

NEW MILFORD PUBLIC SCHOOLS

New Milford, Connecticut



Plant Science 2

April 2021

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New Milford's Mission Statement

The mission of the New Milford Public Schools, a collaborative partnership of students, educators, family and community, is to prepare each and every student to compete and excel in an ever-changing world, embrace challenges with vigor, respect and appreciate the worth of every human being, and contribute to society by providing effective instruction and dynamic curriculum, offering a wide range of valuable experiences, and inspiring students to pursue their dreams and aspirations.

Plant Science II

Grades 11 and 12

Plant Science II is a continuation of the Plant Science I course geared towards a career in the field of horticulture. In Plant Science II, emphasis is placed on the care and use of plants in the outdoors. Students will gain hands-on experience in growing plants from seed and cuttings. Students will learn about soil and composting, seeds and germination, herb gardens, annual and perennial flowering plants, and vegetable gardening. Students will be able to explore their creativity in the design of a vegetable garden using the plants that they learned about. Students should gain an appreciation of the importance and use of plants in their own lives.

Pacing Guide

Include a list of the units and the approximate number of days/weeks it will take to teach the unit.

Unit #	Unit Name	Weeks
Third Marking Period		
1	Soil, Fertilizer, and Composting	4
2	Seeds and Germination	3
3	Herbs, Spices, and Herb Gardens	2
Fourth Marking Period		
4	Annuals and Perennials	2
5	Pests and Pest Management	2
6	Gardening and Hardiness Zones	3
7	Flower Arranging	2

Unit 1: Soil, Fertilizer, and Composting

Stage 1: Desired Results		
<p>ESTABLISHED GOALS</p> <ul style="list-style-type: none"> • NGSS - HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. • CCSS.ELA-Literacy.RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. • CCSS.ELA-Literacy.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. • SEL Competency: Self-awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts. 	Transfer	
	<p><i>Students will be able to independently use their learning to...</i></p> <ul style="list-style-type: none"> • Develop an interest and sense of purpose in the field of horticulture. • Establish the skills required to be successful in a horticulture career. • Recognize one's strengths and limitations with a well-grounded sense of confidence and purpose. • Developing and using models • Planning and carrying out investigations • Obtaining, evaluating, and communicating information 	
	Meaning	
	<p>UNDERSTANDINGS <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • The formation of soil is necessary for plant growth. • There are various textures of soil based on their composition. • Fertilizer helps replace nutrients in soil that have been depleted. • Composting has benefits for gardening and the environment. 	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <ul style="list-style-type: none"> • How does the make up of soil affect plant growth? • What can be done to improve soil conditions? • How does composting affect a positive influence on the environment? • What nutrients are provided by fertilizers?
	Acquisition	
	<p><i>Students will know...</i></p> <ul style="list-style-type: none"> • Soil is a mixture of minerals, water, air, and organic matter. • The type of soil is determined by its composition of silt, sand, and clay. • The symptoms of plant nutrient deficiencies. • The specific type and amount of macronutrients needed in fertilizer to treat a plant that has nutrient deficiency. • Composting is a natural way to add nutrients back into the soil and help reduce greenhouse gasses. 	<p><i>Students will be skilled at...</i></p> <ul style="list-style-type: none"> • Explaining how soil is formed and why it is important to living organisms. • Describing the texture of the 3 components of soil. • Identifying the macronutrient ratios in fertilizers and plant nutrient deficiencies. • Interpreting the label on a fertilizer bag. • Explaining the benefits of composting on the environment. Using a soil texture triangle to determine the type of soil. • Constructing a compost pile from household scraps and waste. • Practicing teamwork and collaborative problem-solving

