



Horticulture

Course: Advanced Landscape Design		Total Framework Hours up to: 180
CIP Code: 010605	☐ Exploratory Beginning ☒ Preparatory Advanced	Date Last Modified: 2017
Career Cluster: Agriculture, Food and Natural Resources		Cluster Pathway: Plant Systems

COMPONENTS AND ASSESSMENTS

Performance Assessments:

- Analyze plant responses to varied light color, intensity and duration and recommend modifications to light for desired plant growth. PS.01.01.01.c.
- Identify examples of and summarize pollination, cross-pollination and self-pollination of flowering plants. PS.03.01.01.a.
- Analyze how leaves capture light energy and summarize the exchange of gases. PS.02.02.04.b.
- Demonstrate proper techniques to control and manage plant growth through mechanical, cultural or chemical means. PS.03.02.05.b.
- Assess and describe the impact environmental factors have on a crop. PS.01.03.06.b.
- Compare and contrast the potential risks and advantages associated with genetically modified plants. PS.03.01.05.b.

Leadership Alignment: Students will think creatively to develop a lab for testing plants reactions to light. Students will produce results when developing their photosynthesis labs. Students will work collaboratively to determine correct amounts of light and temperature during different stages of plant growth. Students will make judgments and decisions based on their research of GMO's.

Standards and Competencies

Unit: Plant Growth and Physiology.

Competencies	Total Learning Hours for Standard: 30
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- Model photosynthesis and cellular respiration.
- Explain the relationship between leaf structure and function as it relates to light.
- Recognize the different ways of pollination.
- Utilize plant hormones and synthetic growth regulators, identify plant response and select regulators for desired responses.
- Manipulate plant growth with differing amounts and quality of light.
- Manipulate plant growth through pinching.
- Research temperature requirements for the different stages of plant growth.
- Debate the concept of GMO's used in plants.

Aligned Washington State Standards

Language	Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized referenced materials, as appropriate.
Reading	Read and comprehend complex literary and informational texts independently and proficiently.

Science	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
Writing	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

COMPONENTS AND ASSESSMENTS	
Performance Assessments: <ul style="list-style-type: none"> Adjust the pH of growing media for specific plants or crops. PS.01.03.02.c. Analyze plant responses to water conditions and recommend modifications to water for desired plant growth. PS.01.01.03.c Formulate and prepare growing media for specific plants or crops. PS.01.02.01.c. Monitor plants for signs of nutrient deficiencies and prepare a scouting report to correct elements negatively affecting plant growth in a field or greenhouse. PS.01.03.01.c. Calibrate application equipment to meet plant nutrient needs. PS.01.03.04.c. Identify fertilizer sources of essential plant nutrients; explain fertilizer formulations, including organic and inorganic; and describe different methods of fertilizer application. PS.01.03.04.a Assess and describe the short and long-term effects production methods have on soil. PS.01.03.05.b. 	
Leadership Alignment: Students will make judgements and decisions based on the soil fertility in the greenhouse crops. Students will collaborate with others to determine the best plan of action for adding amendments to growing plants. Students will access and evaluate information available for both organic and non-organic solutions. Students will access and evaluate information on fertilizer needs and implement a plan.	
<i>Standards and Competencies</i>	
Unit: Soil; growing media and nutrients.	
Competencies	Total Learning Hours for Standard:20
<ul style="list-style-type: none"> Determine the influence on environmental factors on plant growth. Prepare growing media to meet plant requirements. Identify the essential nutrients for plant growth and their major functions. Determine the nutrient content of soils. Evaluate the soil pH and plan adjustments that are needed. Modify the plant nutrients as needed. Identify any soil issues from over cropping in the garden beds. 	
<i>Aligned Washington State Standards</i>	
Reading	Read and comprehend complex literary and informational texts independently and proficiently.
Science	Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
Speaking and Listening	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
Writing	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
COMPONENTS AND ASSESSMENTS	

Performance Assessments: <ul style="list-style-type: none"> Identify and summarize systems used to classify plants based on specific characteristics. PS.02.01.01.a Identify and describe important plants to agricultural and ornamental plant systems by common names. PS.02.01.02.b Identify and categorize plants by their purpose (e.g., floral plants, landscape plants, house plants, etc.). PS.04.01.01.a. 	
Leadership Alignment: Students will manage projects related to plant ID. Students will solve problems of identification based on plant characteristics. Students can participate in the FFA floral CDE. Students will be able to produce results on plant ID quizzes. Students will know all 120 plant names off the list.	
<i>Standards and Competencies</i>	
Unit: Plant Identification	
Competencies	Total Learning Hours for Standard:15
<ul style="list-style-type: none"> Correctly write the binomial names of plants. Understand the use of terminology and languages in nomenclature Identify plants based on their structure. Utilize the Intelli-prep program to identify plants of the state plant list. Identify plants grown and propagated in the greenhouse program. 	
<i>Aligned Washington State Standards</i>	
Educational Technology	Innovate: Demonstrate creative thinking, construct knowledge and develop innovative products and processes using technology. Collaborate: Use digital media and environments to communicate and work collaboratively to support individual learning and contribute to the learning of others.
Science	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
Speaking and Listening	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

