





# GARDEN GROUNDBREAKERS



Experiential Enrichment Curriculum  
Sixth Grade  
2019-2020



# Key Concepts & Goals

<b>Academic Achievement</b>	Enrich student learning by providing comprehensive interdisciplinary garden-based lessons that foster lifelong learning.	
<b>Environmental Stewardship</b>	Enhance environmental knowledge by providing opportunities for students to appreciate, interact and reconnect with nature.	
<b>Healthy and Sustainable Living</b>	Encourage healthier lifestyles, specifically through nutrition education and edible gardening, by teaching students where vegetables and fruits come from.	
<b>Community and Social Development</b>	Expand student ownership by building a sense of community through involvement and teamwork in garden-based learning activities and horticultural displays.	



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Community and Social Development	Expand student ownership by building a sense of community through involvement and teamwork in garden-based learning activities and horticultural displays.

Lesson	Pacing	Objective	Kinesthetic Activity	Outdoor Location
Native Plants	August 21, 28, September 4	The learner will identify native plants.	Discovery Adventure	Oklahoma Prairie Garden
Pollinators	September 11, 18, 25	The learner will explain the significance of pollinators.	Pollinator Data Project	Meinders Garden, Oklahoma Prairie Garden, and Sheridan Lawn
Plants	October 9, 23, 30	The learner will demonstrate proper bulb planting.	Tulip Bulb Planting	Children's Garden, Color Curve, The Devon Lawn
Soil	November 6, 13, 20	The learner will explain the importance of soil to sustain plants and life.	Interactive Soil Quest	Children's Garden and Waterwise Gardens in the Arena Plaza
Water	December 4, 11, 18	The learner will explain the importance of water to sustain plants and life.	Water Resource Excursion	Children's Garden, Crystal Bridge Conservatory, and West Plaza Area
Healthy Living	January 8, 15, 22	The learner will assess the value of healthy and sustainable living.	Food Origins and Wellness Habits	Children's Garden, Seasonal Plaza, and Park House Event Center
Seeds	February 5, 12, 19	The learner will demonstrate proper seed starting.	Indoor and Outdoor Seeding Starting	Meinders Garden, Sheridan Lawn, and Tanenbaum Reflection Garden
Trees	March 4, 11, 25	The learner will distinguish trees by identifiable features.	Illustration Sensory Stroll	Children's Garden

*October 2 – Pumpkin Dissection April 21 – End of the Year Celebration*

Lesson	Essential Vocabulary	Supplies	Inquiry-Based Approach
Native Plants	prairie, native plant, root system, ecosystem	specimens of native plants, microscopes	What native plants persist in Oklahoma?
Pollinators	pollen, nectar, pollination, pollinator, migration	specimens of pollinators, calculators, tape measures	Why are pollinators significant?
Plants	botany, garden, annual, biennial, perennial	specimens of a bulb and flowers, bulbs, gloves, trowel	What are the proper steps for planting bulbs?
Soil	soil, nutrient, mulch, compost, stewardship	specimen of soil types, products to be composted, shovels and rakes	How does soil sustain plants and life?
Water	water, irrigation, water cycle, conservation	irrigation controls, micro-irrigation systems, weather instruments	How does water sustain plants and life?
Healthy Living	harvest, crop, sustainable living, nutrition	protractors, graphing paper, planting calendar, food pyramid, landscape prints	Where does food come from? How important is a healthy lifestyle?
Seed	seed, cotyledon, germination, agriculture	heirloom seeds, soil mix, labels, peat pots, row cover	What are the steps for properly planting seeds?
Trees	sapling, urban, rural, biosphere	art supplies and identifiable parts of trees	Which distinguishable features identify urban trees?