Stage 2 – Evidence		
Code	Evaluative Criteria	Assessment Evidence
A, M, T	Teacher created checklist of project guidelines and requirements.	<p>PERFORMANCE TASK(S):</p> <p>Goal: To design a fertilizer bag that contains the correct ratio of nutrients.</p> <p>Role: Gardener.</p> <p>Audience: Student peers and teacher</p> <p>Situation: Students have been assigned a plant that has an unknown nutrient deficiency.</p> <p>Performance: After identifying the plant nutrient deficiency, students must use this information and their understanding of macronutrients to design a fertilizer bag that contains the correct ratio of macronutrients.</p> <p>Standards for Success: The correct plant nutrient deficiency is identified and the macronutrient ratios are correct on fertilizer bag.</p>
A, M A, M A, M, T A, M, T A, M, T A, M, T A, M, T		<p>OTHER EVIDENCE:</p> <p><i>Students will show they have achieved Stage 1 goals by...</i></p> <p>Formative:</p> <ul style="list-style-type: none"> • Interactive Notebook Warm-Up • Worksheets • Video Assignments • Lab / Experiments <p>Summative:</p> <ul style="list-style-type: none"> • Unit Self Evaluation from Textbook • Research Project • Unit Test / Quizzes

Stage 3 – Learning Plan		
	Pre-Assessment	
	Pre-assessment will be in the form of a class discussion about students' knowledge of the role of soil in the care of plants.	
Code	Summary of Key Learning Events and Instruction	Progress Monitoring
A	<ul style="list-style-type: none"> Teacher presents notes - Soil and Soil Formation 	<ul style="list-style-type: none"> Warm-Up Questions or Brief Discussions.
A, M	<ul style="list-style-type: none"> Student completes a series of tasks which include questions based on notes - Soil and Soil Formation Worksheet 	<ul style="list-style-type: none"> Monitor student notes during note taking or pear deck responses.
A	<ul style="list-style-type: none"> Teacher presents notes on Soil Textures 	<ul style="list-style-type: none"> Exit tickets
A, M, T	<ul style="list-style-type: none"> Students use a soil texture triangle chart to determine the soil type of various examples on Soil Texture Triangle Activity 	<ul style="list-style-type: none"> Teacher Check-In during Activities or Labs
A, M, T	<ul style="list-style-type: none"> Students collect soil from home and bring it back to the lab. They then examine the soil sample and perform calculations to determine the texture (type) of soil of their sample - Lab: Soil Jar Experiment 	<ul style="list-style-type: none"> Teacher Check-In during test taking
A, M	<ul style="list-style-type: none"> Students find examples of fertilizer bag labels online and identify key information from each bag label - Fertilizer Label Activity 	
A, M, T	<ul style="list-style-type: none"> After identifying the plant nutrient deficiency, students must use this information and their understanding of macronutrients to design a fertilizer bag that contains the correct ratio of macronutrients - Design a Fertilizer Bag 	
A	<ul style="list-style-type: none"> Teacher presents concepts - composting 	
A, M	<ul style="list-style-type: none"> Students watch video and answer questions - Edpuzzle: Composting for Beginners 	
T	<ul style="list-style-type: none"> Students demonstrate an understanding of concepts from Unit 1 - Test 	

Unit 2: Seeds and Germination

Stage 1 – Desired Results

ESTABLISHED GOALS	<i>Transfer</i>	
<ul style="list-style-type: none"> ● NGSS - MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. ● CCSS.ELA-Literacy.RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. ● CCSS.ELA-Literacy.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. ● SEL Competency: Self-awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts. 	<i>Students will be able to independently use their learning to...</i> <ul style="list-style-type: none"> ● Develop an interest and sense of purpose in the field of horticulture. ● Establish the skills required to be successful in a horticulture career. ● Recognize one's strengths and limitations with a well-grounded sense of confidence and purpose. ● Developing and using models ● Planning and carrying out investigations ● Constructing explanations ● Obtaining, evaluating, and communicating information. 	
	<i>Meaning</i>	
	UNDERSTANDINGS <ul style="list-style-type: none"> ● Plants change their forms as part of their life cycles. ● Plants have evolved to produce seeds as a method of reproduction. ● Dormancy is a period of suspended life processes brought on by changes in the environment. ● There are several methods of priming seeds to speed up the germination process. 	ESSENTIAL QUESTIONS <ul style="list-style-type: none"> ● What are the structures of a seed? ● What factors affect seed germination? ● Why do seeds remain dormant? ● How can seeds be primed to help them germinate?
	<i>Acquisition</i>	
	<i>Students will know...</i> <ul style="list-style-type: none"> ● Seeds are formed as a product of sexual reproduction between the male and female organs of a plant(s). ● There are several factors that initiate the germination of seeds. ● Seeds provide an evolutionary advantage for plant reproduction. ● Seeds remain dormant to survive extreme conditions in their environment. ● Several methods of seed priming. 	<i>Students will be skilled at...</i> <ul style="list-style-type: none"> ● Identifying the internal and external structures of monocot and dicot seeds. ● Explain the conditions needed for seeds to begin germination. ● Planting and maintaining several plants that they started from seeds. ● Describing the environmental conditions that cause seeds to remain dormant and what causes them to break dormancy. ● Practicing teamwork and collaborative problem-solving