COMPONENTS AND ASSESSMENTS	
Performance Assessments: <ul style="list-style-type: none"> Assess and demonstrate appropriate operation, storage and maintenance techniques for AFNR. CS.03.04.03.b Evaluate and select appropriate tool and equipment to complete AFNR tasks. CS.06.04.02.c 	
Leadership Alignment: Students will interact effectively with others to maintain a safe environment while using classroom tools. Students will communicate clearly if they have issues with any tool. Students will solve problems that arise when using power tools. Students will be responsible to others when they are using power equipment. Students will be responsible for maintaining power tools as well as checking for oil and gas prior to use.	
<i>Standards and Competencies</i>	
Unit: Tools identification, safe use and maintenance.	
Competencies	Total Learning Hours for Standard:10
<ul style="list-style-type: none"> Utilize horticulture/landscape tools correctly. Maintain horticulture/landscape tools. Use appropriate safety procedures when working with horticulture/landscape tools. Students will maintain the oil and gas needed for each power tool. 	

- Students will maintain the sharpness of all hand tools including pruners, saws and shovels.
- Students will work with maintenance to determine any tool problems and come up with a solution.

Aligned Washington State Standards

Health and Fitness	Acquires the knowledge and skills to safely participate in a variety of developmentally appropriate physical activities Acquires skills to live safely and reduce health risks
Speaking and Listening	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

COMPONENTS AND ASSESSMENTS

Performance Assessments:

- Conduct tests associated with seed germination rates, viability and vigor. PS.03.01.02.c.
- Demonstrate sowing techniques for providing favorable conditions to meet the factors of seed germination. PS.03.01.02.a
- Prepare soil and growing media for planting with the addition of amendments. PS.03.02.02.b.
- Identify and analyze major local weeds, insect pests and infectious and noninfectious plant diseases. PS.03.03.01.b.
- Produce pest- and disease-free propagation material. PS.03.02.01c
- Monitor the progress of plantings and determine the need to adjust environmental conditions. PS.03.02.04.b.
- Evaluate asexual propagation practices based on productivity and efficiency. PS.03.01.03.c
- Summarize the use of hydroponic and aquaponic systems for plant production. PS.03.02.07.a.

Leadership Alignment: Students will interact effectively with others to propagate plants asexually. Students will produce results from the plant propagation lab. Students will interact effectively with others to properly air layer fruit trees. Students will communicate clearly their research on different growing methods.

Standards and Competencies

Unit: Plant growth and greenhouse management; including propagation

Competencies

Total Learning Hours for Standard:40

- Demonstrate how to seed correctly for different plant species.
- Prepare soil prior to seeding or transplanting of plugs.
- Demonstrate successful transplanting of a variety of plants.
- Identify pests.
- Design integrated pest management strategies for a variety of greenhouse pests.
- Evaluate growing conditions and adjust as needed.
- Demonstrate methods for pruning a variety of outdoor plants and fruit trees.
- Research and evaluate hydroponics, aquaponics and vertical farming.

Aligned Washington State Standards

Educational Technology	Innovate: Demonstrate creative thinking, construct knowledge and develop innovative products and processes using technology. Collaborate: Use digital media and environments to communicate and work collaboratively to support individual learning and contribute to the learning of others.
Language	Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized referenced materials, as appropriate.
Reading	Read and comprehend complex literary and informational texts independently and proficiently.
Science	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

Writing	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
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COMPONENTS AND ASSESSMENTS	
Performance Assessments: <ul style="list-style-type: none"> Apply the sales process to AFNR businesses and communicate ways of accomplishing the businesses' goals and objectives. ABS.05.02.01.b Identify and explain marketing principles used in AFNR businesses (e.g., 4 P's-product, place, price, promotion; attention, interest, desire, action, etc.). ABS.05.03.01.a 	
Leadership Alignment: Students will work creatively with others to develop a marketing plan for the plant sale. Students will create media products to display in the community. Students will communicate clearly with each other when discussing their goals and objectives.	
<i>Standards and Competencies</i>	
Unit: Utilize sales and marketing techniques.	
Competencies	Total Learning Hours for Standard:10
<ul style="list-style-type: none"> Develop skills in product/service display as a means of showing a product to its best advantage. Develop sale signs for public display. Evaluate plant spacing and grouping for optimum sales. Demonstrate customer relations skills. 	
<i>Aligned Washington State Standards</i>	
Arts	Uses visual arts to communicate for a specific purpose. Uses visual arts to express feelings and present ideas.
Educational Technology	Innovate: Demonstrate creative thinking, construct knowledge and develop innovative products and processes using technology. Collaborate: Use digital media and environments to communicate and work collaboratively to support individual learning and contribute to the learning of others. Investigate and Think Critically: Research, manage and evaluate information and solve problems using digital tools and resources.
Language	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
Math	Make inferences and justify conclusions from sample surveys, experiments and observational studies
Reading	Read and comprehend complex literary and informational texts independently and proficiently.
Social Studies	Understands that people have to make choices between wants and needs and evaluate the outcomes of those choices. Understands the economic issues and problems that all societies face
Speaking and Listening	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
Writing	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