Description	Lesson Design (60 minutes)	Standards, Methods & Models
<ul style="list-style-type: none"> <li>• Lesson rotations               <ul style="list-style-type: none"> <li>○ John Rex Middle School has three sixth grade classes.</li> <li>○ Each Wednesday one class will participate in the lesson.</li> <li>○ Each lesson will repeat until completed by all three classes.</li> </ul> </li> <li>• Classroom spaces               <ul style="list-style-type: none"> <li>○ Crystal Bridge: Second Floor Conference Room</li> <li>○ Visitor Center: The Garden Classroom</li> <li>○ Children's Garden: Gathering Porch</li> <li>○ East Lower Lake: Stone Terrace</li> <li>○ Water Stage Amphitheater</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Instruction (15 minutes)               <ul style="list-style-type: none"> <li>○ Anticipatory Set</li> <li>○ Input &amp; Modeling</li> <li>○ Check for Understanding</li> </ul> </li> <li>• Kinesthetic Activity (30 minutes)               <ul style="list-style-type: none"> <li>○ Guided Practice</li> <li>○ Independent Practice</li> </ul> </li> <li>• Instruction (15 minutes)               <ul style="list-style-type: none"> <li>○ Review</li> <li>○ Closure</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Oklahoma Academic Standards</li> <li>• STEM/STEAM</li> <li>• Bloom's Revised Taxonomy Model</li> <li>• Instructional Theory Into Practice</li> <li>• Madeline Hunter Lesson Design</li> <li>• Explicit Instruction: Effective &amp; Efficient Teaching</li> <li>• Gradual Release of Responsibility Model ("I do, we do, you do")</li> <li>• The Science of Classroom Design</li> <li>• Gardner's Theory of Multiple Intelligences</li> <li>• Maslow's Hierarchy of Needs</li> </ul>

**Supported Standards**

Lesson	Oklahoma Academic Standards – Sixth Grade unless otherwise noted.
Native Plants	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>• <b>MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Ecosystem Dynamics, Functioning, and Resilience: Ecosystems are dynamic in nature; their characteristics can vary over time.</li> </ul> </li> <li>• <b>MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Ecosystem Dynamics, Functioning, and Resilience: Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems.</li> </ul> </li> </ul>
Pollinators	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>• <b>MS-LS1-4 From Molecules to Organisms: Structure and Processes (Seventh Grade)</b> <ul style="list-style-type: none"> <li>○ Growth and Development of Organisms: Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.</li> </ul> </li> <li>• <b>MS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Interdependent Relationships in Ecosystems: Predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.</li> </ul> </li> <li>• <b>MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Ecosystem Dynamics, Functioning, and Resilience: Ecosystems are dynamic in nature; their characteristics can vary over time.</li> <li>○ Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.</li> </ul> </li> </ul> <p><b>Mathematics</b></p> <ul style="list-style-type: none"> <li>• <b>Data &amp; Probability</b> <ul style="list-style-type: none"> <li>○ 6.D.1 Display and analyze data.</li> </ul> </li> <li>• <b>Geometry &amp; Measurement</b> <ul style="list-style-type: none"> <li>○ 6.GM.1 Calculate area solve real-world and mathematical problems.</li> <li>○ 6.GM.3 Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.</li> </ul> </li> </ul>
Plants	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>• <b>MS-LS1-1 From Molecules to Organisms: Structure and Processes</b> <ul style="list-style-type: none"> <li>○ Structure and Function: All living things are made up of cells, which is the smallest unit that can be said to be alive.</li> </ul> </li> <li>• <b>MS-LS1-5 From Molecules to Organisms: Structure and Processes (Seventh Grade)</b> <ul style="list-style-type: none"> <li>○ Growth and Development of Organisms: Genetic factors as well as local conditions affect the growth of the plant.</li> </ul> </li> <li>• <b>MS-LS1-6 From Molecules to Organisms: Structure and Processes</b> <ul style="list-style-type: none"> <li>○ Organization for Matter and Energy Flow in Organisms: Plants, algae, and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.</li> </ul> </li> </ul>
Soil	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>• <b>MS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Cycle of Matter and Energy Transfer in Ecosystems: Decomposers recycle nutrients from dead plants back to the soil in terrestrial environments or to the water in aquatic environments.</li> </ul> </li> <li>• <b>MS-ESS2-2 Earth’s Systems (Eighth Grade)</b> <ul style="list-style-type: none"> <li>○ The Roles of Water in Earth’s Surface Processes: Water’s movements—on both the land and underground—cause weathering and erosion, which change the land’s surface features and create underground formations.</li> </ul> </li> </ul> <p><b>Social Studies</b></p> <ul style="list-style-type: none"> <li>• <b>History Literacy Content Standard 4: The student will analyze the significant events and historic personalities contributing to the development of the state of Oklahoma.</b> <ul style="list-style-type: none"> <li>○ Summarize how the weather and the environment affected Oklahoma in events like the Dust Bowl.</li> </ul> </li> </ul>
Water	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>• <b>MS-PS1-4 Matter and Its Interactions</b> <ul style="list-style-type: none"> <li>○ Structure and Properties of Matter: The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.</li> <li>○ Crosscutting Concepts: Cause and Effect: Cause and effect relationships may be used to predict phenomena in natural or designed systems.</li> </ul> </li> <li>• <b>MS-ESS1-1 Earth’s Place in the Universe (Seventh Grade)</b> <ul style="list-style-type: none"> <li>○ Earth and the Solar System: The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.</li> </ul> </li> <li>• <b>MS-ESS2-4 Earth’s Systems</b></li> </ul>