Stage 2 – Evidence		
Code	Evaluative Criteria	Assessment Evidence
A, M, T	Teacher will observe students throughout the lab/activity to ensure the proper use of scalpel and dissection techniques. Teacher will monitor the progress of the conclusion questions. Students will be evaluated by the questions on the lab handout.	<p>PERFORMANCE TASK(S):</p> <p>Goal: To identify the internal and external structures in monocot and dicot seeds and create diagrams to reference.</p> <p>Role: Plant Scientist conducting an experiment in the lab.</p> <p>Audience: Student peers and teacher.</p> <p>Situation: Students are given two types of seeds to dissect and stain.</p> <p>Performance: Students dissect monocot and dicot seeds and stain them in order to identify the external and internal structures within the seeds. Students then create diagrams of both types of seeds.</p> <p>Standards for Success:.</p>
A, M A, M, T A, M, T A, M, T T A, M, T		<p>OTHER EVIDENCE:</p> <p><i>Students will show they have achieved Stage 1 goals by...</i></p> <p>Formative:</p> <p>Interactive Notebook Warm-Ups</p> <p>Worksheets</p> <p>Lab Activities</p> <p>Summative:</p> <p>Unit Self Evaluation</p> <p>Unit Test / Quizzes</p> <p>Authentic Assessment</p>

Stage 3 – Learning Plan		
<i>Pre-Assessment</i>		
	The pre-assessment for this unit includes a class discussion on how and why seeds are important to plants and humans.	
Code	Summary of Key Learning Events and Instruction	Progress Monitoring
A, M	<ul style="list-style-type: none"> Students engage in an interactive science simulation - Gizmo: Germination 	<ul style="list-style-type: none"> Warm-Up Questions or Brief Discussions. Monitor student notes during note taking or pear deck responses. Exit tickets Teacher Check-In during Activities or Labs Teacher Check-In during test taking
A	<ul style="list-style-type: none"> Teacher presents content - Seeds and Germination (Parts 1 and 2) 	
A, M, T	<ul style="list-style-type: none"> Students create a diagram of the Internal and external Structures of Seeds 	
A,M, T	<ul style="list-style-type: none"> Lab: Monocot and Dicot Seeds - Students dissect monocot and dicot seeds and stain them in order to identify the external and internal structures within the seeds. Students then create diagrams of both types of seeds. 	
A	<ul style="list-style-type: none"> Teacher presents content - Seed Preparation 	
A, M, T	<ul style="list-style-type: none"> Seed Germination Experiment - Students grow radish seeds in a plastic bag and rotate the bag over several days in order to observe the effects of gravity on root growth. 	
T	<ul style="list-style-type: none"> Students demonstrate an understanding of concepts from Unit 2 - Test 	

