

AGRI-SCIENCE III

Horticulture

Overview

Agri-Science III students will focus on those areas of interest they have developed over the previous two years and concentrate on developing skills more specific to those areas of interest. All Agri-Science curriculum is aligned with the national Agriculture, Food, and Natural Resources (AFNR) standards.

Agribusiness Systems (ABS)—the study of business principles, including management, marketing and finance, and their application to enterprises engaged in Agriculture, Food and Natural Resources

Agricultural Mechanics/Power, Structural and Technical Systems (PST)—the study of agricultural equipment, power systems, alternative fuel sources and precision technology, as well as woodworking, metalworking, welding and project planning for agricultural structures

Animal Science/Animal Systems (AS)—the study of animal systems, including life processes, health, nutrition, genetics, management and processing, through the study of small animals, aquaculture, livestock, dairy, horses and/or poultry

Environmental Service Systems (ESS)—the study of systems, instruments and technology used in waste management and their influence on the environment

Food Products and Processing Systems (FPP)—the study of product development, quality assurance, food safety, production, sales and service, regulation and compliance, and food service within the food science industry

Natural Resource Systems (NRS)—the study of the management of soil, water, wildlife, forests and air as natural resources

Horticulture/Plant Systems (PS)—the study of plant life cycles, classifications, functions, structures, reproduction, media and nutrients, as well as growth and cultural practices, through the study of crops, turf grass, trees and shrubs and/or ornamental plants

Note that the AFNR standards pathways do not indicate aquaculture as an independent pathway. Aquaculture standards are drawn from various pathways, most notably Animal Systems.

Students are expected to follow a specific course of study related to their career interests and goals that will prepare them for further study after high school or direct entry into the workplace. Some students may elect to pursue study in two diverse areas. Course selection is developed with the assistance of the SAE advisors and classroom teachers.

Agri-Science III students will continue to have opportunities to further develop leadership skills through participation in the FFA. Students at this stage are encouraged to participate in FFA Career Development Events (CDEs) in order to further develop skills.

Agri-Science III Horticulture students will develop abilities and competencies relative to plant related careers whereby the student receives not only theory but actual practice in “how a plant grows” and “how to grow plants.” Students have the opportunity to learn greenhouse management, landscape design, fertilization, pest control, vegetable and flower production, landscape maintenance, and floral design. All horticulture students will also take a landscape equipment unit in the spring to become familiar with mechanics principles associated with landscape construction and maintenance. There will be ample opportunities for practical work where students will apply classroom instruction to real-world situations in the lab, greenhouse and gardens.

ECE Floral Art is taught concurrently with Agri-Science III horticulture classes. Those students who take the introductory UCONN floral design class will follow the same course rotation as those students who are following the horticulture track, however, assignments and rigor may differ. Students who wish to enroll as ECE students must do so during the registration period in the spring prior to the start of the school year.

Although participation in Agri-Science is limited to those who complete applications, when space allows, ECE classes may be open to other juniors and seniors within Ledyard High School. Course enrollment opportunities by other LHS students will change from year to year based on space availability. Interested students should contact the Agri-Science Instructional Leader or their School Counselor for further information.

Students enrolled in ECE Floral Art and those who wish to focus their studies in Horticulture will follow a course of study indicated by the sequence of units in the following table.

Units
Greenhouse Crop Production
Floral Art II/ECE Floral Art (Holiday Design)
Introduction to Landscape Design - Perennials
Landscape Equipment

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

Unit Overview: SAE is a vital aspect of agricultural education. As part of Agri-Science I & II students have explored their options and developed work experience programs suitable for young students exploring agriculture as a career. Students have learned how to keep records and the best methods for documenting their day to day work as well as their progress. By the end of Agri-Science II students have developed and implemented a clear plan for supervised work experience relating to their interests and career goals.

Agri-Science III students are expected to demonstrate increased responsibility and new learning relative to their SAEs. Through advanced SAE work, students may be more involved in starting and operating their own businesses or taking employment in agriculturally-related enterprises. It is strongly recommended that students apply for local and state FFA proficiency awards as well as the FFA State Degree.

SAE advisors work with individual students, parents, work-site mentors, and employers to ensure student activities are appropriate, meet student needs, and are in compliance with state labor laws. 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:

Read and write critically and effectively for a variety of purposes
Speak clearly and communicate ideas accurately in a variety of settings
Demonstrate critical thinking skills

Agriculture, Food, and Natural Resources Standards:

- CS.01.01.07.c** Evaluate actions taken and make appropriate modifications to personal goals.
- CS.01.03.02.c.** Create a plan of action to complete a task based on a conceptualized idea
- CS.01.06.03.c** Use problem solving strategies to solve a professional or personal issue
- CS.01.06.05.c** Implement a plan to develop new knowledge and skills related to professional and personal aspirations
- CS.02.03.03.c.** Demonstrate employability skills for a specific career
- 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.

ABS.03.01.01.a Maintain production and agri-business records

Common Core State Standards

RST.11-12.4 Determine the meaning of words and phrases as they are used in text, including analyzing how an author uses and refines the meaning of a key term over the course of a text

WHST.11-12.1.e Provide a concluding statement or section that follows from or supports the argument presented.

