



# **HORTICULTURE CURRICULUM**

**Middle Township Public Schools**

**216 S. Main Street**

**Cape May Court House, NJ 08210**

**Born On Date: September 20, 2018**

**Middle Township High School Horticulture Curriculum**

<b>Grade Level and Content:</b>	10-12
Interdisciplinary Connections	<ul style="list-style-type: none"> <li>• Academic and Technical Rigor – Assignments are designed to address key learning standards identified by WIDA and the NJSLS.</li> <li>• Authenticity - Assignments use a real world context (e.g., community and workplace problems) and address issues that matter to the students.</li> <li>• Applied Learning - Assignments engage students in solving problems calling for competencies expected in high-performance work organizations (e.g., teamwork, problem-solving, communication, etc.).</li> <li>• Assessment Practices - Assignments involve students in regular, performance-based exhibitions and assessments of their work; evaluation criteria reflect personal, school, and real- world standards of performance; WIDA ACCESS 2.0, PARCC, STAR.</li> </ul>
Core Instructional Materials	Listed within individual curriculums and weekly lesson plans
Assessments	ACCESS for ELLs, WIDA Model Grades 3-5, oral exercises, Literacy activities, games, oral and/or written quizzes, drawing and identifying, mini conversations, flashcards, student participation, homework assignments, and Math STAR/ Literacy STAR, PARCC; others listed within individual curriculums and weekly lesson plans
Modifications for Special Education Students	Note IEP, audio recordings, digital media, visual presentation, spanish versions of curriculum content
Modifications for Students Who Lack Support for School	Extended time, assign preferential seating, positive reinforcement, peer tutoring, study guides, bilingual readingl, read directions aloud, alternative assignments, after school tutoring

## 21<sup>st</sup> Century Skills

Creativity & Innovation  
Critical Thinking  
Communication  
Collaboration  
Life & Career Skills  
Information Literacy

Media Literacy  
Chronological Thinking  
Spatial Thinking  
Presentational Skills  
Problem Solving  
Decision Making

### Technology Operations & Concepts/ Interdisciplinary Connections

- Web-based activities for reading comprehension
- English Language Arts-Reality Central-Pearson
- Science-web-based lab activities
- Technology-Smart TV, Chromebooks, online translators
- Social Studies-Textbook series/bilingual worksheets
- Character Education-cultural appreciation
- Math-Big Ideas

### Career Ready Practices:

- CRP1. Act as a responsible and contributing citizen and employee
- CRP2. Apply appropriate academic and technical skills
- CRP3. Attend to personal health and financial well-being
- CRP4. Communicate clearly and effectively with reason
- CRP5. Consider the environmental, social and economic impacts of decisions
- CRP6. Demonstrate creativity and innovation
- CRP7. Employ valid and reliable research strategies
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them
- CRP9. Model integrity, ethical leadership, and effective management
- CRP10. Plan education and career paths aligned to personal goals
- CRP11. Use technology to enhance productivity
- CRP12. Work productively in teams while using cultural global competencies

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Plant Anatomy - Vegetative	
<b>Unit Topics:</b>	Leaves, Roots, Stems	
<b>Standard(s) Number and Description (Established Goals)</b>		
<p><b>HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</b></p> <p><b>HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</b></p> <p><b>HS-LS2-1: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.</b></p> <p><b>HS-LS4-2: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment</b></p>		
<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>		
<p><i>Students will understand ...</i></p> <ol style="list-style-type: none"> <li>All life depends on plants to provide energy to ecosystems.</li> <li>The structure of plants.</li> <li>How different parts of plants function to keep the organism alive and reproduce.</li> </ol>		
<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>		
<ol style="list-style-type: none"> <li>What are the parts of plants and how do they function?</li> <li>What is the difference between gymnosperms and angiosperms?</li> <li>What is the difference between monocots and dicots?</li> </ol>		

**Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)**

***Students will be able to ...***

- 1. Describe the structure of leaves, roots, and stems on a macro and microscopic scale.**
- 2. Explain the functions of leaves, roots, and stems.**
- 3. Explain how photosynthesis takes sunlight energy, CO<sub>2</sub>, and H<sub>2</sub>O and produces sugars.**
- 4. How plant products are moved around plants and how they are used.**