Unit 3: Herbs, Spices, and Herb Gardens

Stage 1 – Desired Results

ESTABLISHED GOALS	<i>Transfer</i>	
<ul style="list-style-type: none"> ● NGSS - HS-1.2.2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. ● CCSS.ELA-Literacy.RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. ● SEL Competency: Self-awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts. 	<i>Students will be able to independently use their learning to...</i> <ul style="list-style-type: none"> ● Develop an interest and sense of purpose in the field of horticulture. ● Establish the skills required to be successful in a horticulture career. ● Recognize one's strengths and limitations with a well-grounded sense of confidence and purpose. ● Developing and using models ● Planning and carrying out investigations ● Constructing explanations ● Obtaining, evaluating, and communicating information 	
	<i>Meaning</i>	
	UNDERSTANDINGS <i>Students will understand that...</i> <ul style="list-style-type: none"> ● Herbs and spices come from different plant structures. ● Herbs and spices have many historical and modern uses. ● Herb gardens are an easy way to garden at home. 	ESSENTIAL QUESTIONS <i>Students will keep considering...</i> <ul style="list-style-type: none"> ● How are herbs and spices similar and different from each other? ● What are some common uses for herbs and spices both present and past? ● What are the best herbs to grow in an herb garden?
	<i>Acquisition</i>	
	<i>Students will know...</i> <ul style="list-style-type: none"> ● Herbs come from the stems and leaves of plants, while spices come from the roots, flowers, fruits, bark, and seeds. ● Some of the historical and modern uses for herbs and spices. ● Herb gardens play an important role in horticulture and are used in the culinary field as well. 	<i>Students will be skilled at...</i> <ul style="list-style-type: none"> ● Describing the differences between an herb and a spice. ● Identifying the structures that specific herbs and spices come from. ● Explaining past and modern uses of various herbs and spices. ● Designing a presentation using research conducted on an herb/spice of their choosing. ● Designing, planting, and maintaining an herb garden. ● Asking questions ● Practicing teamwork and collaborative problem-solving

STAGE 2

Code	Evaluative Criteria	Assessment Evidence
A, M, T	Teacher-created rubric.	<p>PERFORMANCE TASK(S):</p> <p>Goal: To research an herb/spice of students choosing and present it to their peers.</p> <p>Role: Plant Scientist doing research on herbs and spices.</p> <p>Audience: Other plant scientists</p> <p>Situation: Research is done on an herb or spice chosen by each student.</p> <p>Performance: Students conduct research on an herb or spice. They will then create a poster or slide presentation of their findings.</p> <p>Standards for Success: Presentations successfully communicate modern uses, historical uses, growth requirements, picture, methods of propagation and recipe using their herb or spice.</p>
<p>A,M</p> <p>A, M</p> <p>A, M, T</p> <p>T</p>		<p>OTHER EVIDENCE:</p> <p><i>Students will show they have achieved Stage 1 goals by...</i></p> <p>Formative:</p> <p>Interactive Notebook Warm-Ups</p> <p>Worksheets</p> <p>Lab Activities</p> <p>Summative:</p> <p>Unit Test / Quizzes</p>

Stage 3 – Learning Plan

Pre-Assessment

The pre-assessment for this unit is a slide show presentation of various herbs and spices. Students will try and figure out what plant structure they come from.

Code	Summary of Key Learning Events and Instruction	Progress Monitoring
A A, M, T	<ul style="list-style-type: none">• Teacher will deliver content - Herbs vs Spices• Students conduct research on an herb or spice. They will then create a poster or slide presentation of their findings - Herbs and Spices Project	<ul style="list-style-type: none">• Warm-Up Questions or Brief Discussions.• Monitor student notes during note taking or pear deck responses.
A, M	<ul style="list-style-type: none">• Students will observe the techniques used to plant a culinary herb garden - Video: How to Plant a Culinary Garden	<ul style="list-style-type: none">• Exit tickets• Student project-based assignments.
A T	<ul style="list-style-type: none">• Teacher will deliver content - Herb Garden Design• Students use their knowledge of various herbs to design an herb garden - Design Project: Herb Garden	<ul style="list-style-type: none">• Teacher Check-In during Activities or Labs• Group Discussions with Lab Partners