WHST.11-12.2a Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension

WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

MP 6 Attend to precision

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Implement planned improvements to enhance or improve work experience program	<ul style="list-style-type: none"> • Develop and expand work experience activities/projects in line with career goals • Write SMART goals for SAE improvement over the year 	CS.01.01.07.c CS.01.03.02.c CS.01.06.03.c CS.01.06.05.c CS.02.03.03.c. ABS.03.01.01.a RST.11-12.4 WHST.11-12.4
Accurately (or independently) complete appropriate work experience forms utilizing AFNR standards	<ul style="list-style-type: none"> • Identify key skills necessary to complete the Structured Work-Based Learning Form using AFNR standards • Complete appropriate CT Departments of Labor and Education forms for student work experience independently 	CS.01.06.05.c CS.02.03.03.b. CS.03.01.01.b. WHST.9-10.4
Demonstrate effective and appropriate work skills	<ul style="list-style-type: none"> • Work safely and effectively • Document safe handling of equipment, plants, and animals 	CS.01.06.03.c CS.02.03.03.c. CS.01.06.05.c

	<ul style="list-style-type: none"> Demonstrate appropriate workplace skills such as time management, interpersonal skills, organization, communication, technology and tool use, and problem solving 	CS.03.02.03.b. CS.07.04.01.c. CS.08.01.01.c. ABS.03.01.01.a RST.11-12.4 WHST.11-12.4
Develop and maintain clear records	<ul style="list-style-type: none"> Document time spent in activities, skills learned, income, and expenses Keep all SAE records in a well-organized binder Provide evidence of work using photographs, videos, and journals Meet with SAE advisor weekly during the school year and at least once during the summer Set up/organize appointments with SAE advisor and employer/supervisor/parent 	CS.02.03.03.c. CS.03.01.01.b. ABS.03.01.01.a RST.11-12.4 WHST.11-12.1.e WHST.11-12.2a WHST.11-12.4

Vocabulary

- | | |
|--|---|
| <ul style="list-style-type: none"> 501(c)(3) Entrepreneurship Hazardous Occupations Liability Non-Profit Entity | <ul style="list-style-type: none"> Paid Placement Structured Work-Based Learning Plan Volunteer Worker's Compensation Work-site Mentor |
|--|---|

Assessments:

- Weekly record checks
- Monthly and annual summaries
- On-site visits by advisor in coordination with parent/supervisor/employer
- SAE rubrics

Resources/Materials:

- AFNR Standards
- Binder and record sheets
- SDE/SDOL employment forms

Title: Floral Art I/ECE Floral Art

Unit Overview: Floral Art is an introductory floral design class that exposes students to the basic styles of arrangements used for every day designs and special occasions: conical, round mound, oval, and asymmetrical arrangements, corsages, and boutonnieres. The unit will begin with a simple round mound centerpiece and complete with asymmetrical arrangements and wearable floral art. This class will follow a syllabus approved by the Plant Science Department at the University of Connecticut. Agri-Science students have the option of taking the class for college credit or as an Agri-Science III unit.

Suggested Time: One quarter

Ledyard High School Expectations for Student Learning:

- Read and write critically and effectively for a variety of purposes
- Speak clearly and communicate ideas accurately in a variety of settings
- Demonstrate critical thinking skills

AFNR Standards:

CS.02.04.01.c Demonstrate critical and creative thinking skills while completing a task

CS.02.04.02.c Implement effective problem solving strategies

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

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

CS.11.01.01.b Design an experiment to test a hypothesis

ABS.05.01.02.a Name and explain the impact of external economic factors on an AFN business

ABS.05.01.04.a Calculate percentages, ratios, and related business applications

PS.01.01.02.b Identify agriculturally important plants by common names

PS.01.02.02.c Relate the active and passive transport of minerals into and through the root system to plant nutrition

PS.01.02.05.c Apply the knowledge of flower structures to plant breeding, production and use.

PS.03.05.03.b Explain the proper conditions to maintain the quality of plants and plant products held in storage.

PS.04.01.01.c Select plants, hard goods, supplies and other materials for use in a design based on a range of criteria.

PS.04.01.02.c Create and implement designs by following established principles of art

Common Core State Standards

RST.11-12.4 Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text

- RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- WHST. 11-12.1e.** Provide a concluding statement or section that follows from or supports the argument presented.
- WHST. 11-12.4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- MP 4** Model with mathematics
- MP 6** Attend to precision

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Identify and use color harmonies effectively	<ul style="list-style-type: none"> • Create a color wheel and identify six color harmonies • Identify color harmonies of grouped flowers or objects • Select appropriate floral materials using color theory 	CS.02.04.01.c PS.04.01.01.c PS.04.01.02.c RST.11-12.4
Identify floral design eras and compare styles, colors, and uses of flowers during those times	<ul style="list-style-type: none"> • Create a table identifying floral design eras, styles, and uses • Create a poster picturing contemporary floral arrangements depicting assigned design eras 	PS.01.01.02.b PS.04.01.02.c RST.11-12.4 WHST. 11-12.1e
Implement practices to extend the life of cut flowers and greens	<ul style="list-style-type: none"> • Create and conduct an experiment to determine the best practice for processing lilies • Use data from lily lab to determine the best course of action in treating lilies and similar flowers • Write a lab report based on the results from the lily lab • Condition purchased flowers appropriately to ensure a long life 	CS.11.01.01.b PS.01.02.02.c PS.01.02.05.c PS.03.05.03.b RST.11-12.8 WHST. 11-12.1e WHST. 11-12.4.
Use available floral materials to create standard floral designs incorporating design principles	<ul style="list-style-type: none"> • Create arrangements following class models: round mound, conical, triangular, scalene triangle • Select appropriate flowers to complete required design styles • Select appropriate flowers based on size, 	CS.02.04.01.c CS.02.04.02.c CS.06.02.01.a CS.08.01.01.c PS.01.01.02.b PS.01.02.05.c