**Key Vocabulary and Terms:**

***Blade, petiole, compound, simple, epidermis, palisade mesophyll, spongy mesophyll, stoma, guard cell, cuticle, root hair, zone of elongation, zone of differentiation, root cap, xylem, phloem, vascular bundle, tracheid, vessel member, sieve tube, cortex, bark, periderm, cambium, terminal bud, axillary bud, leaf scar, lenticel, etc.***

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Plant Anatomy - Reproductive	
<b>Unit Topics:</b>	Flowers, Fruits, Seeds	
	<b>Standard(s) Number and Description (Established Goals)</b>	
	<p><b>HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</b></p> <p><b>HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</b></p> <p><b>HS-LS2-1: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.</b></p> <p><b>HS-LS4-2: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment</b></p>	
	<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>	
	<p>Students will understand that...</p> <ol style="list-style-type: none"> <li>1. Flowers are the sexual reproductive structures of angiosperms.</li> <li>2. Fruits are the result of flower pollination processes.</li> <li>3. New generations of angiosperms are found in seeds of their fruits.</li> </ol>	
	<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>	
	<ol style="list-style-type: none"> <li>1. What are the parts of the flower?</li> <li>2. How are flowers pollinated?</li> <li>3. How do fruits form?</li> <li>4. What are the parts of a seed?</li> </ol>	
	<b>Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)</b>	
	<i>Students will be able to ...</i>	

1. Diagram the parts of a flower.
2. Explain the roles of different parts of a flower.
3. Identify different inflorescences.
4. Describe different classifications of fruits.
5. Describe the different types of seeds and their physiology.

**Key Vocabulary and Terms:**

*Flower, calyx, sepal, corolla, petal, stamen, filament, anther, carpel, stigma, style, ovary, ovule, dehiscent, indehiscent, berry, pepo, drupe, pome, hesperidium, cyme, raceme, panicle, spike, etc.*

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Fertilizers	
<b>Unit Topics:</b>	Providing plant nutrition	
	<b>Standard(s) Number and Description (Established Goals)</b>	
	<p>9.3.12.AG-PL.1: Develop and implement a crop management plan for a given production goal that accounts for environmental factors.  9.3.12.AG-PL.2: Apply the principles of classification, plant anatomy and plant physiology to plant production and management.</p>	
	<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>	
	<p>Students will understand that...</p> <ol style="list-style-type: none"> <li>1. Plants require specific nutrients to thrive.</li> </ol>	
	<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>	
	<ol style="list-style-type: none"> <li>1. What are the main elements and compounds needed to keep plants healthy?</li> <li>2. How are fertilizers dosed and administered?</li> <li>3. What are the symptoms of nutrient deficiencies in plants?</li> </ol>	
	<b>Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)</b>	
	<p><i>Students will know....</i></p> <ol style="list-style-type: none"> <li>1. N, P, K are the three macronutrients that plants need.</li> <li>2. Other trace elements are required.</li> <li>3. Fertilizers can be measured and delivered in specific quantities.</li> <li>4. Fertilizers must be applied at specific intervals.</li> </ol>	
	<b>Key Vocabulary and Terms:</b>	
	<i>Nitrate, ammonium, phosphate, potash, fertilizer injector, electrical conductivity, water soluble, slow-release, deficiency, symptoms</i>	

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Pesticides	
<b>Unit Topics:</b>	Pesticide types and application	
	<b>Standard(s) Number and Description (Established Goals)</b>	
	9.3.12.AG-PL.1: Develop and implement a crop management plan for a given production goal that accounts for environmental factors. 9.3.12.AG-PL.2: Apply the principles of classification, plant anatomy and plant physiology to plant production and management.	
	<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>	
	Students will understand that... 1. Plants can become victim to many different pests 2. There are ways to control those pests	
	<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>	
	1. What types of pests attack plants? 2. What chemicals can be used to control pests? 3. How can integrated pest management be used to reduce the use of chemicals in pest control?	
	<b>Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)</b>	
	Students will be able to (do)... 1. Identify several pest problems including insect and fungal diseases. 2. Determine the best methods using chemicals to control pests. 3. Explain the concepts behind integrated pest management to avoid using chemicals to control pests.	
	<b>Key Vocabulary and Terms:</b>	
	LC50, LD50, insect, fungus, wettable powder, granule, water soluble, fumigant, aerosol	