Unit 4: Annuals and Perennials

Stage 1 – Desired Results

ESTABLISHED GOALS	<i>Transfer</i>	
<ul style="list-style-type: none"> ● MS-LS1-4. Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. ● CCSS.ELA-Literacy.RST.11-12 .1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. ● CCSS.ELA-Literacy.RST.11-12 .3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. ● SEL Competency: Self-awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts. 	<p><i>Students will be able to independently use their learning to...</i></p> <ul style="list-style-type: none"> ● Develop an interest and sense of purpose in the field of horticulture. ● Establish the skills required to be successful in a horticulture career. ● Recognize one's strengths and limitations with a well-grounded sense of confidence and purpose. ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Obtaining, evaluating, and communicating information 	
	<i>Meaning</i>	
	<p>UNDERSTANDINGS <i>Students will understand that...</i></p> <ul style="list-style-type: none"> ● The differences between annuals and perennials must be considered when choosing plants for any type of garden. ● Seeds are an easy way to propagate plants for a garden or for retail. ● Using the proper techniques and growing conditions when planting seeds will help to ensure successful germination and growth of a mature plant. 	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <ul style="list-style-type: none"> ● What are the differences between annual and perennial plants? ● What are some examples of annual and perennial plants? ● What are the proper techniques for planting seeds? ● What are the correct conditions for growing and maintaining annual bedding plants and vegetables?
	<i>Acquisition</i>	
	<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Annuals are plants that germinate, grow, reproduce, and die within one year. They must be replaced each year. ● Perennials are cold hardy plants that survive the winter and return in the spring each year. ● Annuals can be started from seeds in the greenhouse and are relatively easy to maintain. 	<p><i>Students will be skilled at...</i></p> <ul style="list-style-type: none"> ● Identifying by name several annual and perennial flowering plants ● Describing the differences between annual and perennial plants ● Recognizing the unique characteristics of these plants and their uses in the landscape ● Completing a coloring book of the perennial plants presented each week ● Practicing teamwork and collaborative problem-solving

Stage 2 – Evidence		
Code	Evaluative Criteria	Assessment Evidence
A, M, T	Teacher-created rubric.	<p>PERFORMANCE TASK(S):</p> <p>Goal: To identify various garden pests and find a natural way of controlling them.</p> <p>Role: Gardener</p> <p>Audience: Customer</p> <p>Situation: Student has been hired by a customer determine the</p> <p>Performance: Students first choose a theme for the mailbox garden. They then design a mailbox garden using annual flowers.</p> <p>Standards for Success: Students can successfully choose a theme for the mailbox garden that uses an element of design. They then design the garden around the theme making sure that the flowers have the correct height and spacing.</p>
<p>A, M</p> <p>A, M, T</p> <p>M, T</p>		<p>OTHER EVIDENCE:</p> <p><i>Students will show they have achieved Stage 1 goals by...</i></p> <p>Formative:</p> <p>Worksheets</p> <p>Lab Activities</p> <p>Summative:</p> <p>Mailbox Garden Project</p>

Stage 3 – Learning Plan

Pre-Assessment

The pre-assessment for this unit is a group discussion of the possible reasons people would choose annuals and perennials.

Code	Summary of Key Learning Events and Instruction	Progress Monitoring
A A, M, T	<ul style="list-style-type: none">Teacher will deliver content - Annual Bedding PlantsStudents research the basic growth and gardening information of 15 - 20 annual flowers to use in the mailbox garden project - Flower Coloring Pages (Started at the beginning of the semester)	<ul style="list-style-type: none">Warm-Up Questions or Brief Discussions.Monitor student notes during note taking or pear deck responses.
A, M, T	<ul style="list-style-type: none">Students will review various types of annual flowers - Annuals Review Worksheet	<ul style="list-style-type: none">Exit ticketsStudent project-based assignments.
A A, M	<ul style="list-style-type: none">Teacher will deliver content - Perennials and GroundcoverStudents will investigate differences between annuals and perennials - Article: The Difference Between Annuals and Perennials	<ul style="list-style-type: none">Teacher Check-In during Activities or Labs
A, M, T	<ul style="list-style-type: none">Students first choose a theme for the mailbox garden - They then design a mailbox garden using annual flowers. Garden Mailbox Project	
T	<ul style="list-style-type: none">Students demonstrate an understanding of concepts from Unit 4 - Self Evaluation	