	<ul style="list-style-type: none"> color, and use in designs Individualize arrangements by selecting appropriate floral materials and accents Select appropriate plants and construct a dish garden 	P PS.04.01.02.b PS.04.01.01.c
Create boutonnières and pinned corsages using a variety of materials	<ul style="list-style-type: none"> Select appropriate flowers and fillers by color and size Wire and tape flowers neatly and cleanly Construct a 6-loop corsage bow to coordinate with selected flowers, clothing color, or theme Create a one, two, or three flower boutonniere Create a three to five flower corsage in a defined shape (triangular, crescent, line) 	CS.02.04.01.c CS.02.04.02.c CS.06.02.01.a CS.08.01.01.c PS.01.01.02.b PS.01.02.05.c PS.04.01.01.c PS.04.01.02.c
Evaluate floral arrangements using design rubrics	<ul style="list-style-type: none"> Identify aspects of floral design standards in an exemplar Use floral design rubrics to evaluate arrangements Implement design principles when creating or modifying an arrangement Assess arrangements and in writing indicate how each arrangement meets each design principle. 	CS.02.04.01.c CS.02.04.02.c PS.01.01.02.b PS.01.02.05.c PS.04.01.02.c RST.11-12.4 WHST. 11-12.1e
Determine economic value of raw materials and finished products	<ul style="list-style-type: none"> Differentiate between wholesale cost and retail price Explain factors that affect wholesale costs and retail pricing of floral designs Determine the amount and types of materials used in an arrangement and calculate the wholesale cost 	CS.02.04.02.c ABS.05.01.02.a ABS.05.01.04.a PS.01.02.05.c MP 4 MP 6
Level 1 Students		
Identify floral design eras and compare styles, colors, and uses of flowers during those times	<ul style="list-style-type: none"> Compare and classify given designs by design period 	PS.01.02.05.c PS.04.01.02.c WHST. 11-12.1e
Evaluate floral arrangements using design rubric	<ul style="list-style-type: none"> Critique a given floral arrangement and provide suggestions for improving the design 	PS.04.01.02.c WHST. 11-12.1e

Vocabulary:

- Analogous color harmony
- Complementary color harmony
- Condition flowers
- Harmony/unity
- Monochromatic color harmony
- Negative space
- Physical and visual balance
- Physical stability
- Polychromatic color harmony
- Proportion
- Rhythm
- Scale
- Shade
- Split complementary color harmony
- Tetrad color harmony
- Tint
- Tone

Assessments:

- Quizzes
- Class assignments
- Floral design projects

Resources/Materials:

- Floral materials: Alstromeria, lilies, Gypsophila, Caspia, carnations, pompoms, leatherleaf, other flowers and fillers will be selected based on season and availability
- Hard goods: floral snips, floral foam, design bowls, floral tape & wire, #2 & #3 satin ribbon
- Text: Florists' Review Design School
- Text: Floriculture: Designing & Merchandising, Griner
- "Complete ID Preparation for the National FFA Floriculture CDE"
- "Clustered Corsage" video, www.floristsreview.com
- Florists' Review Magazine
- Floral design rubric
- www.floristsreview.com
- www.ftd.com
- www.teleflora.com
- www.1800flowers.com

UCONN Course Syllabus
UCONN Floral Art (Hort 2520)
Instructor: Shelly Roy
Ledyard High School - Agri-Science III Horticulture
Semester 1

Course Description:

Two credits. The study of flower arrangement as an art form with emphasis on historical background, artistic principles, color harmony and care of perishable media. Individual expression is encouraged in the creation of floral composition.

Course Eligibility:

Successful completion of one year of high school biology.

Text: Florists' Review Design School

Supplemental Materials: Florists' Review magazine
"Complete ID Preparation for the National FFA Floriculture CDE"
Floriculture: Designing and Merchandising, Griner

Grading Scale

A	93 – 100
A-	90 – 92
B+	87 – 89
B	83 – 86
B-	80 – 82
C+	77 – 79
C	73 – 76
C-	70 – 72
D+	67 – 69
D	63 – 66
D-	60 – 62
F	> 60

Note that grades of C- and below will not be eligible for UCONN credit.

