cells; transplant seedlings into appropriate cell packs • Select and take cuttings of plants using stems and leaves 	PS.01.02.01.a., PS.01.02.02.a., PS.01.02.03.a., PS.01.02.05.a., PS.01.02.06.a PS.01.03.01.b., PS.03.01.02.a., PS.03.01.02.a., PS.03.02.01.a., PS.03.02.03.a. PS.03.02.04.a. RST.9-10.4., WHST.9-10.4
Keep accurate records	<ul style="list-style-type: none"> • Create a table to document and compare the germination of corn and bean seeds • Track plant growth • In a brief paragraph compare the germination and sprouting of bean and corn seeds 	RST.9-10.4., WHST.9-10.4

Vocabulary:

- Anther
- Cell packs
- Cutting
- Dicotyledon
- Filament
- Flat
- Flower
- Fruit
- Germination
- Growing media
- Imperfect flower
- Monocotyledon
- Ovary
- Ovule
- Perfect flower
- Petal
- Photosynthesis
- Pistil
- Respiration
- Root
- Seedling
- Sprouting
- Stamen
- Stem
- Stigma
- Stock plant
- Style
- Vegetable
- Water break

Assessments:

- Quizzes
- Unit test
- Class participation/lab activities
- Fruit vs. vegetable assignment
- Bean and corn seed germination table
- Class assignments
- Project: Invent-a-Plant

Resources/Materials:

- Text: Working in Horticulture. Richardson/Moore. Glencoe, 1991
- Supplemental materials from Cooperative Extension on fertilizing and propagating
- Assorted fruits and flowers for dissection (preferably lily, apple, strawberry)
- Assorted rooting and growing media
- Plastic flats & cell packs
- Floral shears and knives
- Rooting hormone
- Seeds, stock plants, seedlings

Title: Introduction to Aquaculture

Unit Overview: Introduction to Aquaculture is a broad overview of the uses, techniques and methods used in production and commercial aquaculture. Students use practical application to support instruction such as water testing, monitoring the health of aquarium systems, and performing basic maintenance such as cleaning, changing filters and changing the water of the school aquariums.

Suggested Time: 10-12 days

Ledyard High School Expectations for Student Learning:

Read and write critically and effectively for a variety of purposes
Employ problem solving skills effectively

Agriculture, Food, and Natural Resources Standards:

- CS.01.01.01.a.** Work productively with a group or independently.
- CS.06.02.01.a.** Use proper safety practices/personal protective equipment.
- AS.01.01.01.a.** Identify the origin, significance, distribution and domestication of animal.
- AS.02.01.01.a.** Explain the importance of the binomial system of nomenclature.
- AS.02.01.02.a.** Identify major animal species by common and scientific names.
- AS.03.01.01.a.** Explain methods of determining animal health and disorders.
- AS.08.02.01.a.** Identify optimal environmental conditions for animals.
- AS.06.01.01.b.** Outline safety procedures for working with animals by species.
- ESS.04.03.02.b.** Define source water assessment steps.
- ESS.04.05.01.a.** Identify types of hazardous materials.
- NRS.01.02.04.a.** Describe morphological characteristics used to identify aquatic species.
- NRS.03.01.10.a.** Identify uses of aquatic species.

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

WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Define aquaculture and describe its importance as a part of the agriculture industry.	<ul style="list-style-type: none"> • Identify the origins of aquaculture and its development through history • Identify and label common species and uses in aquaculture production 	AS.02.01.01.a., AS.06.01.01.b., AS.08.02.01.a. WHST.9-10.4
Discuss the primary uses of aquatic species in aquaculture.	<ul style="list-style-type: none"> • Compare and contrast the methods and purposes of raising aquatic species 	AS.01.01.01.a. , AS.02.01.01.a. NRS.03.01.10.a. WHST.9-10.4
Compare and contrast the methods and systems used in aquaculture.	<ul style="list-style-type: none"> • Describe common aquaculture methods and species used in aquaculture 	AS.02.01.02.a.
Identify and demonstrate procedures to control and improve water quality in aquariums.	<ul style="list-style-type: none"> • Demonstrate safe and effective maintenance procedures on aquariums in relation to fish health and water quality. • Work safely and efficiently in an aquaculture classroom and lab • Demonstrate appropriate techniques and proper equipment use in aquarium maintenance 	CS.01.01.01.a., AS.08.02.01.a.,
List and discuss sources, formation and signs of ammonia in a closed system.	<ul style="list-style-type: none"> • Outline factors and sources that cause high ammonia levels in closed systems 	WHST.9-10.4
Safely and successfully determine the level of chemicals in an aquaculture system through water testing.	<ul style="list-style-type: none"> • Use ammonia test kit to determine the level ammonia in an aquarium • Perform safe techniques during acquisition, procedure and disposal of water sample • Ammonia testing assignment and assessment 	ESS.04.03.02.b. CS.06.02.01.a. RST.9-10.4

