Options EHS Plant Science	Scope and Sequence
Unit Lesson	**Objectives**
WHAT IS PLANT SCIENCE?	
What Is Plant Science?	
	Explain the elements of both plant science and plant systems.
	Compare the goals of the three major industries involving the plant sciences.
	Discuss the growing topics of research involving plant systems that are taking place today.
The Scientific Classification of Plants	
	Explain the importance of taxonomy in plant biology.
	Describe the different kinds of reproduction that take place in various plant phyla.
	Diagram the various parts of a flower and a leaf.
Project: Understanding Phyla, Families, and Species	
Plant and Seed Identification	
	Understand the crucial role of the seed in the plant system.
	Compare the different kinds of crops crucial to North American agriculture in terms of both purpose and biology.
	Recognize the parts of various plants and seeds and their uses both as food and other commodities.
Soil Types	
	Describe the characteristics of the three main soil textures.
	Explain the role of organic and inorganic material in soil.
	Know why soil horizons and soil taxonomy information is important to plant scientists.
Project: Determining Soil Types	
Soil Nutrient Management	

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Unit Lesson	**Objectives**
	Evaluate a soil’s acidity and know how to amend it.
	Understand the nitrogen cycle and the role of fertilizer’s in it.
	Enumerate the dangers of fertilizer misuse.
	Explain the advantages and disadvantages of compost.
Conservation Practices	
	Explain the advantages and disadvantages of monoculture and polyculture.
	Understand the impact of nonpoint source pollution on water.
	Implement an agricultural plan using the conservation methods of multiple cropping and integrated pest management.
Test	
PLANT STRUCTURE AND FUNCTION	
Plant Anatomy	
	Identify the various parts of plants, flowers, grasses, and trees and the purposes of each.
	Explain the different types of flowers and their physiology.
	Understand the various ways plants grow from their roots and stems..
Project: Illustrating the Features of Flowers	
Seeds, Germination, and Dispersal	
	Diagram the parts of a seed and describe each part’s function.
	Discuss various ways that plants disperse their seeds and how the seeds are adapted for that purpose.
	Understand the dangers of invasive species..
	Explain some benefits and deficits of genetically modified seed.
Pollination and Plant Reproduction	

Options EHS Plant Science		Scope and Sequence
Unit	**Lesson**	**Objectives**
		Explain the difference between asexual and sexual plant reproduction and describe examples of each.
		Understand the concept of the critical photoperiod and how it relates to short- and long-day plants.
		Graft one plant onto another to create a your own hybrid plant.
	Project: Pollination and Colony Collapse Disorder	
	Photosynthesis	
		Diagram the structures within a leaf, outlining the role each plays in the process of photosynthesis.
		Explain how different classes of herbicides work by inhibiting photosynthesis.
		Evaluate the role of photosynthesis in the carbon cycle and its relationship to climate change.
	Project: The Effects of Light on Plant Growth	
	Respiration	
		Explain the difference between photosynthesis and respiration.
		Diagram the four stages of respiration.
		Understand how the environment impacts respiration.
	Biotechnology and Agriculture in Society	
		Understand the difference between genetic engineering and cross-breeding.
		Explain the advantages and disadvantages of gmos.
		Discern credible sources for evaluating the safety of gm food.
	Project: Investigating Golden Rice	
	Test	
CROP MANAGEMENT		
	Growing Climates of the United States	
		Compare the advantages of the USDA Hardiness Map and the Koppen-Geiger climate

Unit	Lesson	Objectives
		classification.
		Explain the factors that create microclimates in a region and identify microclimates when you see them.
		Calculate growing degree days for a particular crop and discuss its relationship to pest management.
	Yield Calculations and Pest Identification	
		Understand the basic scientific principles behind crop yields.
		Identify common cereal crops pests and diseases in the United States.
		Explain the four components of a successful IPM program.
		Create an IPM plan to minimize damage to a model crop, such as corn.
	Project: Integrated Pest Management for a Model Crop	
	Agricultural Technology	
		Explain the environmental benefits of precision agriculture.
		Describe how some current threats to agriculture are not addressed by current precision technology.
		Create a framework for a precision agriculture plan for a cereal crop farm.
	Project: Precision Agriculture in Your State: A Web Page Summary for the Chamber of Commerce	
	Crop Management and Pesticides	
		Explain the details of a crop management plan for a specific crop.
		Describe how IPM is used beyond agriculture.
		Compare several different categories of pesticides, naming advantages and disadvantages of each.
	Yield Calculations	

