

## Pollinator Schoolyard Garden 5<sup>th</sup> Grade STEM PBL Semester Unit (by Leigh Ray)

### Part I: Project Overview

<b>Project Title</b>	Pollinator Schoolyard Garden
<b>Overarching Driving Question</b>	How will my class and I attract <i>pollinators, especially Monarchs</i> , to become regular visitors to our schoolyard, and why is this important?  Driving Quote: “The beauty of the situation is that by supporting pollinators’ need for habitat, we support our own needs for food and support diversity in the natural world” (The Pollinator Partnership™/North American Pollinator Protection Campaign, 2023)
<b>Grade Level/ Subjects</b>	5 <sup>th</sup> Grade ELA, Math, Science, Technology, Engineering, Art
<b>Time Frame</b>	Semester-long PBL: Entry Event, Background learning, planning phase, implementation phase, unveiling and presentations, maintenance/observation phase
<b>Project Idea (Summary of the issue, challenge, investigation, scenario, or problem)</b>	Students will learn about the problem (decline in pollinators), pollinator insects’ life cycles and habitats, food chains, Native TN flora, soil needs, garden construction, and garden maintenance to create a garden on school property that will attract pollinators. Students will plan and build a pollinator garden in the schoolyard with assistance from community helpers.
<b>Public Product(s)</b> Individual and Team	Individual performances and products vary among sub-units. Group performances and products: completed pollinator gardens with thriving native pollinating plants (audience: community at large, school community, and the insects)

## Part II: Standards, Learning Goals, Success Criteria

<b>TN Standards (following the JC Schools pacing guide for Qtrs. 3-4)</b>	<b>Math:</b> <ul style="list-style-type: none"><li>• 5.MD.B.2 – Make a line plot to display a data set of measurements (in fractions, if applicable)</li><li>• 5.MD.C.3 – Understand concepts of volume measurement</li><li>• 5.MD.C.5 – Relate volume to operations of multiplication and addition to solve real world problems involving volume</li></ul>
	<b>Science:</b> <ul style="list-style-type: none"><li>• 5.ETS.1.1 – Research, test, re-test, and communicate a design to solve a problem</li></ul>
	<b>ELA:</b> <ul style="list-style-type: none"><li>• 5.RI.KID.1 – Quote accurately from a text when explaining what the text says.</li><li>• 5.RI.KID.2 Determine the central idea of a text and explain how it is supported by key details; summarize the text.</li><li>• 5.RI.IKI.9 – Integrate information from two or more texts on the same topic in order to build content knowledge.</li><li>• 5.W.RBPK.7 – Conduct short research projects (from multiple sources) to build knowledge through investigations of different aspects of a topic.</li><li>• 5.SL.CC.3 – Summarize the point a speaker makes and explain how each claim is supported by reasons and evidence.</li><li>• 5.W.TTP.3 – Write narratives to develop imagined experiences using descriptive details and event sequences (perspective of a bee, butterfly, caterpillar, hummingbird, flower, raindrop, or earthworm.).</li><li>• 5.RI.CS.4 Determine the meaning of words and phrases as they are used in a text relevant to a grade 5 topic or subject area, including figurative, connotative, and technical meanings.</li><li>• 5.SL.PKI.4 Report on a topic or text, or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas.</li><li>• 5.SL.PKI.5 Include multimedia components and visual displays in presentations, when appropriate, to enhance the development of main ideas or themes.</li><li>• 5.SL.PKI.6 Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation.</li></ul>

<b>Language Standards (WIDA)</b>	Multilanguage learners will: <ul style="list-style-type: none"> <li>• ELD-SI.4-14.Inform (summarize most important aspects of information)</li> <li>• ELD-SI.4-12.Explain (generate and convey initial thinking)</li> </ul>
<b>NGSS &amp; Engineering</b>	5-PS1-1. Collaboratively develop models based on evidence that describes phenomena. Develop diagrams or simple physical prototypes to convey a proposed object, tool, or process.
<b>CCSS</b>	Mathematics: <b>MP.5</b> Use appropriate tools strategically.  Science: <b>5-PS1-3</b> Make observations and measurements to identify materials based on their properties.  Language Arts: <b>RI.5.4</b> Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
<b>Technology Standards (ISTE)</b>	<b>1.6 Creative Communicator</b> 6.b. Students create original works using digital resources (Flip).
<b>Arts</b>	<b>Enduring Understanding</b> “People create and interact with objects, places, and design that define, shape, enhance, and empower their lives.” <b>Essential Questions</b> “How do objects, places, and design shape lives and communities? How do artists and designers determine goals for designing or redesigning objects, places, or systems? How do artists and designers create works of art or design that effectively communicate?”  <div style="text-align: right;">(Soper et al., 2021, p. 6)</div>