	of water test	
Determine the health of a system based on the water quality results and the physical state of the system.	<ul style="list-style-type: none"> • Perform ammonia tests on designated aquariums. • Write an analysis based on water quality test and physical state of system • Discuss the health of a system based on physical state of an aquarium and ammonia test results 	ESS.04.03.02.b AS.03.01.01.a. WHST.9-10.4
Identify safety hazards and proper handling of chemicals and solutions used in water testing through the use of Material Safety Data Sheets	<ul style="list-style-type: none"> • Locate MSDS in classroom • Identify the chemical properties and treatment of specific chemicals used in water testing through MSDS 	ESS.04.05.01.a. CS.06.02.01.a. RST.9-10.4 WHST.9-10.4
Label and define the external anatomy of the finfish	<ul style="list-style-type: none"> • Label the external anatomy of a finfish • Define the external anatomical functions of a finfish 	NRS.01.02.04.a WHST.9-10.4
Demonstrate proper and safe handling techniques of finfish	<ul style="list-style-type: none"> • Visit aquaculture lab to identify production species • Catch and safely handle production species 	AS.06.01.01.b. NRS.01.02.04.a.
Outline the primary types of filtration used in re-circulating systems.	<ul style="list-style-type: none"> • Compare mechanical and biological filtration • Demonstrate proper techniques when cleaning and replacing filter pads in aquariums 	AS.06.01.01.b. RST.9-10.4 WHST.9-10.4

Vocabulary:

- Algae Scraper
- Ammonia
- Aquaculture
- Biological filtration
- Channel Catfish (*Ictalurus punctatus*)
- Chemical filtration
- Dissolved Oxygen
- Gravel vacuum
- Koi (*Cyprinus carpio*)
- Mariculture
- Material Data Safety Sheets (MSDS)
- Mechanical Filtration
- Nile Tilapia (*Oreochromus niloticus*)
- Production species
- Re-Circulating system
- Siphon

Assessments:

- Water Testing Safety Rubric
- Ammonia Assignment
- Water Analysis Assignment
- Fish Identification Quiz
- Practical Work Rubric: Aquarium Maintenance
- Unit Test
- Class Participation Rubric
- Aquarium Task List

Resources/Materials:

- Text: Aquaculture Science, Second Edition. Parker. Delmar, 2002
- Water Test Safety Rubric
- Water Test Kits
- Safety goggles
- MSD sheets
- Assorted Aquariums and tropical Aquarium Species
- Aquarium Maintenance Equipment
- Production fish: Catfish and/or Tilapia
- www.srac.msstate.edu - Southeastern Regional Aquaculture Center

Title: Safe Operation of Agricultural Equipment

Unit Overview: This unit provides an introduction to the safe operation of farm equipment. Emphasis is given to safety protocols for equipment operation and practical operating skills.

Suggested Time: 10-12 days

Ledyard High School Expectations for Student Learning:

Read and write critically and effectively for a variety of purposes
Employ problem solving skills effectively

Agriculture, Food, and Natural Resources Standards:

- CS.06.02.01.a.** Use proper safety practices/personal protective equipment.
- PST.02.02.01.a.** Identify power unit and equipment controls and instruments, along with their functions.
- PST.02.02.01.b.** Perform start-up and shut-down procedures on power units and equipment as specified in technical manuals.
- PST.02.02.02.a.** Perform pre-operation inspection according to manufacturers' specifications and/or prevailing industry standards.
- PST.02.02.02.b.** Demonstrate safe practices and regulations in the operation of power units and equipment.
- PST.03.01.01.a.** Identify components and systems of internal combustion engines.
- PST.03.01.02.a.** Describe the operation of internal combustion engines by types of fuel used.