Tentative Schedule:

- Week 1: Introduction, General Flower Information
History of Floral Design
Review tools
- Week 2: Plant Physiology and Flower Care & Handling
Lily Lab
Conditioning Flowers
Arrangement #1: Round Mound
- Week 3: Principles of Design
Arrangement #2: Basket – Conical/Triangular
Wholesale cost and retail price
- Week 4: Principles of Design
Planning an arrangement – sketching and estimating
Arrangement #3: Equilateral Triangle
- Week 5: Design Styles
Selecting appropriate containers
Arrangement #4: Line Arrangement (Asymmetrical Triangle)
- Week 6: Elements of Design and Pricing Review
Arrangement #5: Constructing pinned/wrist corsages & boutonnieres
- Week 7: Evaluating Floral Designs
Peer review of arrangements
Arrangement #6: Floral Centerpiece with accents (student choice)
- Week 8: Design Techniques
Designing flowers for a holiday (holiday work will depend on time of year)
Submit results of lily lab
- Week 9: Arrangement #7: Dish Garden
Unit Test

Assessments:

Unit Exam	100
Portfolio	200
Arrangements	700
Class Assignments	50
Weekly Class Grades	<u>200</u>
Total Points	1250

The final exam for this class will contain the following elements:

- Design principles
- Flower identification and care
- Evaluating a floral arrangement and suggesting changes
- Calculating the wholesale cost and retail price of an arrangement
- Creating a design (arrangement or corsage)

Class Assignments:

- Design history chart and poster
- Lily lab
- Flower ID
- Pricing article and assignment
- Design styles sketches
- Evaluating arrangements
- Arrangement portfolio

IMPORTANT NOTES!

Students are expected to complete all assignments in a timely manner. Because of the number of arrangements and the perishable nature of floral materials **all arrangements and corsages must be completed in the class time allowed.** Students may come in before school, stay after school, or come in during a study hall to complete arrangements but no additional class time will be given.

For any assignment or arrangement that is submitted late the student's grade will be decreased by 1 letter grade for each day.

If you should miss class when an arrangement is assigned and do not return to school in enough time to complete it you must complete the arrangement on your own time or complete a written assignment to make up for that arrangement. If either of these is not submitted you will be assigned a grade of "0".

Contact information:

You can reach me at mroy@ledyard.net or by phone at 860-464-9600 ext. 7128

I am available mornings from 6:30 – 7:30. I'm also here Monday and Wednesday after school and other days by appointment. Check with me before coming in to make sure I am available.

Title: Greenhouse Crop Production

Unit Overview: To produce a crop in the greenhouse is a process involving principles of botany and greenhouse operations. Students will build on knowledge and skills taught in introductory horticulture units to bring a crop to maturity. Students will be involved in all aspects of the growing cycle from planting cuttings to marketing the product. Crop production involves monitoring plant health as well as maintaining the growing environment to prevent disease and insect problems and produce a high quality product that is comparable to those produced in commercial greenhouses.

Students will review what they have learned in introductory horticulture units in Agri-Science I & II as well as from Biology and Chemistry. That knowledge will be applied to the crop in question, generally poinsettias, to monitor health, feed, pinch, water, as well as to time activities to ensure crop will mature at the appropriate time for sales. Students will also cost out the crop and determine an appropriate retail price based on the crop condition and local markets.

Field trips may be taken to compare the school growing facilities to those of local greenhouse growers. Students will also be able to compare their crop to those being grown commercially.

Suggested Time: One quarter (generally in the fall)

Ledyard High School Expectations for Student Learning:

- Read and write critically and effectively for a variety of purposes
- Speak clearly and communicate ideas accurately in a variety of settings
- Demonstrate critical thinking skills

AFNR Standards:

CS.02.04.02.c Implement effective problem solving strategies

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

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

ABS.05.01.02.aName and explain the impact of external economic factors on an AFN business

ABS.05.01.04.aCalculate percentages, ratios, and related business applications

ABS.06.01.01.cImplement and evaluate marketing strategies with agricultural commodities, products and services

ABS.06.04.01.bDevelop advertising campaigns that promote products and services

PS.01.02.02.c Relate the active and passive transport of minerals into and through the root system to plant nutrition

PS.01.02.04.c Explain the relationships between leaf structure and functions and plant management practices.

PS.02.01.01.b Describe plant responses to light color, intensity and duration

PS.02.01.02.c Design, implement and evaluate a plan to maintain optimal conditions for plant growth

- PS.02.03.04.c** Use variable-rate technology to apply fertilizers to meet crop nutrient needs
- PS.03.02.04.b** Monitor the progress of plantings and determine the need to adjust environmental conditions
- PS.03.02.05.b** Demonstrate proper techniques to control and manage plant growth through mechanical, cultural or chemical means
- PS.03.04.01.b** Assess the stage of growth to determine crop maturity or salability and demonstrate proper harvesting techniques.

Common Core State Standards

- RST.11-12.3** Follow precisely a complex multistep procedure when carry out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- RST.11-12.4** Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text
- WHST. 11-12.1e.** Provide a concluding statement or section that follows from or supports the argument presented.
- WHST. 11-12.4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- MP 2** Reason abstractly and quantitatively
- MP 4** Model with mathematics
- MP 6** Attend to precision

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Apply proper watering techniques	<ul style="list-style-type: none"> • Differentiate between dry and moist media • Select proper water breakers appropriate to crop watering needs • Water plants appropriately based on crop needs 	CS.02.04.01.c CS.06.02.01.a CS.07.04.01.c CS.08.01.01.c PS.01.02.03.c PS.03.02.04.b
Evaluate nutrient needs of greenhouse crop	<ul style="list-style-type: none"> • Use fertilizer labels to determine the type and amounts of nutrients needed for a specific crop • Calculate the appropriate amounts and combinations of fertilizers • Calibrate and use the <i>injector proportioner</i> to apply water soluble fertilizer to a crop 	CS.02.04.02.c CS.07.04.01.c ABS.05.01.04.a PS.01.02.02.c PS.02.01.02.c PS.02.03.04.c PS.03.02.04.b PS.03.02.05.b RST.11-12.3