Options EHS Plant Science		Scope and Sequence
Unit	**Lesson**	**Objectives**
		Explain the importance of crop yield estimates.
		Calculate an estimated crop yield from sample data.
		Describe the importance of high-yield farming in the 21st century.
	Crop Management and Stewardship of Natural Resources	
		Name and describe several farming practices that promote stewardship of natural resources.
		Compare the similarities and differences between sustainable agriculture, sustainable crop intensification, and conservation agriculture.
		Explain the elements of your state's Right to Farm law.
	Project: Sustainable Agriculture in Your State: A Research Study Profile	
	Test	
SPECIALTY CROPS		
	Greenhouses and Production Methods	
		Identify the different types of greenhouses and explain what crops grow best in which type.
		Design a functioning greenhouse that has an appropriate temperature regulation and light control system.
		Explain how solar radiation creates an ideal environment for plant growth.
	Project: The Greenhouse Effect	
	Greenhouse Growth Techniques	
		Compare the types and properties of many soilless media and mixtures.
		Explain the advantages and disadvantages of hydroponics over regular gardening.
		Create a simple IPM plan for a greenhouse.
	Greenhouse Retail Products	

Options EHS Plant Science		Scope and Sequence
Unit	**Lesson**	**Objectives**
		Explain the differences between greenhouses that grow the common trio of bedding plants, mums, and poinsettias and those that grow cut flowers.
		Compare and contrast the differences between selling greenhouse products as a retailer and as a wholesaler.
		Describe the business skills necessary to be a successful horticulturist, regardless of whether the crop is flowers or vegetables.
	Project: Schedule for a Bedding Plant–Mum–Poinsettia Greenhouse Operation	
	Orchards	
		Become familiar with the most common orchard, grove, and vineyard crops grown in the United States.
		Demonstrate two methods for grafting fruit tree scions and rootstocks.
		Design an orchard using the principles of passive freeze protection.
		Explain the pruning techniques appropriate for apple and cherry trees.
		Evaluate common harvest and storage techniques.
	Landscape Design	
		Design a shade garden and a butterfly garden, naming appropriate plants and features for each.
		Explain the philosophical differences between a jardin a la francais and a Japanese tea garden.
		Evaluate any given garden in terms of the design principles of line, form, color, texture, and unity.
	Turfgrass	
		Explain the characteristics that common species of turfgrass have in common.
		Diagram the main structures common to all grass plants.
		Create an IPM plan for a school soccer field.
	Project: Water Management for Golf Courses	
	Test	

Options EHS Plant Science		Scope and Sequence
Unit	**Lesson**	**Objectives**
PLANT SCIENCE CAREERS		
	Careers in Agronomy	
		Explain how the Morrill Act continues to influence the study of agriculture in the twenty-first century.
		Place agricultural jobs on a continuum ranging from those requiring the least education to those requiring the most.
		Discuss why it is advantageous for those employed in agriculture to understand the concepts of natural capital, ecological services, and externalities.
	Careers in Horticulture	
		Explain the purpose of the nationwide cooperative extension program.
		Outline the education and/or career path you would take to become a botanist whose research focuses on developing a frost-resistant variety of rose.
		Compare and contrast the skills and education necessary to be a successful floriculturist, plant pathologist, and arborist.
		Become aware of some of the professional organizations that can provide information vital to career development in horticulture.
	Project: Interview a Master Gardener	
	Careers in Landscape Design	
		Explain the difference between the job duties and qualifications of a landscape designer and a landscape architect.
		Use online resources to obtain education and career information for various jobs and careers in the landscaping profession.
		Analyze the theory of landscape urbanism and discuss how it seeks to transcend the goals of traditional landscape architecture.
		Become aware of the various organizations that are available for the support of landscape professionals.
	Project: Investigating Landscape Urbanism	

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	Plant Science Employers	
		Compare the qualifications and skills needed to work in the plant sciences as a business owner, as a government employee, at a non-profit, or at a for-profit company.
		Describe the functions of the various services that comprise the U.S. Department of Agriculture.
		Explain the similarities and differences of the major agriculture/seed companies.
	Project: Conducting a Job Shadow	
	Agricultural Economics	
		Explain how agricultural commodities futures and options work.
		Describe how agricultural supply chain management relates to the field of agronomics.
		Analyze the intent and purpose of the U.S. Farm Bill in relation to the intent and purpose of the original Agricultural Adjustment Act in 1933 and explain whether it still fulfills its mission.
	Project: Agronomics: Studies from the Economic Research Service	
	Plant Science Career Outlooks	
		Compare high-level national Bureau of Labor Statistics data on plant science careers with more detailed state level data to determine job outlooks in different parts of the country.
		Perform self-guided career planning using online resources.
		Understand the value and limitations of BLS plant science career data, including education, skills, and salary.
	Test	
COURSE PROJECT, REVIEW, AND EXAM		
	Review	
	Exam	