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
- WHST.9-10.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Identify design features that make farm tractors suitable for tasks other than transportation.	<ul style="list-style-type: none"> • Compare and contrast the farm tractor with automobiles and other familiar pieces of equipment. 	<ul style="list-style-type: none"> • PST.02.02.01.a, • PST.03.01.01.a, • PST.03.01.02.a
Describe the differences between 2-stroke, 4-stroke, and diesel engines to determine fuels type and mixture.	<ul style="list-style-type: none"> • Describe in writing the difference between 2-stroke, 4-stroke and diesel fuels and the engines that use them. • Determine the appropriate fuel to put into the fuel tank. 	<ul style="list-style-type: none"> • PST.03.01.02.a • WHST.9-10.4
Identify the function of power, motion and implement controls and employ them appropriately in the operation of a farm tractor.	<ul style="list-style-type: none"> • Identify key controls of a tractor and describe their function. • Perform key functions of motions such as starting, stopping, clutch use, stopping, steering control, throttle and implement movement. 	<ul style="list-style-type: none"> • PST.02.02.01.a
Perform a pre-operation inspection of a tractor, identifying and correcting any operation concerns or hazardous conditions	<ul style="list-style-type: none"> • Perform a pre-operational safety inspection of a tractor including checking fluids, implements and surroundings. • Formulate, in writing, a pre operation checklist 	<ul style="list-style-type: none"> • CS.06.02.01.a • PST.02.02.02.a. • WHST.9-10.4
Safely start a tractor, maneuver it through a course which requires both forward and backward motion, stop and shut the engine down properly	<ul style="list-style-type: none"> • Safely start a tractor, maneuver it through a course which requires both forward and backward motion, stop and shut the engine down properly. • Perform the proper operation of the clutch and brake for stopping and starting. • Formulate, in writing, an operators checklist • Formulate, in writing, a post operation checklist 	<ul style="list-style-type: none"> • CS.06.02.01.a • PST.02.02.01.b. • PST.02.02.02.b • WHST.9-10.4
Explain conditions which might cause tractor indicator lights to go on and describe appropriate operator responses	<ul style="list-style-type: none"> • Identify and describe the meaning of symbols which are found on the tractor • Explain conditions which might cause console indicator lights to go on and describe appropriate operator responses. While operating a farm tractor, identify console lights 	<ul style="list-style-type: none"> • PST.02.02.01.a • PST.03.01.01.a • RST.9-10.4

	that are lit and take appropriate actions in response to them.	
Identify situations during tractor operation that may pose a safety risk to operators and bystanders.	<ul style="list-style-type: none"> Identify hazard conditions that might be encountered while operating a tractor and appropriate responses to eliminate or minimize risks. Read and respond to case studies of tractor driving situations, evaluating the actions of the participants from the standpoint of safety. 	<ul style="list-style-type: none"> PST.02.02.02.b RST.0-10.4 WHST.9-10.4 CS.06.02.01.a

Vocabulary:

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| <ul style="list-style-type: none"> 2 Stroke Engine 4 Stroke Engine Ammeter Brake Clutch Compression Coolant Diesel Engine | <ul style="list-style-type: none"> Drawbar Exhaust Guard Hydraulic Ignition Implement Intake Neutral | <ul style="list-style-type: none"> Parking Brake PTO (Power Take Off) ROPS (Roll Over Protection Structure) RPM (Rotations Per Minute) Shift Lever SMV (Slow Moving Vehicle) Transmission |
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Assessments:

- Pre-operation/Operators/Post Operation Checklist
- Directed Notes Safety Assignment
- Similarities and Differences Assignment
- Identifying Hazards Assignment
- Skills Checklist for Operation
- Course 1 Operators Rubric
- Course 2 Operators Assessment
- Symbol/Instrument Identification Assignment
- Unit Test
- Class Participation Rubric

Resources/Materials:

- National Safe Tractor and Machinery Operation Program found at <http://extension.psu.edu/business/ag-safety/youth-safety/national-safe-tractor-and-machinery-operation-program>
- Agricultural Mechanics texts:
 - Agricultural Mechanics: Fundamentals and Applications – Chapter 4
 - Agricultural Power and Machinery – Units I, II and IV
- EASTERN REGIONAL FFA SAFE TRACTOR OPERATING CAREER DEVELOPMENT EVENT guidelines found at http://www.caaeonline.org/CAAE/FFA_CDE_Handbook_files/safe%20tractor.pdf

Title: Introduction to Natural Resources

Overview:

This unit is an introduction to the principles involved in natural resource management. Emphasis is given to developing knowledge and skills required for successful careers in Natural Resources and Environmental Systems.

Suggested Time:

10 – 12 days

Ledyard High School Expectations for Student Learning:

Employ problem solving skills effectively
Employ effective research and study skills

Agriculture, Food, and Natural Resources Standards:

- CS.01.01.01.a** Work productively with a group or independently.
- CS.06.02.01.a.** Use proper safety practices/personal protective equipment.
- NRS.02.01.01.b.** Demonstrate safety practices when working in an outdoor environment.
- NRS.01.01.01.b.** Differentiate between renewable and nonrenewable natural resources.
- NRS.01.01.02.b.** Describe the interdependence of organisms within an ecosystem.
- NRS.01.02.01.b.** Identify trees and other woody plants.
- NRS.02.04.03.a.** Identify characteristics of a healthy wildlife habitat.
- NRS.02.06.05.a.** Describe the processes associated with ecological succession.
- NRS.02.06.08.b.** Describe the impact of pollution on natural resources.
- NRS.02.06.09.a.** Describe climatic factors that influence natural resources.

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
- WHST.9-10.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Demonstrate forestry biometric skills	<ul style="list-style-type: none"> • Measure merchantable height and diameter to determine tree volume of a standing tree. • Utilize standard volume table to determine volume of measured trees 	CS.01.01.01.a CS.06.02.01.a NRS.02.01.01.b RST.9-10,4
Describe the interrelationships of biotic and abiotic components within ecosystems	<ul style="list-style-type: none"> • Compare and contrast softwood and hardwood including the types of trees yielding them • Describe basic food requirements of common wildlife • Create a table to compare and contrast carnivores, herbivores and omnivores • Compare and contrast ruminant and non-ruminants • Compare and contrast generalists and specialists • Identify various sources of food for wild animals in Connecticut • Research a Connecticut mammal and create a poster to include taxonomy, range, habitat, territory, cover, food, and water needs, and identifying tracks and scat 	NRS.01.01.01.b NRS.01.01.02.b. NRS.01.02.01.c., NRS.02.01.01.b, NRS.02.04.03.a. NRS.02.06.05.a NRS.02.06.08.b. NRS.02.06.09.a. RST.9-10,4 WHST.9-10.4
Articulate the importance of environmental stewardship	<ul style="list-style-type: none"> • Write a brief paragraph describing the role of habitat destruction on wildlife populations • Measure merchantable height and diameter to determine tree volume of a standing tree 	

Vocabulary:

- Biosphere
- Board foot volume
- Carnivore
- Coniferous
- Cover
- Deciduous
- Diameter
- Ecological succession
- Genus
- Habitat
- Habitat destruction
- Habitat improvement
- Herbivore
- Mammal
- Merchantable height
- Natural Resource
- Omnivore
- Predator
- Prey
- Range
- Raptor
- Ruminant
- Scat
- Species
- Stewardship
- Territory
- Track
- Wildlife sign

Assessments:

- Quizzes
- Tree volume assessment
- Class participation rubric
- Unit Test
- Mammal Project

Resources/Materials:

- Connecticut Department of Energy and Environmental Protection (DEEP) www.ct.gov/deep/
- Deal, Kevin H.; Wildlife and Natural Resource Management; Thompson, Delmar Learning; 2003
- Cruising sticks
- Tree calipers
- Timber cruising stick
- Tree volume tables

Title: Work Safe/ SAE

Unit Overview: This unit provides an introduction to the impact a job injury can have on a young person's life. Students will develop an understanding of the common health and safety hazards that teens may face on the job, and explain measures that can reduce or eliminate hazards at the workplace. OSHA regulations and the Child Labor Laws will be discussed in depth to make the students more knowledgeable about handling workplace emergencies, their legal rights on the job, worker's compensation benefits and the discrimination and disability acts. Students will also develop skills to effectively communicate with their employer or co-workers if a problem arises at work. All students will plan and execute their Supervised Agricultural Experience program.

