

CTE Standards Unpacking
Fundamental Horticulture

Course: Fundamental Horticulture

Course Description: Fundamental Horticulture is designed to give students a background in horticultural science and the many career opportunities in nursery, garden, turf and landscape industries. Fundamental Horticulture addresses the biology and genetics involved in production, processing, and marketing of horticulture. Quality nursery and landscape operations require skilled, educated employees. In this course, students develop the necessary knowledge and skills for both entry-level employment and advancement within the horticulture industries. Topics covered include classifying and identifying plants, physiology and propagation, pest management, understanding soil, environmental, and fertility factors affecting plant growth, various horticulture industry sectors, and employability skills. Classroom and laboratory content may be enhanced by utilizing appropriate equipment and technology. Mathematics, biology, English and human relations skills will be reinforced in the course. This class is reinforced through the FFA and Supervised Agricultural Experience (SAE) activities such as the Nursery/Landscape and Floriculture Career Development Events, and related Proficiency Awards. Each student will be expected to maintain a SAE.

Career Cluster: Agriculture, Food and Natural Resources

Prerequisites: Recommended: Introduction to AFNR

Program of Study Application: Fundamental Horticulture is a first pathway course in the Agriculture, Food and Natural Resources Program of Study, Plant Systems pathway. Fundamental Horticulture is preceded by a Cluster course and would be followed by Advanced Horticulture or Advanced Plant Science.

INDICATOR #HORT 1: Explain horticultural plant classifications.		
SUB-INDICATOR 1.1 (Webb Level: 1 Recall): Classify and identify horticultural plants.		
Knowledge (Factual): -Horticulture plants -Classification systems -Parts of a plant	Understand (Conceptual): -Understand taxonomy -Grasp the uses for different horticulture plants -Understand plant production in species	Do (Application): -Create an identification booklet on plant classification -Discuss and evaluate plant selection and identification for local landscape applications

Benchmarks:
Students will be assessed on their ability to:

- Identify landscaping plants.
- Identify vegetables and fruits.
- Identify floriculture crops.
- Identify trees and shrubs.
- Identify plants using a dichotomous key.
- Classify plants using botanical growth habits, landscape uses, culture requirement, and a simple botanical key.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	Sample Performance Task Aligned to the Academic Standard(s):
<p>English:</p> <p>1) 9-12 SL.1 - Participate in collaborative discussion</p> <p>2) 9-12 W.6 – Use technology, including the internet, to produce an individual writing product.</p>	<p>-Discuss and evaluate plant selection and identification for local landscape applications.</p> <p>-Research and write a report on a horticulture plant.</p>

INDICATOR #HORT 2: Define basic principles of plant physiology and propagation.		
SUB-INDICATOR 2.1 (Webb Level: 1 Recall): Explain basic principles of plant physiology and growth.		
SUB-INDICATOR 2.2 (Webb Level: 2 Skill/Concept): Demonstrate the propagation of plants by sexual and asexual methods.		
<p>Knowledge (Factual):</p> <ul style="list-style-type: none"> -Parts of a plant -Sexual and asexual propagation methods -Environmental factors for optimal plant growth 	<p>Understand (Conceptual):</p> <ul style="list-style-type: none"> -Understand the function of plant parts in propagation -Evaluate the sexual and asexual methods of plant propagation 	<p>Do (Application):</p> <ul style="list-style-type: none"> -Choose potted foliage and flower plants for varied light levels -Interpret plant growth deficiencies -Maintain dormant plants -Plan planting schedules

Benchmarks:

Students will be assessed on their ability to:

- Describe photosynthesis, osmosis, transpiration, respiration, plant and cell structures.
- Illustrate the factors affecting plant growth.
- Identify plant parts and their functions.
- Compare the parts of a plant and explain their purposes.
- Differentiate plant reproduction methods.
- Propagate plants by seeds.
- Transplant seedlings at the appropriate two leaf stage.
- Plant bulbs and force to bloom.
- Propagate plants in a soilless media.
- Propagate plants by taking cuttings and by division.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):

Science:

1) HS-LS4-3 – Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

Sample Performance Task Aligned to the Academic Standard(s):

-Use a Punnett Square to predict favorable traits.