<p><b>Key Vocabulary</b></p>	<p>Content words: pollination/pollinators, habitat (loss, health, restoration), carbon/nitrogen cycle, life cycle, water cycle, condensation, filtration, transpiration, evaporation, precipitation, runoff, erosion, photosynthesis, migrate/migration, germination, percolation/infiltration, drainage, amendments, compost, silt, sand, clay, loamy, woodland, meadow, wetland, erosion, growing season, herbaceous, pests, restoration, runoff, topography, pesticides/neonicotinoids, nectar, thermometer, poisonous, arachnids, insect names, rodents, mammals, food chain, desertification, regeneration, native, invasive, species, zone, dependent, blueprint, volume, scale, line plot, seedling</p> <p>Cognitive Academic Language Proficiency (CALP) words (academic words): impact statement, rubric, reflection, presentation, background information, summary/summarize, analyze, generate, assess, derive, process, specify, classify, communicate, interact, coordinate, conclude, restore, identify, categorize, describe, debrief, model, development, diagram, collaborate, requirement, calculate</p>
<p><b>Literacy Skills</b></p>	<p>Students will be able to quote accurately from informational texts when explaining a topic. Students will be able to understand academic and content vocabulary in informational texts. From their reading, students will be able to build content knowledge from multiple texts. Students will be able to investigate topics and produce short, written research essays that convey information learned from multiple sources. All reading and writing will support analysis, reflection, and research on the topic and may be recorded in personal journals, and presented visually in group projects or through presentations. After guest speakers have presented, students will be able to summarize their main points and explain the supporting evidence presented. Students will be able to write a narrative in which they imagine life as a bee, butterfly, caterpillar, hummingbird, flower, raindrop, or earthworm.</p>
<p><b>Success Skills (21<sup>st</sup> c.)</b></p>	<p>Collaboration</p> <ul style="list-style-type: none"> <li>• Takes responsibility for the quality and timeliness of his or her own work.</li> <li>• Stays on task during group work.</li> <li>• Accepts shared responsibility for the work of the group.</li> <li>• Helps improve the quality of the work and understanding of other members.</li> <li>• Respects the ideas, opinions, abilities, values, and feelings of other group members.</li> </ul> <p>Critical Thinking/Problem Solving</p> <ul style="list-style-type: none"> <li>• Gathers pertinent information from a variety of sources; evaluates the quality of information</li> </ul>

	<p>(source, validity, bias).</p> <ul style="list-style-type: none"> <li>• Considers alternatives.</li> </ul> <p style="text-align: right;">(Hallermann et al., 2011)</p>
<b>DOK</b>	<p>--DOK-3 (knowledge analysis): Think strategically and reasonably about how and why concepts, ideas, operations, and procedures can be used to attain and explain answers, conclusions, decisions, outcomes, reasons, and results. (Francis, 2017)</p> <p>--DOK-4 (knowledge augmentation): Think extensively about what else can be done, how else can learning be used, and how could the student personally use what they have learned in different academic and real-world contexts. (Francis, 2017)</p>
<b>Learning Goals (unpacked standards)</b>	<p>Mathematics</p> <ol style="list-style-type: none"> <li>1. Using 21<sup>st</sup> century skills, students will be able to use appropriate tools strategically to measure soil temperatures and make a line plot to display collected data, using fractions when appropriate.</li> <li>2. Using 21<sup>st</sup> century skills, students will understand the concepts of volume measurement as it applies to filling rectangular raised beds with soil or adding compost/amendments to existing garden beds.</li> <li>3. Using 21<sup>st</sup> century skills, students will be able to use multiplication to calculate the number of bags of soil (volume) required for project.</li> </ol> <p>Science</p> <ol style="list-style-type: none"> <li>1. Using 21<sup>st</sup> century skills, students will be able to research and solve problems by communicating a plan after testing it, then creating an appropriate design that will support plant and animal needs.       <ol style="list-style-type: none"> <li>a. Students will create a model demonstrating the life cycle of monarchs or of plants.</li> <li>b. Students will use quantitative reasoning/mathematics to construct a plan/diagram for a pollinator garden.</li> <li>c. Students will be able to make observations of soil and measurements of soil temperature to identify soil types based on their properties and to chart temperatures from various locations around the schoolyard.</li> <li>d. Students will discriminate between native and nonnative plants when choosing which ones to include in the pollinator garden.</li> <li>e. Students will decide through research and evaluation the best location for pollinator</li> </ol> </li> </ol>