		RST.11-12.4 WHST. 11-12.1e MP2 MP 4 MP 6
Create and maintain a healthy environment for producing crops for sale at a predetermined time	<ul style="list-style-type: none"> • Perform greenhouse checks and report status of facility and crops on status board • Identify signs of disease or insect damage in crop • Perform basic greenhouse maintenance to control humidity, temperature, reduce potential pests and pathogens, and maintain proper greenhouse sanitation • Monitor and adjust computerized greenhouse control system based on crop needs and current greenhouse conditions (temperature, light, relative humidity) • Keep a journal of tasks accomplished and crop progress • Compare and contrast management practices between LHS greenhouse and a commercial house growing the same crop 	CS.02.04.02.c CS.06.02.01.a CS.07.04.01.c ABS.05.01.02.a PS.01.02.02.c PS01.02.04.c. PS.02.01.01.b PS.02.01.02.c PS.03.02.04.b PS.03.02.05.b PS.03.04.01.b RST.11-12.3 WHST. 11-12.1e WHST.11-12.4
Identify and control greenhouse crop pathogens and pests	<ul style="list-style-type: none"> • Use insect monitoring cards to identify pests present in a crop and to evaluate the level of infestation • Research common greenhouse crop pests and create a display showing the life cycle, potential damage to crops, and management protocols • Identify types of damage in plants: chemical, mechanical, pest, or pathogenic • Given a specific situation determine the best course of action for dealing with a plant disorder 	CS.02.04.02.c CS.06.02.01.a PS.02.01.02.c PS.03.02.04.b PS.03.02.05.b RST.11-12.3 WHST.11-12.4
Perform specific tasks necessary to bring a specific crop to maturity	<ul style="list-style-type: none"> • Select and take cuttings from stock plants and identify the most effective media for rooting cuttings • Determine the most appropriate rooting hormone concentration for successful propagation 	CS.02.04.02.c CS.06.02.01.a CS.07.04.01.c ABS.05.01.02.a PS.01.02.02.c

	<ul style="list-style-type: none"> • Monitor light needs of crop and use shading or grow lights to provide appropriate photoperiods • Identify specific crops needs and timing necessary to produce a mature crop • Perform tasks necessary to maintain a crop: pinch, fertilize, water, space, maintain sanitation • Monitor and adjust computerized greenhouse control system based on crop needs and current greenhouse conditions (temperature, light, relative humidity) 	PS.01.02.04.c PS.02.01.01.b PS.02.01.02.c PS.03.02.04.b PS.03.02.05.b RST.11-12.4
Prepare, market, and sell plants to public	<ul style="list-style-type: none"> • Calculate wholesale cost for producing the crop and develop a reasonable retail price • Organize plants for sale to allow for optimal experience for customers • Create posters and signs to provide necessary information to customers • Research plant needs and develop a care brochure suitable for customers • Work with customers to select plants, answer questions, and package purchases 	CS.02.04.02.c ABS.05.01.02.a ABS.05.01.04.a ABS.06.01.01.c ABS.06.04.01.b PS.03.04.01.b WHST. 11-12.1e MP 4 MP 6
Level 1 Students		
Evaluate nutrient needs of greenhouse crop	<ul style="list-style-type: none"> • Create a fertilizer schedule based on crop needs and anticipated sale • Assess fertility program through tissue and media sample analyses 	CS.02.04.02.c PS.01.02.02.c PS.01.02.04.c PS.02.01.02.c PS.03.02.04.b PS.03.02.05.b WHST. 11-12.4.
Create and maintain a healthy environment for producing crops for sale at a predetermined time	<ul style="list-style-type: none"> • Identify symptoms of disease or insect damage in greenhouse crops and prepare a plan for controlling the problems • Keep a journal of management practices performed and crop progress • Assess crop progress with the intent of making changes to management procedures 	CS.02.04.02.c WHST. 11-12.4.

Italicized items indicate technology use

Vocabulary:

- Apical meristem
- Black-out curtains
- Breaks/lateral branching
- Chlorosis
- Edema
- Fertilizer ratios
- Fungus gnat
- Growing media
- Injector proportioner
- Insect monitoring cards
- Interveinal
- Lateral buds
- Leaching
- Long-day plants
- Maggots
- Necrosis
- Necrotic lesions
- Nutrient deficiencies
- Pathogens
- Photoperiodism
- Phototropism
- Pinching
- Pythium
- Sanitation
- Short-day plants
- Soluble salts
- Thrips
- Whitefly

Assessments:

- Quizzes
- Class assignments
- Greenhouse journal
- Poinsettia care brochure

Resources/Materials:

- Poinsettia cuttings, growing media, pots
- Floral snips, knives, rooting media, rooting hormone, stock plants
- Cooperative Extension Bulletins: poinsettia culture, pest management, fertilization, plant propagation
- www.ladybug.uconn.edu
- www.hort.purdue.edu
- www.gardening.cornell.edu
- www.usbg.gov
- www.store.extension.iastate.edu
- www.aces.edu

Title: Introduction to Landscape Design - Perennials

Unit Overview: Up to this point Agri-Science and ECE students have worked primarily with greenhouse crops. As part of the introductory work in landscape design students will learn to identify common herbaceous perennials as well as cultural information about the plants. Basic landscape design principles will be discussed and compared to floral design principals. Students will have the opportunity to develop garden plans for various uses/situations. Because this is an introductory class students will create all designs using hand tools, however, they will have the opportunity to visit with a professional landscape designer who will demonstrate the use of computerized systems.