Unit 5: Pests and Pest Management

Stage 1 – Desired Results

ESTABLISHED GOALS	<i>Transfer</i>	
<ul style="list-style-type: none"> ● CCSS.ELA-Literacy.RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. ● CCSS.ELA-Literacy.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. ● SEL Competency: Self-awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts. 	<i>Students will be able to independently use their learning to...</i> <ul style="list-style-type: none"> ● Develop an interest and sense of purpose in the field of horticulture. ● Establish the skills required to be successful in a horticulture career. ● Recognize one's strengths and limitations with a well-grounded sense of confidence and purpose. ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Obtaining, evaluating, and communicating information 	
	<i>Meaning</i>	
	UNDERSTANDINGS <i>Students will understand that...</i> <ul style="list-style-type: none"> ● Plants can become victims of many different pests and environmental problems. ● There are chemical and natural ways to control those pests and deal with the environmental problems. 	ESSENTIAL QUESTIONS <i>Students will keep considering...</i> <ul style="list-style-type: none"> ● What types of pests can create problems with a garden? ● What are some environmental problems that interfere with the health of plants? ● How can these pests and problems be controlled without harming the environment?
	<i>Acquisition</i>	
	<i>Students will know...</i> <ul style="list-style-type: none"> ● There are many types of insects and fungal diseases that have a negative impact on vegetation. ● Pest management includes methods of treating and preventing insects and certain fungal diseases. 	<i>Students will be skilled at...</i> <ul style="list-style-type: none"> ● Identifying potential insect pests that are harmful to garden vegetation. ● Identifying the symptoms of pest and/or plant disease damage. ● Determining the correct pest management control to treat and prevent pests and fungal diseases. ● Practicing teamwork and collaborative problem-solving ● Asking questions

Stage 2 – Evidence		
Code	Evaluative Criteria	Assessment Evidence
A, M, T	Teacher created rubric	<p>PERFORMANCE TASK(S):</p> <p>Goal: To conduct research on five agricultural pests to determine the damage caused to plants and common ways to control the pest.</p> <p>Role: Plant Scientist working in pest management.</p> <p>Audience: Other plant scientists</p> <p>Situation: Presentation of common agricultural pests.</p> <p>Performance: Students are presented with five agricultural pests in which they perform research of plant damage and common control methods.</p> <p>Standards for Success: Students can successfully describe the vegetative damage and pest management strategy.</p>
<p>A,M</p> <p>A, M</p> <p>A, M, T</p>		<p>OTHER EVIDENCE:</p> <p>Formative: Worksheets Activities</p> <p>Summative: Research Projects</p>

Stage 3 – Learning Plan

	<p align="center">Pre-Assessment</p> <p>Students will break out into groups. They will be presented with pictures of plants that have been exposed to various pests and diseases. They will discuss any observations they have made as to what plant functions might be affected by the pest/problem.</p>	
Code	Summary of Key Learning Events and Instruction	Progress Monitoring
A	<ul style="list-style-type: none"> Teacher will deliver content - Pests and Problems 	<ul style="list-style-type: none"> Warm-Up Questions or Brief Discussions.
A, M	<ul style="list-style-type: none"> Students will match symptoms and potential pests and problems of plants - Pest and Problems Worksheet 	<ul style="list-style-type: none"> Monitor student notes during note taking or pear deck responses.
A, M	<ul style="list-style-type: none"> Students will explore alternative ways to combat pests in gardens - Article: Combating Pests in Agriculture 	<ul style="list-style-type: none"> Exit tickets
A	<ul style="list-style-type: none"> Teacher will deliver content - Integrated Pest Management 	<ul style="list-style-type: none"> Student project-based assignments.
A, M	<ul style="list-style-type: none"> Students will practice identifying garden pest insects - Garden Pest Matching Slides 	<ul style="list-style-type: none"> Teacher Check-In during Activities or Labs
A, M, T	<ul style="list-style-type: none"> Students examine the scenario and determine what the potential pest problem is. They will then research the best pest control strategy and develop a plan to manage the pest - Integrated Pest Management Scenarios 	
A, M, T	<ul style="list-style-type: none"> Students are presented with five agricultural pests in which they perform research of plant damage and common control methods - Agricultural Pest Project 	