	<p style="text-align: center;">gardens around the schoolyard.</p> <ol style="list-style-type: none"> <li>2. Using 21<sup>st</sup> century skills, students will understand how a problem-based learning activity may solve or improve a problem in an authentic (real-world) setting.</li> </ol> <p>ELA</p> <ol style="list-style-type: none"> <li>1. Using 21<sup>st</sup> century skills, students will be able to identify central ideas and the supporting key details in nonfiction texts and quote these during collaborative presentations.</li> <li>2. Using 21<sup>st</sup> century skills, students will be able to explain the relationships among varying ideas in more than two texts on the same topic during collaborative presentations and extend these ideas to the needs of a thriving pollinator garden.</li> <li>3. Using 21<sup>st</sup> century skills, students will correctly use academic and content language in journal writing, during collaboration, and during presentations.</li> <li>4. Thinking strategically, students will be able to solve problems and build content knowledge by locating and integrating into journal writing and presentations information from multiple texts and digital sources on the topics related to the unit.</li> <li>5. Students will be able demonstrate extensive thinking by writing and organizing a clear and coherent presentation that conveys information from multiple sources about a pollinator garden on school property that includes formatting features, illustrations, facts, definitions, concrete details, and a conclusion about soil needs and best garden location.</li> <li>6. Using 21<sup>st</sup> century skills, students will be able to summarize key details presented by guest speakers and experts.</li> <li>7. Students will be able to write imagined narratives from the perspectives of a bee, butterfly, caterpillar, hummingbird, flower, raindrop, or earthworm, focusing on life cycles and needs.</li> </ol>
<p><b>Success Criteria (expected performances aligned with learning goals)</b></p>	<p><b>Overarching Performance:</b></p> <p>Students will work collaboratively with each other, experts and guests, the teacher, and community volunteers to create one or more thriving pollinator gardens in the schoolyard.</p> <p><b>Mathematics Performances:</b></p> <p>Using tools, students will work in groups to take soil temperatures in various locations around the schoolyard, then create line plots from data.</p> <p>Using mathematical problem solving, students will each recommend the number of bags of soil and/or</p>

soil amendments for the project, showing their work in their journals.

Using mathematical reasoning, students will create models and diagrams. (Cross reference with science performances.)

**Science Performances:**

Students will choose and justify in team presentations appropriate *locations for* and *needs of* one or more pollinator gardens in the schoolyard, and present them to the class. Through consensus, a master plan will be developed and diagramed. (Cross reference with ELA performances.)

Using 21<sup>st</sup> century skills, students will work with experts from the community to select appropriate native plants, list them, and design a master layout for planting them.

Students will individually create labeled models of their choice, then create Flip videos in their teams explaining their models. Completed videos will be shared online with other classes and families.

Collaboratively, students will diagram the water cycle.

**ELA Performances:**

Throughout unit, students will choose a book from text boxes and summarize its central ideas and supporting key details to peers (within teams).

Students will create collaborative presentations that use academic and content language and are based on knowledge learned through books, internet research, and activities. (Cross reference with science performances.)

Students will create a presentation that conveys information from multiple sources (including texts, experts and guest speakers, activities, and investigations) about a pollinator garden on school property that includes formatting features, illustrations, facts, definitions, concrete details, and a conclusion about soil needs and best garden location.

	Student journals will include daily entries related to the content being learned that demonstrate extensive thinking during problem solving, summarizing, and reflecting. Journal entries will use academic and content language. Journal entries should include illustrations and diagrams when appropriate to task. Journals entries will be supported through citation of sources of facts or ideas, drawing from multiple texts and digital sources on the topics related to the unit.
<b>Rubric(s)</b>	See <u>Appendix A</u> for Rubrics.