Students will also compare the use of annuals and perennials in gardens and assist customers with selecting appropriate plants for their gardens during the spring plant sales.

Suggested Time: One quarter

Ledyard High School Expectations for Student Learning:

- Read and write critically and effectively for a variety of purposes
- Speak clearly and communicate ideas accurately in a variety of settings
- Demonstrate critical thinking skills

AFNR Standards:

CS.02.04.01.c Demonstrate critical and creative thinking skills while completing a task

CS.02.04.02.c Implement effective problem solving strategies

ABS.06.05.02.b Devise sales practices to achieve goals effectively and efficiently

ABS.06.05.03.c Intercept, interpret, and process customer complaints, needs and problems with products and services

PS.01.01.01.c Classify agricultural plants according to the hierarchical classification system, life cycles, plant use and as monocotyledons and dicotyledons

PS.01.01.02.c Identify agriculturally important plants by scientific names

PS.01.02.05.c Apply the knowledge of flower structures to plant breeding, production and use.

PS.03.04.01.b Describe sustainable agriculture practices and compare the ecological effects of traditional agricultural practices with those of sustainable agriculture

PS.04.01.01.c Select plants, hard goods, supplies and other materials for use in a design based on a range of criteria.

PS.04.01.02.c Create and implement designs by following established principles of art

Common Core State Standards

- RST.11-12.4** Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text
- RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- WHST. 11-12.1e.** Provide a concluding statement or section that follows from or supports the argument presented.
- WHST. 11-12.4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- MP 4** Model with mathematics
- MP 6** Attend to precision

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Determine the most appropriate landscape plants to use in gardens	<ul style="list-style-type: none"> • Identify common perennials and annuals • Use on-line and print sources to collect photos for identification and study • Practice identification using pictures and live samples • Use cultural information on perennials and annuals to select appropriate plants for specific garden uses • Identify plants most suitable for sustainable landscaping 	CS.02.04.01.c PS.01.01.01.c PS.01.01.02.c PS.01.02.05.c PS.03.04.01.b
Sketch garden designs to scale	<ul style="list-style-type: none"> • Use landscape design tools to draw landscape features to scale (French curve, landscape templates, engineering scales) • Apply landscape design principles to a unique perennial garden plan 	CS.02.04.01.c PS.01.02.05.c
Create garden designs	<ul style="list-style-type: none"> • Using plants learned in class select appropriate plants in response to specific situations • Identify and use hardscape items in garden designs • Create a cohesive garden design for a large perennial garden utilizing common perennials and hardscape 	CS.02.04.01.c CS.02.04.02.c PS.01.01.01.c PS.01.02.05.c PS.03.04.01.b PS.04.01.01.c PS.04.01.02.c

	<ul style="list-style-type: none"> Use sustainable landscaping principles to design gardens with the least possible environmental impacts 	
Propagate and grow perennials and annuals for sale	<ul style="list-style-type: none"> Identify specific crops needs and timing necessary to produce a mature crop Read seed packages and determine the best time to start seeds to guarantee mature plants at a pre-selected time Monitor light needs of crop and use shading or grow lights to provide appropriate light/dark hours Perform tasks necessary to maintain a crop: pinch, fertilize, water, space, maintain sanitation Monitor and adjust computerized greenhouse control system based on crop needs and current greenhouse conditions (temperature, light, relative humidity) 	CS.02.04.01.c CS.02.04.02.c ABS.06.05.02.b ABS.06.05.03.c PS.01.01.01.c PS.01.02.05.c PS.03.04.01.b PS.04.01.01.c

Level 1 Students

Create garden designs	<ul style="list-style-type: none"> Propose solutions to landscape problems using appropriate plants Create a cohesive garden design for a given large perennial garden utilizing common perennials and hardscape to ensure four-season interest 	CS.02.04.01.c CS.02.04.02.c PS.04.01.01.c PS.04.01.02.c
Propagate and grow perennials and annuals for sale	<ul style="list-style-type: none"> Assess data from spring plant sales and suggest changes for plant varieties and sizes for the next sale 	CS.02.04.02.c ABS.06.05.02.b ABS.06.05.03.c MP 4 MP 6

Italicized items indicate technology use

Vocabulary:

- Perennial
- Annual
- Biennial
- Landscape template
- French curve
- Engineer's scale
- Garden design
- Landscape design
- Distal features
- Proximal features
- Hardscape
- Corm
- Sustainable landscaping
- Accent plant
- Native plant
- Bulb
- Crown
- Dormancy
- Exotic plant
- Herbaceous
- Irrigation
- Massing plants
- Specimen plant
- Terrain
- Crown rot
- Zoning

Assessments:

- Identification quizzes
- Design projects
- Landscape problem assignments
- Garden design plan

Resources/Materials:

- Print and on-line plant catalogs
- Landscape design tools: French curves, landscape templates, engineer's scales, compasses
- www.ladybug.uconn.edu
- www.gardening.cornell.edu

Title: Landscape Equipment

Unit Overview:

This unit is an introduction to the equipment used in landscape construction and maintenance. The unit is intended to allow students with a horticulture or landscape design background to become familiar with equipment principles applicable to these areas, while providing those with strong mechanical skills opportunities to expand their skills as well as to explore the connections between machinery and the landscape.