INDICATOR #HORT 3: Describe pest management in the horticultural industry.

SUB-INDICATOR 3.1 (Webb Level: 1 Recall): Identify principles of pest management.

Knowledge (Factual):

-Plant diseases and pests

-Pest management techniques

Understand (Conceptual):

-Importance of pest management in horticulture plants

-Effects of diseases and pests on plant production

-Principles which impact growing techniques

Do (Application):

-Complete pesticide applicators certification training

-Create a Integrated Pest Management (IPM) plan

<p>Benchmarks: <i>Students will be assessed on their ability to:</i></p> <ul style="list-style-type: none"> • Identify common plant diseases, insects, and weeds. • Describe methods of pest control for a specific pest. • Identify the proper chemicals for a specific application. • List the steps in chemical application. • List and compare the biological pest control methods. • Discuss integrated pest management. • Discuss the local, state and federal pesticide requirements. 	
<p>Academic Connections</p>	
<p>ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):</p> <p>English: 1) 9-12 SL.1 - Participate in a range of collaborative discussions with diverse partners, building on other's ideas and expressing one's own.</p>	<p>Sample Performance Task Aligned to the Academic Standard(s):</p> <p>-Discuss integrated pest management.</p> <p>-Discuss the local, state and federal pesticide requirements.</p>

<p>INDICATOR #HORT 4: Analyze soil, environment, and fertility properties as they affect plant growth.</p>		
<p>SUB-INDICATOR 4.1 (Webb Level: 3 Strategic Thinking): Examine soil and planting media management.</p>		
<p>SUB-INDICATOR 4.2 (Webb Level: 4 Extended Thinking): Examine the growing environment and its effect on plant growth.</p>		
<p>SUB-INDICATOR 4.3 (Webb Level: 3 Strategic Thinking): Identify plant nutrition practices for horticulture plants as they relate to plant growth and health.</p>		
<p>Knowledge (Factual):</p> <ul style="list-style-type: none"> -Types of planting media -Nutritional practices for plants -Impact of environmental factors on plant growth -Nutrient deficiencies in plants 	<p>Understand (Conceptual):</p> <ul style="list-style-type: none"> -Understand the effects of the soil and environment on plant growth -Understand the relationship of nutrients on plant growth -Understand the impact of soil quality on nutrient availability 	<p>Do (Application):</p> <ul style="list-style-type: none"> -Distinguish soil mix materials and characteristics -Create an outdoor seedbed -Construct a management plan to create the best growing environment for different plants

		-Read and interpret fertilizer labels and select fertilizer for given soil based on test analysis
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Benchmarks:

Students will be assessed on their ability to:

- Compare and contrast the effect soil structure and texture have on water-holding ability.
- Select soil media and test soil pH.
- Analyze soil amendments.
- Critique seedbed preparations.
- Analyze water, light, and air quality, temperature, humidity, etc. to determine growing effectiveness of plants.
- Analyze plant hardiness zones.
- Test soil mix for fertility by using a soil testing kit and interpret results.
- Differentiate between good and poor quality media for planting and how it effects plant growth.

Academic Connections

<p>ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):</p> <p>Math: HSG.MG.A.1 - Use geometric shapes, their measures, and their properties to describe objects</p>	<p>Sample Performance Task Aligned to the Academic Standard(s):</p> <p>-Design a scale model of an outdoor seedbed using geometric techniques.</p>
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<p>INDICATOR #HORT 5: Examine horticulture industry sectors.</p>
<p>SUB-INDICATOR 5.1 (Webb Level: 1 Recall): Investigate the care and maintenance of vegetable/fruit crops.</p>
<p>SUB-INDICATOR 5.2 (Webb Level: 2 Skills and Concepts): Investigate the floriculture industry.</p>
<p>SUB-INDICATOR 5.3 (Webb Level: 2 Skills and Concepts): Investigate the nursery/landscape industry.</p>
<p>SUB-INDICATOR 5.4 (Webb Level: 2 Skills and Concepts): Investigate the care and management of turf grass.</p>