COMPONENTS AND ASSESSMENTS	
Performance Assessments: <ul style="list-style-type: none"> Devise, implement, and evaluate strategies for personal involvement in civic service at work and in the community. CRP.01.03.01.c Identify opportunities to apply technical concepts to solve problems in the community. CRP.02.02.01.a Classify the types of information (e.g., data, research, procedures, regulations, etc.) and resources (e.g., human, financial, technology, time, etc.) that may be used to make workplace and community decisions. CRP.05.01.03.a 	

<ul style="list-style-type: none"> Analyze how different research methods are used to generate data in a variety of situations. CRP.07.01.01.b Analyze and demonstrate adherence to protective equipment requirements when using various AFNR tools and equipment. CS.03.04.02.b 	
Leadership Alignment: Students will work independently to come up with their SAE program. Students will manage projects to fulfill classroom requirements. Students will communicate clearly any help or concerns they have.	
<i>Standards and Competencies</i>	
Unit: Demonstrate an understanding of Supervised Agricultural Experience Programs and leadership skills.	
Competencies	Total Learning Hours for Standard:5
<ul style="list-style-type: none"> Describe the various types of Supervised Agricultural Experience Programs including Experience Programs including Entrepreneurship, Placement, Improvement, and Exploratory Programs. Describe the purpose of Supervised Agricultural Experience Programs within the Agricultural Education program. Utilize and analyze appropriate record keeping techniques with their Supervised Agricultural Experience Program. Identify opportunities available through the Supervised Agricultural Experience Program. Recognize life skills that are incorporated in their Supervised Agricultural Experience Program. Incorporate appropriate research into Supervised Agricultural Experience Program. Demonstrate effective communication skills. Participate in team work activities. 	
<i>Aligned Washington State Standards</i>	
Educational Technology	Investigate and Think Critically: Research, manage and evaluate information and solve problems using digital tools and resources.
Language	Acquire and use accurately a range of general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
Math	Reason quantitatively and use units to solve problems. Reason quantitatively and use units to solve problems Apply geometric concepts in modeling situations.
Speaking and Listening	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Writing	Write arguments to support claims in an analysis of substantive of topics or texts, using valid reasoning and relevant and sufficient evidence. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

COMPONENTS AND ASSESSMENTS	
Performance Assessments: <ul style="list-style-type: none"> Explain the concept of landscape ecology and summarize factors that shape the ecology of a landscape (e.g., composition, structure, function, etc.). PS.04.02.03.a. Apply principles and elements of design that form the basis of artistic impression. PS.04.02.01.b Choose and properly use appropriate tools to create a desired design. PS.04.02.02.b Create a design utilizing plants in their proper environments. PS.04.01.02.b 	
Leadership Alignment: Students will analyze a variety of commercial landscaped properties before beginning their projects. Students will manage their projects and produce results during the drawing unit. Students will use systems thinking when putting in appropriate plants and water features into their drawings.	

<i>Standards and Competencies</i>	
Unit: Landscape Design and Implementation	
Competencies	Total Learning Hours for Standard:50
<ul style="list-style-type: none"> • Measure out a commercial property. • Construct an analysis plan of a commercial property. • Design a trial design with appropriate scale of a commercial property and land area. • Complete a final landscape drawing to scale with plant id key and color. • Design a landscape drawing for a specific location on the school grounds. • Design and draw up plans for implementation of small design at local fairs. 	
<i>Aligned Washington State Standards</i>	
Arts	Understands and applies visual art concepts and vocabulary Develops visual art skills and techniques Applies a creative process to visual arts (identifies, explores, gathers, interprets, uses, implements, reflects, refines, and presents) Uses visual arts to communicate for a specific purpose.

<i>21st Century Skills</i>		
Check those that students will demonstrate in this course:		
LEARNING & INNOVATION Creativity and Innovation ☒ Think Creatively ☒ Work Creatively with Others ☒ Implement Innovations Critical Thinking and Problem Solving ☒ Reason Effectively ☒ Use Systems Thinking ☒ Make Judgments and Decisions ☒ Solve Problems Communication and Collaboration ☒ Communicate Clearly ☒ Collaborate with Others	INFORMATION, MEDIA & TECHNOLOGY SKILLS Information Literacy ☒ Access and /evaluate Information ☒ Use and Manage Information Media Literacy ☒ Analyze Media ☒ Create Media Products Information, Communications and Technology (ICT Literacy) ☒ Apply Technology Effectively	LIFE & CAREER SKILLS Flexibility and Adaptability ☒ Adapt to Change ☒ Be Flexible Initiative and Self-Direction ☒ Manage Goals and Time ☒ Work Independently ☒ Be Self-Directed Learners Social and Cross-Cultural ☒ Interact Effectively with Others ☒ Work Effectively in Diverse Teams Productivity and Accountability ☒ Manage Projects ☒ Produce Results Leadership and Responsibility ☒ Guide and Lead Others ☒ Be Responsible to Others