Suggested Time: 10 – 12 days

Ledyard High School Expectations for Student Learning:

Employ problem-solving skills effectively

Agriculture, Food, and Natural Resources Standards:

- CS.01.01.01.a** Work productively with a group or independently
- CS.01.01.03.a** Exhibit good planning skills for a specific task or situation
- CS.01.01.07.a** Set personal goals using the SMART goals method
- CS.03.02.03.a** Differentiate between ethical and unethical behavior
- CS.06.03.01.a** Demonstrate the importance of safety, health, and environmental practices in the workplace
- CS.06.04.01.a** Determine the level of contamination or injury that would be considered a risk as associated with a specific job or activity
- CS.07.02.01.a** Inform others how to avoid placing oneself in hazardous work situations
- CS.07.04.01.a** Research applicable regulatory and safety standards (e.g. MSDS)

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.
- WHST.9-10.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose and audience.

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Plan and execute an SAE program	<ul style="list-style-type: none"> • Using the SAE planning sheet, write potential SAE projects, assistance and materials needed. • Write a short term and a long term SMART goal for SAE project. • In writing, develop a plan for an SAE project that is a paid placement, unpaid placement, entrepreneurship, research or school-based project. • Execute a planned SAE and using the SAE record book, document SAE hours, expenses and income. 	CS.01.01.01.a CS.01.01.03.a CS.01.01.07.a RST.9-10.4 WHST.9-10.4
Identify workplace hazards.	<ul style="list-style-type: none"> • Working in a group, identify safety hazards, chemical hazards, biological hazards and zoonotic hazards in an agricultural workplace. • Discuss how to control hazards on the job to promote a safe workplace. • Read a workplace scenario and discuss the steps necessary to avoid a workplace emergency. 	CS.01.01.01.a CS.06.03.01.a CS.06.04.01.a CS.07.02.01.a RST.9-10.4
Identify the government agencies that enforce labor and job safety laws	<ul style="list-style-type: none"> • Read and discuss the Child Labor Laws and how they apply to high school workers. • Read given workplace scenarios and categorize them as ethical or unethical behaviors. • Read the OSHA regulations for safety, health and the environment for the workplace. • Discuss the importance of worker's compensation and how to obtain the insurance. • Use a Venn diagram to compare and contrast OSHA regulations and the Child Labor Laws. • Participate in the Labor Law Bingo Game 	CS.01.01.01.a CS.03.02.03.a CS.06.03.01.a CS.06.04.01.a CS.07.04.01.a RST.9-10.4 WHST.9-10.4

Interpret a Material Safety Data Sheet	<ul style="list-style-type: none"> • Read an MSDS and write a brief paragraph identifying how to work safely around/with the chemical. 	CS.01.01.01.a CS.07.02.01.a CS.07.04.01.a RST.9-10.4 WHST.9-10.4
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Vocabulary:

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| <ul style="list-style-type: none"> • Bacterial • Chemical • Disability • Discrimination • Employment • Entrepreneurship • Ethical • Injury | <ul style="list-style-type: none"> • Labor Laws • LED 31-23 • LED 75-1 • MSDS • Non-Profit • OSHA • Placement • Research | <ul style="list-style-type: none"> • SAE • Safety • Unethical • Unpaid • Virus • Volunteer • WorkSafe • Zoonotic |
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Assessments:

- Quizzes
- Class assignments
- Test
- SAE Record Book

Resources/Materials:

- SAE Record Book
- CT SDE/DOL Work Experience forms
- WorkSafe Curriculum
- MSD Sheets
- www.ctdol.state.ct.us
- www.osha.gov
- www.ctdol.state.ct.us/osha/osha.htm