<p>Knowledge (Factual):</p> <ul style="list-style-type: none"> -Different components of the horticulture industry -Care and maintenance of vegetables, fruits, and turf grass -Horticulture agribusiness and its role in the economy -Economic factors in the horticulture industry 	<p>Understand (Conceptual):</p> <ul style="list-style-type: none"> -Grasp the concepts of the horticulture industry -Understand the qualities and attributes necessary to succeed in a chosen horticulture career -Understand how supply and demand influence career opportunities in the horticulture industry 	<p>Do (Application):</p> <ul style="list-style-type: none"> -Research practices for growing vegetable/fruit crops -Plant a community garden -Research careers in the floriculture industry -Compete in Floriculture Career and Development Event -Research careers in the nursery/landscape industry -Compete in Nursey and Landscaping Career and Development Event -Research careers in the turf grass industry -Grow and display types of turf grass -Compete in Nursey and Landscaping Career and Development Event.
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Benchmarks:

Students will be assessed on their ability to:

- Identify common fruit and vegetable crops for area.
- Identify common pests for fruit and vegetable crops.
- Identify common flowers.
- Describe each sector of the floriculture chain of distribution.
- Evaluate flower arrangements.
- Identify tools needed for the nursery/landscape industry.
- Identify plants used in the nursery/landscape industry.
- Sketch a landscape design.
- Identify types of turf grass equipment.
- Analyze the uses of different turf grasses.

Academic Connections	
<p>ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):</p> <p>English: 1) 9-12 W.6 – Use technology, including the internet, to produce an individual writing product.</p>	<p>Sample Performance Task Aligned to the Academic Standard(s):</p> <p>-Research and create a report on the various segments of the horticulture industry.</p>

<p>INDICATOR #HORT 6: Develop employability skills related to the Plant Systems Pathway.</p>		
<p>SUB-INDICATOR 6.1 (Webb Level: 2 Skills and Concepts): Develop soft skills to enhance employability.</p>		
<p>Knowledge (Factual): -Proper communication skills</p>	<p>Understand (Conceptual): -Importance of employability skills in careers -Differentiate appropriate behaviors between work(formal) and informal environments</p>	<p>Do (Application): -Job shadow -Tour industry</p>
<p>Benchmarks: <i>Students will be assessed on their ability to:</i></p> <ul style="list-style-type: none"> • Create a resume. • Fill out a job application. • Demonstrate proper communication skills. • Complete a job interview. • Identify non-verbal communication signals. • Create an SAE project. • Identify ways to handle conflict. • Work as a team to solve problems. • Complete a Proficiency Application. 		

<i>Academic Connections</i>	
<p>ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):</p> <p>English:</p> <p>1) 9-12 SL.1 - Participate in collaborative discussion</p> <p>2) 9-12 W.2 – Write to inform</p>	<p>Sample Performance Task Aligned to the Academic Standard(s):</p> <p>-Participate in a job interview.</p> <p>-Create a cover letter and resume.</p>

Additional Resources

- Plant Science lessons (Middle School Food and Agricultural Literacy Curriculum: Educators Resources in ffa.org)
- Agricultural Science and Technology lessons (Middle School Food and Agricultural Literacy Curriculum: Educators Resources in ffa.org)
- MyCAERT Curriculum
- Cengage Introduction to Agronomy, Food, Crops, and Environment textbook
- Plant & Soil Science: Fundamentals and Applications by Rick Parker (Delmar Cengage Learning)
- Principles of Agriculture, Food, and Natural Resources by Rayfield, Smith, Park, and Croom (Goodheart-Wilcox Publisher)
- Curriculum for Agricultural Science Education: Principles of Agricultural Science-Plant
- Curriculum for Agricultural Science Education: Animal and Plant Biotechnology
- Unleashing a Decade of Innovation in Plant Science: A Vision for 2015-2025 (www.plantsummit.files.wordpress.com)
- South Dakota Soybean Interactive Curriculum: http://www.vivayicsolutions.com/063-SDSoy&PC/16-01SoyInteractive/Gold/story_html5.html
- Communities of Practice: Horticulture/Greenhouse Management (<https://communities.naae.org/community/instruction/horticulture>)
- Communities of Practice: Floral Design (<https://communities.naae.org/community/instruction/floraldesign>)