Unit 6: Gardening and Hardiness Zones

Stage 1 – Desired Results

ESTABLISHED GOALS	<i>Transfer</i>	
<ul style="list-style-type: none"> ● MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services. ● CCSS.ELA-Literacy.RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. ● CCSS.ELA-Literacy.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. ● SEL Competency: Self-awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts. 	<p><i>Students will be able to independently use their learning to...</i></p> <ul style="list-style-type: none"> ● Develop an interest and sense of purpose in the field of horticulture. ● Establish the skills required to be successful in a horticulture career. ● Recognize one's strengths and limitations with a well-grounded sense of confidence and purpose. ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Obtaining, evaluating, and communicating information 	
	<i>Meaning</i>	
	<p>UNDERSTANDINGS <i>Students will understand that...</i></p> <ul style="list-style-type: none"> ● Hardiness zones determine the type of perennial plants that can be successfully grown in a given area. ● The proper planning of vegetable gardens is essential to ensure the maximum yield of crops. ● Having a garden at home is an economical way to provide your family with fruits and vegetables. 	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <ul style="list-style-type: none"> ● What are hardiness zones? ● What plants will be successful in the regional hardiness zones? ● What design elements need to be considered when planning a vegetable garden? ● How is a home vegetable garden beneficial to the environment and personal economy?
	<i>Acquisition</i>	
	<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Each hardiness zone is determined by the average minimum temperature over a 30 year period. ● Hardiness zones can be used to determine which perennial plants can survive from year to year. ● Planting a garden requires precise planning in order to maximize the yield of your crop. 	<p><i>Students will be skilled at...</i></p> <ul style="list-style-type: none"> ● Identifying the U.S. hardiness zones. ● Describing what types of plants are suitable for each zone. ● Identifying various types of garden design strategies. ● Researching the requirements to plan and design a garden that maximizes the yield of vegetables. ● Identifying planting information from the seed packets being used in their gardening. ● Practicing teamwork and collaborative problem-solving

Stage 2 – Evidence		
Code	Evaluative Criteria	Assessment Evidence
A, M, T	Teacher will observe students throughout the lab/activity to ensure the students understand the assignment. Teacher will monitor the progress through the research portion of the project. Students will submit planning to the teacher before plotting their gardens.	<p>PERFORMANCE TASK(S):</p> <p>Goal: To construct a garden that maximizes the crop yield.</p> <p>Role: Gardener</p> <p>Audience: Peers and Teacher</p> <p>Situation: Students perform research and then design a garden plot.</p> <p>Performance: Students will conduct research to determine the correct planting/harvesting dates, growing conditions, spacing, and companion planting in order to maximize the potential crop yield of a garden. They will then plot out that garden to demonstrate the maximized crop.</p> <p>Standards for Success: Students can successfully design a garden plot that will produce a crop with a maximum yield of fruits and vegetables.</p>
A A, M A, M, T A, M, T T		<p>OTHER EVIDENCE:</p> <p><i>Students will show they have achieved Stage 1 goals by...</i></p> <p>Formative: Interactive Notebook Warm-Ups Reading / Review Worksheet Worksheets Lab Activities</p> <p>Summative: Unit Test / Quizzes</p>

Stage 3 – Learning Plan

Pre-Assessment

Students will be given a warm-up and asked to identify as many structures within a plant flower as possible. The same warm-up will be used at the end of the unit to show progress in learning.

