

# PLANT SCIENCE CURRICULUM

## Course 13015

Plant Science (Horticulture) is designed to introduce students to the agricultural system. Students will learn basic principles of plant growth as it applies to crop production. They will also learn anatomy and physiological process of plants. Students will also learn about landscape design and care of landscapes, including weed control. Topics to be covered are: plant anatomy, plant physiology, environmental factors such as light, water, and soil, plant nutrition, basics of growing plants in a greenhouse, principles of landscape design and weed control.

### PLANT SCIENCE OUTLINE:

Goals	Skills	Summative Assessments	Time Frame	Main Resources
<ul style="list-style-type: none"><li>• Learn basic plant leaf anatomy and physiology.</li><li>• Learn basic plant root anatomy and physiology.</li><li>• Understand basic physiological processes that give insight to the structure of plant parts.</li><li>• Know are the main environmental factors controlled in a greenhouse.</li><li>• Understand soil differences and the effects that has on plants.</li><li>• Understand that light, temperature, and water affect the three basic physiological processes of plants.</li><li>• Know the basic principles of landscaping.</li><li>• Explain methods of weed control.</li></ul>	<ul style="list-style-type: none"><li>• Apply principles of landscaping to select plants that are appropriate for specific landscapes.</li><li>• Construct a weed/crop collection guide.</li></ul>	Unit Tests	1/2-year	

**PLANT SCIENCE MAP:**

TIME FRAME	BIG IDEAS	CONCEPTS	ESSENTIAL QUESTIONS	STANDARDS	OBJECTIVES	DIFFERENTIATION	ASSESSMENT
Unit 1 (Weeks 1)	<ul style="list-style-type: none"> <li>Horticulture is a billion dollar industry with many career options for students interested in that field.</li> </ul>	1. We will briefly explore careers in horticulture.	<ul style="list-style-type: none"> <li>What careers are available in the</li> <li>Horticulture industry?</li> </ul>	<p>3.4.8.E2 Describe how biotechnology applies the principles of biology to create commercial products or processes.</p> <p>S8.B.2.1.1 Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.</p> <p>S8.B.2.1.2 Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.</p> <p>S8.B.2.1.3 Explain that mutations can alter a gene and are the original source of new variations.</p> <p>S8.B.2.1.4 Describe how selective breeding or biotechnology can change the genetic makeup of organisms.</p> <p>S8.B.2.1.5 Explain that adaptations are developed over long periods of time and are passed from one generation to another.</p>	<p>(1) Define agriculture, agronomy, silviculture, and horticulture terms.</p> <p>(2) Describe the major divisions in the horticulture industry.</p> <p>(3) Explain various career options and business within the horticulture industry.</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>
Unit 2 (Weeks 2-3)	<ul style="list-style-type: none"> <li>The knowledge of the basic parts of plants aids in the identification, which is essential for work in a greenhouse or garden.</li> </ul>	1. Basic anatomy and physiology of leaves.	<ul style="list-style-type: none"> <li>What are the necessary parts for a plant to function?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>(1) Name the three main parts of a plant and their functions.</p> <p>(2) Name the three main parts of the cross-section of a trunk.</p> <p>(3) Describe four types of below-ground stem modifications.</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>

Unit 3 (Weeks 4-5)	<ul style="list-style-type: none"> <li>Understanding of the leaf's importance in the overall structure of the plant and their purpose in photosynthesis.</li> </ul>	1. Understanding of the leaf's importance in the overall structure of the plant and their purpose in photosynthesis	<ul style="list-style-type: none"> <li>The structure of leaves directly relates to their function as organs of photosynthesis .</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>(1) Identify basic leaf parts and their functions</p> <p>(2) Name three types of leaf characteristics that help in plant identification</p> <p>(3) Identify leaf and flower buds.</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>
Unit 4 (Weeks 6-7)	<ul style="list-style-type: none"> <li>A healthy root system is essential for the success of the overall plant.</li> </ul>	1. Roots anchor the plant; flowers and fruit perpetuate the species.	<ul style="list-style-type: none"> <li>What are the main functions of roots?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>(1) Name three functions of roots.</p> <p>(2) Describe the functions of the root for the plant.</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>
Unit 5 (Weeks 8--9)	<ul style="list-style-type: none"> <li>The fertilization and maturation of the ovary forms the fruit on most plants.</li> </ul>	1. Roots anchor the plant; flowers and fruit perpetuate the species.	<ul style="list-style-type: none"> <li>What are the types of roots?</li> <li>What is a fruit and how is it formed?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>(1) Name three functions of roots.</p> <p>(2) Name the female and male parts of a flower, and the parts of each.</p> <p>(3) Define a fruit, in scientific terms.</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>
Unit 6 (Weeks 10-11)	<ul style="list-style-type: none"> <li>The structure of the plant and adhesion aid in the movement of water through a plant.</li> </ul>	1. Basic physiological processes give insight to the structure of plant parts.	<ul style="list-style-type: none"> <li>How are photosynthesis and cellular respiration related?</li> <li>How does water move through a plant?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D</p>	<p>(1) Explain and diagram photosynthesis, or production of food</p> <p>(2) Explain and diagram respiration, or consumption of food</p> <p>(3) Explain and diagram transpiration,</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>