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Propagation	
<b>Unit Topics:</b>	Growing new plants from cuttings and seeds	
	<b>Standard(s) Number and Description (Established Goals)</b>	
	9.3.12.AG-PL.1: Develop and implement a crop management plan for a given production goal that accounts for environmental factors.	
	9.3.12.AG-PL.2: Apply the principles of classification, plant anatomy and plant physiology to plant production and management.	
	<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>	
	<i>Students will understand that...</i>	
	1. That plants can be grown from seeds (sexual reproduction) and from cuttings (asexual reproduction).	
	<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>	
	1. What are the proper conditions to start seeds? 2. What steps are needed to produce plants from cuttings?	
	<b>Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)</b>	
	<i>Students will be able to (do)...</i>	
	1. Start seeds under appropriate conditions to ensure growth. 2. Make cuttings of various different plants that produce new growth.	
	<b>Key Vocabulary and Terms:</b>	
	<i>Hardwood, softwood, semi-softwood, rooting hormone, germination, sprouting</i>	

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Spring Plant Sale	
<b>Unit Topics:</b>	Producing various crops of annuals for sale	
	<b>Standard(s) Number and Description (Established Goals)</b>	
	9.3.12.AG-PL.1: Develop and implement a crop management plan for a given production goal that accounts for environmental factors. 9.3.12.AG-PL.2: Apply the principles of classification, plant anatomy and plant physiology to plant production and management.	
	<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>	
	<i>Students will understand that...</i>	
	1. A detailed plan is needed to bring a crop of many types of plants to sale	
	<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>	
	1. What type of planning is involved with a production greenhouse? 2. What skills are needed to start, grow, and finish plants?	
	<b>Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)</b>	
	<i>Students will be able to (do)...</i>	
	1. Create a list of plants to sell at Mother's Day. 2. Create a plan timeline for starting those plants. 3. Create a plan for feeding and pest control 4. Operate the sale of grown plants	
	<b>Key Vocabulary and Terms:</b>	
	<i>Growth plan, advertising</i>	

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Vegetable Garden	
<b>Unit Topics:</b>	Starting, implementing, and harvesting from a vegetable garden.	
	<b>Standard(s) Number and Description (Established Goals)</b>	
	9.3.12.AG-PL.1: Develop and implement a crop management plan for a given production goal that accounts for environmental factors. 9.3.12.AG-PL.2: Apply the principles of classification, plant anatomy and plant physiology to plant production and management.	
	<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>	
	<i>Students will understand that...</i> 1. A home vegetable garden takes planning and work 2. A home vegetable garden can yield a year's worth of food	
	<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>	
	1. What are the different families of crops that can be grown? 2. What are the requirements of the different families of crops? 3. What is needed to prepare and care for a home vegetable garden?	
	<b>Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)</b>	
	<i>Students will be able to (do)...</i> 1. Plan and implement a home vegetable garden. 2. Prepare a plot of ground for a home vegetable garden.	
	<b>Key Vocabulary and Terms:</b>	
	Till, cover crop, raised bed, irrigation, bolting, succession planting	

<b>Content Area:</b>	Horticulture	Grade(s) 10-12
<b>Unit Plan Title:</b>	Aquaponics	
<b>Unit Topics:</b>	Raising fish and vegetables in a closed system	
	<b>Standard(s) Number and Description (Established Goals)</b>	
	9.3.12.AG-PL.1: Develop and implement a crop management plan for a given production goal that accounts for environmental factors. 9.3.12.AG-PL.2: Apply the principles of classification, plant anatomy and plant physiology to plant production and management.	
	<b>Enduring Understandings: (What are the big ideas? What specific understandings about them are desired? What misunderstandings are predictable?)</b>	
	<i>Students will understand that...</i>	
	1. Crops can be grown using water with fish wastes in it.	
	<b>Essential Questions : (What provocative questions will foster inquiry, understanding, and transfer of learning?)</b>	
	1. How do nutrients cycle through a closed system?	
	<b>Student Learning Goals/Objectives: (What key knowledge and skills will students acquire as a result of this unit? What should they eventually be able to do as a result of such knowledge and skill?)</b>	
	<i>Students will be able to (do)...</i>	
	<ol style="list-style-type: none"> <li>1. Raise and care for a crop of tilapia</li> <li>2. Maintain a recirculating aquaculture system for tilapia</li> <li>3. Maintain a system where fish waste water is used to grow vegetable crops</li> </ol>	
	<b>Key Vocabulary and Terms:</b>	
	<i>Nitrogen cycle, nitrogen fixation, nitrite, nitrate, ammonia, aeration, dissolved oxygen, pH</i>	