### Part III: Project Milestones Overview

<b>Milestone #1 5 Days</b>	<b>Milestone #2 February (3-4 weeks)</b>	<b>Milestone #3 March (3 weeks)</b>	<b>Milestone #4 (April)</b>	<b>Milestone #5 May (1<sup>st</sup> week)</b>	<b>Milestone #6 Ongoing</b>
<p><b>Entry Events:</b></p> <ul style="list-style-type: none"> <li>• Overview: all about pollinators (video)</li> <li>• T/F pre-test on <u>Google forms</u> (individual) to gauge present knowledge. After “submit,” multiple videos.</li> <li>• Problem: decline in pollinating</li> </ul>	<p><b>Background Learning:</b></p> <ul style="list-style-type: none"> <li>• Field observations of plants and animals; use iNaturalist app, PlantSnap app, Picture Insect app</li> <li>• Food chains, including the role of the sun and pollination</li> <li>• Cycles: Monarch, water,</li> </ul>	<p><b>Planning:</b></p> <ul style="list-style-type: none"> <li>• Site selection (sun, drainage, other considerations)</li> <li>• Seed or seedling selection (native, heights, spacing, needs) &amp; mapping</li> <li>• Inviting volunteers (see (Soper et al., 2021, p. 76)</li> <li>• Tools and materials</li> </ul>	<p><b>Implementation:</b></p> <ul style="list-style-type: none"> <li>• Groups of students paired with volunteers.</li> <li>• Site preparation (weed removal, soil &amp; amendments added, edging).</li> <li>• Construction of any raised beds.</li> <li>• Plants or seeds sorting and distribution to groups for different</li> </ul>	<p><b>Unveiling Event</b> (for School &amp; Public)</p> <ul style="list-style-type: none"> <li>• Presentations</li> </ul>	<p><b>Summer Maintenance</b></p> <ul style="list-style-type: none"> <li>• Volunteer based</li> <li>• Maintenance Calendar</li> <li>• Daily Log (with photos)</li> </ul> <p><a href="https://www.schooltube.com/media/Summer-Maintenance-Planning-for-Your-Schoolyard-Habitat/1_x3s51do">https://www.schooltube.com/media/Summer-Maintenance-Planning-for-Your-Schoolyard-Habitat/1_x3s51do</a></p>



Milestone #1 5 Days	Milestone #2 February (3-4 weeks)	Milestone #3 March (3 weeks)	Milestone #4 (April)	Milestone #5 May (1 <sup>st</sup> week)	Milestone #6 Ongoing
plants and insects (videos, fishbowl discussions) <ul style="list-style-type: none"> <li>• Experience: field trip to Discovery Garden at Hands-On Museum</li> <li>• Solutions</li> </ul>	plants <ul style="list-style-type: none"> <li>• Soil data collection (type, temp, percolation, physical features of land)</li> <li>• Native plants (esp. flowering, with focus on growing requirements such as soil type, sun, water, germination timeline)</li> </ul>	needed <ul style="list-style-type: none"> <li>• Engineering planning (of gardens) and design (mapping of gardens in schoolyard, mapping of plants within gardens, mapping of soil needs)</li> <li>• Timelines</li> </ul>	gardens. <ul style="list-style-type: none"> <li>• Planting</li> <li>• Watering schedule implemented</li> </ul>		p
<b>Key Student Questions</b>	<b>Key Student Questions</b>	<b>Key Student Questions</b>	<b>Key Student Questions</b>	<b>Key Student Questions</b>	<b>Key Student Questions</b>
These are the anticipated <i>need to know questions</i> that guide the learning for each milestone. <ol style="list-style-type: none"> <li>1. What are pollinators and why are they</li> </ol>	<ol style="list-style-type: none"> <li>1. How do various natural cycles play a part in pollination?</li> <li>2. How does a healthy garden support pollinators?</li> <li>3. What are the</li> </ol>	<ol style="list-style-type: none"> <li>1. What must we consider when choosing the best places on our school property for pollinator gardens?</li> <li>2. Which plants</li> </ol>	<ol style="list-style-type: none"> <li>1. Will the rewards from our labor be worth it?</li> <li>2. How will we check our progress to see how we are doing?</li> </ol>	<ol style="list-style-type: none"> <li>1. What is most important to share with the public during your presentation?</li> </ol>	<ol style="list-style-type: none"> <li>1. Couldn't we just let nature take care of the garden once it is planted and thriving (i.e., during the summertime)?</li> <li>2. What will it look</li> </ol>