				Evaluate the use of technologies to increase plant and animal productivity.	or water movement through the plant.		
Unit 7 (Weeks 12-13)	<ul style="list-style-type: none"> <li>The purpose of a greenhouse is to control or modify certain environmental factors. These factors include water, temperature and light.</li> </ul>	1. Light, temperature, and water affect the three basic physiological processes of plants.	<ul style="list-style-type: none"> <li>What are the main environmental factors controlled in a greenhouse?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>Explain the effects of three environmental factors on plant functions:</p> <p>(1) light (2) temperature (3) water</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>
Unit 8 (Weeks 14-15)	<ul style="list-style-type: none"> <li>Important nutrients such as nitrogen, phosphorus and potassium are critical for plant growth.</li> </ul>	1. Seventeen essential minerals are required for normal physiological processes of plants.	<ul style="list-style-type: none"> <li>What are the critical nutrients for most plants?</li> <li>How do the plants acquire the important nutrients?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>(1) Name the 17 elements that form critical links in the chain of plant nutrition,</p> <p>(2) Explain how plants absorb nutrients, and</p> <p>(3) Summarize the functions of 6 of the 9 macronutrients.</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>
Unit 9 (Weeks 16)	<ul style="list-style-type: none"> <li>When creating a garden or landscaping design, soil is an essential part of all planning.</li> </ul>	1. The root-soil interface and the physical makeup of the soil relate heavily to the normal physiological processes of plants.	<ul style="list-style-type: none"> <li>What are the layers of the soil?</li> <li>What are the components that make up soil?</li> <li>What is the ideal pH for healthy soil?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>(1) Name and describe 5 soil layers,</p> <p>(2) Summarize five physical properties of soil and how they relate to plant health,</p> <p>(3) Quantify the percentages of the 4 components of soil, and</p> <p>(4) Point out the ideal soil pH for most plants.</p>	<p>All directions read aloud Guided notes provided Separate Testing Environment</p>	<p>Student quizzes Participation in maintenance of the greenhouse Unit test</p>
Unit 10 (Weeks 17)	<ul style="list-style-type: none"> <li>The ability to choose a proper design when landscaping is essential for an</li> </ul>	1. In this lesson we'll examine the steps in the process a designer	<ul style="list-style-type: none"> <li>How is a design chosen for landscaping?</li> </ul>	3.4.8.E2 Describe how biotechnology applies the principles of biology to create commercial products or processes.	(1) List the goals of the two steps of the design analysis,	<p>All directions read aloud Guided notes provided</p>	<p>Student quizzes Participation in maintenance of the greenhouse</p>

	aesthetic end product.	follows for any landscape design project.	<ul style="list-style-type: none"> <li>• What factors are involved in selecting plants for the landscaping design?</li> </ul>	<p>S8.B.2.1.1 Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.</p> <p>S8.B.2.1.2 Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.</p> <p>S8.B.2.1.3 Explain that mutations can alter a gene and are the original source of new variations.</p> <p>S8.B.2.1.4 Describe how selective breeding or biotechnology can change the genetic makeup of organisms.</p> <p>S8.B.2.1.5 Explain that adaptations are developed over long periods of time and are passed from one generation to another.</p>	<p>(2) Describe the evolution of a landscape design through four drawings, and</p> <p>(3) Discuss some factors involved in selecting plant materials.</p>	Separate Testing Environment	Unit test
Unit 11 (Weeks 18)	<ul style="list-style-type: none"> <li>• Developing a successful watering cycle and controlling weeds are important in the basic concept of gardening.</li> </ul>	1. Eliminating weed competition, proper watering techniques, and appropriate choices of mulch material enhance proper development of plants	<ul style="list-style-type: none"> <li>• What are the best methods for controlling weeds?</li> <li>• What are the most successful watering techniques for greenhouses?</li> </ul>	<p>4.1.10.D Research practices that impact biodiversity in specific ecosystems.</p> <p>Analyze the relationship between habitat changes to plant and animal population fluctuations.</p> <p>4.4.10.D Evaluate the use of technologies to increase plant and animal productivity.</p>	<p>(1) Describe two methods of controlling weeds,</p> <p>(2) Discuss watering techniques, and</p> <p>(3) List several mulch materials.</p>	All directions read aloud Guided notes provided Separate Testing Environment	Student quizzes Participation in maintenance of the greenhouse Unit test