Code	Summary of Key Learning Events and Instruction	Progress Monitoring
A	<ul style="list-style-type: none"> Teacher will deliver content - Climate and Hardiness Zones 	<ul style="list-style-type: none"> Warm-Up Questions or Brief Discussions.
A, M	<ul style="list-style-type: none"> Students will investigate hardiness zones in their local area and throughout the country - Interactive Hardiness Zones Activity 	<ul style="list-style-type: none"> Monitor student notes during note taking or pear deck responses.
A,M	<ul style="list-style-type: none"> Students will explore how hardiness zones affect the type of crops that can be planted in a specific region - 	<ul style="list-style-type: none"> Exit tickets
A, M, T	<ul style="list-style-type: none"> Reading/Video: Hardiness Zones 	<ul style="list-style-type: none"> Student project-based assignments.
A, M, T	<ul style="list-style-type: none"> Students will consider if seeds should be started indoors or outdoors depending on their specific growing conditions - 	<ul style="list-style-type: none"> Teacher Check-In during Activities or Labs
A, M, T	<ul style="list-style-type: none"> Article and Questions: How to sow seeds indoors or out. 	<ul style="list-style-type: none"> Teacher Check-In during test taking
A, M, T	<ul style="list-style-type: none"> Students will conduct research to determine the correct planting/harvesting dates, growing conditions, spacing, and companion planting in order to maximize the potential crop yield of a garden. They will then plot out that garden to demonstrate the maximized crop. - Garden Planning Activity and Garden Plot Design 	<ul style="list-style-type: none"> Group Discussions with Lab Partners

Unit 7: Flower Arranging

Stage 1 – Desired Results

ESTABLISHED GOALS	<i>Transfer</i>	
<ul style="list-style-type: none"> ● NGSS - 1-LS1-1. The shape and stability of structures of natural and designed objects are related to their function(s). ● CCSS.ELA-Literacy.RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. ● CCSS.ELA-Literacy.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. ● SEL Competency: Self-awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts. 	<i>Students will be able to independently use their learning to...</i> <ul style="list-style-type: none"> ● Develop an interest and sense of purpose in the field of horticulture. ● Establish the skills required to be successful in a horticulture career. ● Recognize one's strengths and limitations with a well-grounded sense of confidence and purpose. ● Developing and using models ● Constructing explanations ● Obtaining, evaluating, and communicating information 	
	<i>Meaning</i>	
	UNDERSTANDINGS <i>Students will understand that...</i> <ul style="list-style-type: none"> ● Flower Arranging is the art of organizing the design elements of plant material and other components according to artistic principles to achieve beauty, harmony, distinction, and expression. ● Color theory can be used in many disciplines and careers. 	ESSENTIAL QUESTIONS <i>Students will keep considering...</i> <ul style="list-style-type: none"> ● How can we use the concepts of color theory in the field of floral arranging? ● How are the principles of design used to create eye-pleasing floral arrangements?
	<i>Acquisition</i>	
	<i>Students will know...</i> <ul style="list-style-type: none"> ● There are four basic color schemes that we can use from color theory in the field of floral arranging: monochromatic, analogous, complementary, and triadic. ● The principles of design that are used in many artistic fields can be applied to arranging flowers: shape, balance, harmony, etc. 	<i>Students will be skilled at...</i> <ul style="list-style-type: none"> ● Using color schemes from color theory in the practice of floral arranging. ● Implementing the concepts of design principles in the practice of floral arranging. ● Communicating and interpreting the needs of the customer. ● Practicing teamwork and collaborative problem-solving ● Asking questions

Stage 3 – Learning Plan

	<i>Pre-Assessment</i> Students are shown some slides that use various design elements in plantscaping. They will brainstorm in groups trying to come up with terms that describe the element they think is being used.	
Code	Summary of Key Learning Events and Instruction	Progress Monitoring
A	<ul style="list-style-type: none">Teacher will deliver content - Floral Design PrinciplesStudents will investigate the four color schemes used by florists to create floral arrangements - Videos: Flower School - Color Schemes Used in Floral Arrangements.Students will investigate the principles of design used in floral arrangements - Design Principles of Floral Arrangements Research ActivityStudents will design a floral arrangement using a color scheme (monochromatic, etc) and a principle of design (harmony, etc) based on input of a fictitious customer - Floral Arrangement Project	<ul style="list-style-type: none">Warm-Up Questions or Brief Discussions.Monitor student notes during note taking or pear deck responses.Exit ticketsStudent project-based assignments.Teacher Check-In during Activities or Labs
A, M		
A, M, T		
A, M, T		