	<ul style="list-style-type: none"> <li>○ The Roles of Water in Earth’s Surface Processes: Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.</li> <li>● <b>MS-ESS2-5 Earth’s Systems (Seventh Grade)</b> <ul style="list-style-type: none"> <li>○ Weather and Climate: Because these patterns are so complex, weather can only be predicted probabilistically.</li> </ul> </li> <li>● <b>MS-PS3-4 Energy</b> <ul style="list-style-type: none"> <li>○ Definitions of Energy: Temperature is a measure of the average kinetic energy of particles of matter.</li> </ul> </li> </ul> <p><b>English Language Arts</b></p> <ul style="list-style-type: none"> <li>● <b>Informative</b> <ul style="list-style-type: none"> <li>○ 6.3.W.2 Students will compose essays and reports about topics, incorporating evidence (e.g., specific facts, examples, details) and maintaining an organized structure.</li> </ul> </li> </ul>
Seed	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>● <b>MS-LS1-5 From Molecules to Organisms: Structure and Processes (Seventh Grade)</b> <ul style="list-style-type: none"> <li>○ Growth and Development of Organisms: Genetic factors as well as local conditions affect the growth of the plant.</li> </ul> </li> <li>● <b>MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Ecosystem Dynamics, Functioning, and Resilience: Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems.</li> </ul> </li> <li>● <b>MS-LS3-1 Heredity: Inheritance and Variation of Traits (Seventh Grade)</b> <ul style="list-style-type: none"> <li>○ Variation of Traits: Some changes are beneficial, others harmful, and some neutral to the organism.</li> </ul> </li> </ul> <p><b>Mathematics</b></p> <ul style="list-style-type: none"> <li>● <b>Geometry &amp; Measurement</b> <ul style="list-style-type: none"> <li>○ 6.GM.3 Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.</li> </ul> </li> </ul>
Trees	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>● <b>MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Interdependent Relationships in Ecosystems: Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.</li> </ul> </li> </ul> <p><b>Visual Arts</b></p> <ul style="list-style-type: none"> <li>● <b>Standard 3: Visual Art Expression: “Creating”</b> <ul style="list-style-type: none"> <li>○ The student will observe, select, and utilize a variety of ideas and subject matter in creating original works of art.</li> </ul> </li> <li>● <b>Standard 4: Visual Art Appreciation: “Connecting”</b> <ul style="list-style-type: none"> <li>○ The student will appreciate and utilize visual art to make interdisciplinary connections and informed aesthetic decisions.</li> </ul> </li> </ul>
Healthy Living	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>● <b>MS-ESS3-3 Earth and Human Activity</b> <ul style="list-style-type: none"> <li>○ Human Impacts on Earth Systems: Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things.</li> </ul> </li> <li>● <b>MS-ESS3-4 Earth and Human Activity (Eighth Grade)</b> <ul style="list-style-type: none"> <li>○ Human Impacts on Earth Systems: Typically as human populations and per-capita consumption of natural resources increase, so do the negative effects on Earth, unless the activities and technologies involved are engineered otherwise.</li> </ul> </li> <li>● <b>MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics</b> <ul style="list-style-type: none"> <li>○ Ecosystem Dynamics, Functioning, and Resilience: The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health.</li> <li>○ Biodiversity and Humans: Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling.</li> <li>○ Influence of Engineering, Technology, and Science on Society and the Natural World: The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus, technology use varies by region and over time.</li> </ul> </li> </ul> <p><b>Health/Safety (Grades 6-8)</b></p> <ul style="list-style-type: none"> <li>● <b>Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.</b> <ul style="list-style-type: none"> <li>○ 1.8.3 Analyze how the environment affects personal health.</li> </ul> </li> <li>● <b>Standard 3: Students will demonstrate the ability to access valid information, products and services to enhance health.</b> <ul style="list-style-type: none"> <li>○ 3.8.3 Determine the accessibility of products that enhance health.</li> </ul> </li> <li>● <b>Standard 5: Students will demonstrate the ability to use decision-making skills to enhance health.</b> <ul style="list-style-type: none"> <li>○ 5.8.4 Distinguish between healthy and unhealthy alternatives of health related decisions.</li> </ul> </li> </ul>