Suggested Time: One quarter

Ledyard High School Expectations for Student Learning:

Read and write critically and effectively for a variety of purposes
Speak clearly and communicate ideas accurately in a variety of settings.
Employ problem-solving skills effectively.
Employ effective research and study skills
Demonstrate critical thinking skills.

Agriculture, Food, and Natural Resources Standards:

- ABS.04.01.02.b** Use accounting information to estimate the cost of goods sold and margins on the goods
- ABS.05.01.04.a** Calculate percentages, ratios, and related business applications
- CS.06.02.01.a.** Use proper safety practices/personal protective equipment.
- CS.07.01.01.b.** Use appropriate personal protective equipment for a given task.
- CS.07.04.01.c.** Apply general workplace safety precautions/procedures.
- CS.07.04.02.a.** Handle chemicals and equipment in a safe and appropriate manner.
- CS.08.01.01.c.** Use tools and equipment appropriately to complete a specific task.
- CS.08.01.02.b.** Demonstrate appropriate operation, storage, and maintenance techniques for tools and equipment.
- ESS.06.02.01.a.** Demonstrate proper use and maintenance of hand tools.
- ESS.06.02.01.b.** Operate equipment and machinery in accordance with manufacturers' instructions and OSHA standards, specifically addressing personal protective equipment and proper machine guarding.
- ESS.06.02.01.c.** Demonstrate proper preventive maintenance techniques and set up a mock preventive maintenance schedule.
- PS.02.01.02.c** Design ,implement and evaluate a plan to maintain optimal conditions for plant growth.
- PS.02.03.01.b.** Describe nutrient deficiency symptoms and recognize environmental causes of nutrient deficiencies.
- PS.02.03.04.b.** Calculate the amount of fertilizer to be applied and calibrate equipment to apply the prescribed amount of fertilizer.

- PS.03.01.02.a.** Demonstrate sowing techniques and provide favorable conditions for seed germination.
- PS.03.02.05.b** Demonstrate proper techniques to control and manage plant growth through mechanical, cultural or chemical means
- PS.03.03.01.b.** Identify major local weeds, insect pests and infectious and noninfectious plant diseases.
- PS.03.03.03.a.** Describe pest control strategies associated with integrated pest management.
- PS.03.03.04.b.** Explain procedures for the safe handling, use and storage of pesticides.
- PST.01.02.01.b.** Classify lubricants by SAE viscosity and API service classifications.
- PST.01.02.01.c.** Select, use and dispose of lubricants.
- PST.01.03.01.b.** Select, maintain and use hand and power tools in service, construction and fabrication.
- PST.02.01.01.a.** Identify and schedule power unit and equipment lubrication.
- PST.02.01.02.a.** Service filtration systems and maintain fluid levels on power units and equipment.
- PST.02.01.02.b.** Adjust equipment, including belts and drives, chains and sprockets, and maintain fluid conveyance components, such as hoses, lines and nozzles.
- 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.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.03.01.01.b.** Utilize technical manuals and computer-based diagnostics in engine analysis and repair.
- PST.03.01.02.b.** Analyze and troubleshoot internal combustion engines.
- PST.05.02.02.c.** Troubleshoot electrical system performance problems.

Common Core State Standards:

- WHST 11.-12.2** Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
- WHST 11.-12.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose and audience
- RST 11.-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- SL 11.-12.4** 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.
- MP1** Make sense of problems and persevere in solving them.
- MP2** Reason abstractly and quantitatively.
- MP4** Model with mathematics.
- MP5** Use appropriate tools strategically.

MP6 Attend to precision

Objectives	Required Activities/ Suggested Activities	AFNR Standards/CCSS
Work safely and effectively in the shop and in the field.	<ul style="list-style-type: none"> • Maintain a clean and safe work environment. • Demonstrate procedures for maintaining a safe working environment • Identify hazards inherent to working in the shop and in the field 	CS.06.02.01.a CS.07.01.01.b CS.07.04.01.c. CS.07.04.02.a. CS.08.01.01.c. CS.08.01.02.b ESS.06.02.01.b. PS.03.03.04.b.
Maintain hand tools key to working in agriculture.	<ul style="list-style-type: none"> • Clean, sharpen and lubricate hand tools. 	CS.07.04.01.c. ESS.06.02.01.a.
Maintain power equipment including push mowers, rider mowers and string trimmers.	<ul style="list-style-type: none"> • Clean and perform routine maintenance tasks to prepare landscape equipment for the season or for storage. • Develop a preventive maintenance schedule for a tractor or rider lawnmower based on manufacturers recommendations and good practice. • Mix 2-stroke oil and gasoline according to manufacturers' recommendations. • Calibrate a spreader or boom sprayer 	ESS.06.02.01.c. PS.02.03.04.b. PST.01.03.01.b. PST.01.02.01.b. PST.01.02.01.c. PST.02.01.01.a PST.02.01.02.a. PST.02.01.02.b. WHST 11-12.2 WHST 11-12.4 RST 11-12.4 MP2 MP4 MP6
Diagnose and correct fuel and spark problems in gasoline-powered equipment.	<ul style="list-style-type: none"> • Analyze case studies of engine performance problems and determine the likely cause of the problem. • Diagnose and correct fuel and spark problems in power equipment such as push mowers and string trimmers. 	PST.02.02.01.a. PST.02.02.01.b. PST.02.02.02.b. PST.03.01.01.a. PST.03.01.01.b. PST.03.01.02.b.