**Essential Vocabulary**

<b>Lesson</b>	<b>Term</b>	<b>Definition</b>
Native Plants	prairie	a large open area of land made up of grasses, flowers, small shrubs, and few trees
	native plant	a plant that has developed over thousands of years in a particular region
	root system	a part of a plant that is usually hidden underground and absorbs water and food from the soil
	ecosystem	all the living things in a given place
Pollinators	pollen	powdery seed dust on flowers
	nectar	the energy-packed sugar liquid flowers produce
	pollination	the process by which pollen is carried by insects or blown by the wind from one flower to another
	pollinator	an animal that causes plants to make fruit or seeds
	migration	seasonal movement from one region to another
Plants	botany	the study of plants
	garden	a piece of ground used for growing plants
	annual	a plant that completes its life cycle in one year
	biennial	a plant that lives for two years
	perennial	a plant that lives more than two years
Soil	soil	a mixture of organic matter, minerals, gases, liquids, and organisms that together support life
	nutrient	a substance that provides nourishment for plants
	mulch	a material (as straw or bark) spread over the ground especially to protect the roots of plants from heat or cold, to keep soil moist, and to control weeds
	compost	decayed organic material (as of leaves and grass) used to improve soil especially for growing crops
	stewardship	responsible use and protection of the natural environment
Water	water	a colorless, transparent, odorless, tasteless liquid that forms the seas, lakes, rivers, and rain and is the basis of the fluids of living organisms
	irrigation	the supply of water to land or crops to help growth
	water cycle	the way that water moves between being water vapor to liquid water and then back to water vapor
	conservation	preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife
Seed	seed	a flowering plant's unit of reproduction, capable of developing into another such plant
	cotyledon	the first leaf or set of leaves that sprout from a seed
	germination	the process by which a plant grows from a seed
	agriculture	the science or practice of farming
Trees	sapling	a young tree
	urban	a city or town
	rural	the countryside
	biosphere	regions of the Earth
Healthy Living	harvest	the process or period of gathering in crops
	crop	a plant that is grown as food, especially a grain, fruit, or vegetable
	sustainable living	a lifestyle that attempts to reduce an individual's or society's use of the Earth's natural resources
	nutrition	the process by which the body nourishes itself by transforming food into energy and body tissues