	<ul style="list-style-type: none"> Analyze the water content of gasoline and recommend appropriate actions. 	RST 11-12.4 SL 11.-12.4 WHST.11-12.2 WHST 11-12.4 MP4 MP6
Diagnose and correct electrical system problems in power equipment.	<ul style="list-style-type: none"> Diagram the electrical system of a rider mower. Use a multimeter or battery tester to evaluate the condition of a storage battery Demonstrate procedures for safely charging a vehicle battery 	PST.02.02.01.a. PST.05.02.02.c. MP5 MP6
Estimate the time, labor, equipment and materials required to service a property and estimate charges to the client.	<ul style="list-style-type: none"> Determine the time, labor, equipment and materials required to service a property and estimate charges to the client. Interview the owner of a landscaping business. Collect information on the methods used to maintain property and determine fees. 	ABS.05.01.04.a SL 11.-12.4 WHST.11-12.2 WHST 11-12.4 MP4 MP6
Demonstrate procedures for establishing and maintaining turf.	<ul style="list-style-type: none"> Determine the best type of grass mixture for a specific purpose Prepare soil; seed and maintain turf Demonstrate the proper procedures for cutting a lawn with a push or rider mower. Apply lime or fertilizer to turf. 	ABS.04.01.02.b PS.02.03.01.b PS.03.01.02.a. PS.03.02.05.b PS.03.03.03.a. PS.03.03.04.b. RST 11-12.4 MP4 MP6
Demonstrate procedures for pruning trees and ornamental shrubs	<ul style="list-style-type: none"> Identify the various reasons for pruning Discriminate between pruning and shearing and describe when each would be used Demonstrate proper pruning techniques on landscape trees and shrubs 	CS.06.02.01.a. CS.07.01.01.b. CS.07.04.01.c PS.03.02.05.b PS.03.03.03.a. SL 11.-12.4

Level 1 Students

Demonstrate procedures for establishing and maintaining turf	<ul style="list-style-type: none"> • Prepare a turf establishment plan for a given scenario 	PS.02.01.02.c PS.02.03.04.b PS.03.03.01.b WHST 11-12.2 WHST 11-12.4 RST 11-12.4 MP4 MP6
Demonstrate procedures for pruning trees and ornamental shrubs	<ul style="list-style-type: none"> • Develop a pruning plan for the trees and shrubs in a given area 	PS.02.01.02.c PS.03.02.05.b PS.03.03.03.a WHST 11-12.2 WHST 11-12.4 RST 11-12.4

Italicized items indicate technology use

Vocabulary:

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> • Alternator • Collar • Compression • Cool-season Grasses • Heading • Heat Stroke • Hypothermia • Irrigation | <ul style="list-style-type: none"> • Leader/Lead Branch • Plugging • Scaffold Branch • Seeding • Sod • Sprigging • Sucker • Thatch | <ul style="list-style-type: none"> • Thinning • Turf • Warm-season Grasses • Water Sprout • Winterize |
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Assessments:

- Written quizzes and tests
- Lab reports

Resources/Materials:

- Agricultural Mechanics: Fundamentals and Applications. Cooper. Delmar, multiple editions
- Briggs and Stratton, Tecumseh and other repair manuals stored in the engine room or online.
- HOSTA Curriculum materials found at <http://extension.psu.edu/business/ag-safety/youth-safety>, 1/2015
- Iowa Western Horticulture course materials found at <https://sites.google.com/a/w-harrison.k12.ia.us/whagdepartment/horticulture>, 1/2015
- North American Guidelines for Children's Agricultural Tasks (NAGCAT) found at <http://www.nagcat.org/nagcat/> 1/2015
- Ornamental Horticulture, Ingels, Delmar
- OSHA Landscape Hazards and Solutions materials found at <https://www.osha.gov/SLTC/landscaping/hazards.html>, 1/2015
- Pruning Techniques; Brooklyn Botanic Garden Record. Cook. Sterling Pub (Brooklyn Botanical Garden),
- Replacement parts such as head gaskets, crankcase gaskets, and governor springs, as-needed.
- Shop tools, Oil, Gasoline and grease for engines
- Small Engine Repair Made Easy, Ramsey. Publications International
- Small Gas Engines. Roth. Goodheart-Wilcox.
- Turfgrass extension information found at <http://plantscience.psu.edu/research/centers/turf/extension>, 1/2015
- Working in Horticulture. Richardson and Moore. McGraw-Hill, 1980