<b>Milestone #1 5 Days</b>	<b>Milestone #2 February (3-4 weeks)</b>	<b>Milestone #3 March (3 weeks)</b>	<b>Milestone #4 (April)</b>	<b>Milestone #5 May (1<sup>st</sup> week)</b>	<b>Milestone #6 Ongoing</b>
<p>important?</p> <p>2. How can we help? (What action will we take?)</p> <p>3. Who can help us?</p>	<p>key elements of a healthy garden?</p> <p>4. What questions do you have?</p> <p>5. Who can help us?</p> <p>6. Who lives in our neighborhood?</p>	<p>will thrive in the locations we choose for our pollinator gardens?</p> <p>3. What is the process for creating our gardens?</p> <p>4. What materials do we need to solve our problem?</p> <p>5. Who can help us?</p> <p>6. Who is interested in our finished project?</p>			<p>like or what will happen if we solve the problem and accomplish our goals?</p>
<b>Formative Assessment(s)</b>	<b>Formative Assessment(s)</b>	<b>Formative Assessment(s)</b>	<b>Formative Assessment(s)</b>	<b>Formative Assessment(s)</b>	<b>Formative Assessment(s)</b>
<ul style="list-style-type: none"> <li>Pre-test (individual) <a href="https://forms.gle/bgTBvPRAWIVTLYN77">https://forms.gle/bgTBvPRAWIVTLYN77</a></li> <li>Team questions developed to</li> </ul>	<ul style="list-style-type: none"> <li>Quiz on food webs</li> <li>Individual 3-D models (student choice from this milestone's topics)</li> </ul>	<ul style="list-style-type: none"> <li>Team site selection presentations</li> <li>Design ad to inform and engage community</li> </ul>	<ul style="list-style-type: none"> <li>Documentation of all processes using photography and individual journaling</li> <li>Student self-</li> </ul>	<ul style="list-style-type: none"> <li>Team presentations</li> </ul>	n/a

Milestone #1 5 Days	Milestone #2 February (3-4 weeks)	Milestone #3 March (3 weeks)	Milestone #4 (April)	Milestone #5 May (1 <sup>st</sup> week)	Milestone #6 Ongoing
<p>ask expert during field trip.</p> <ul style="list-style-type: none"> <li>Students will choose a book from text boxes and summarize its central ideas and supporting key details to peers in teams.</li> <li>Journal notes and diagrams.</li> </ul>	<ul style="list-style-type: none"> <li>Team Flip explaining models</li> <li>Team diagram of water cycle</li> <li>Accurate line plot of soil temperature on chart paper (per team)</li> <li>Journal notes and diagrams, including sketches of model planning, sketches of water cycle, and a table of soil temperatures taken with team, notes from guest speaker</li> </ul>	<ul style="list-style-type: none"> <li>Write letters to invite volunteers</li> <li>Journal notes and diagrams, including field notes, mapping of gardens around schoolyard, mapping of plants in gardens, mapping of soil needs</li> </ul>	<p>and peer-collaboration reflections (daily)</p> <p><a href="https://forms.gle/RHhvm7Nms1MEjXfy8">https://forms.gle/RHhvm7Nms1MEjXfy8</a></p>		
<b>Resources</b>	<b>Resources</b>	<b>Resources</b>	<b>Resources</b>	<b>Resources</b>	<b>Resources</b>
1. <a href="https://youtu.be/8TreF11iuLc">https://youtu.be/8TreF11iuLc</a>	1. Experts (extension)	1. Experts 2. Lists	1. Volunteers 2. Tools/Materials 3. Designs/Plots	1. Community invitations	Volunteers for summer watering and weeding

Milestone #1 5 Days	Milestone #2 February (3-4 weeks)	Milestone #3 March (3 weeks)	Milestone #4 (April)	Milestone #5 May (1 <sup>st</sup> week)	Milestone #6 Ongoing
<p>(The Ranger Zak Show)</p> <p>2. <a href="https://youtu.be/K0QTIwwvrs">https://youtu.be/K0QTIwwvrs</a> (newscast focused on documentary “The Pollinators”)</p> <p>3. Pre-Test (contains multiple videos after “submit”): <a href="https://forms.gle/bgTBvPRAWIVTLYN77">https://forms.gle/bgTBvPRAWIVTLYN77</a></p> <p>4. Text sets (see below)</p>	<p>services, nurseries)</p> <p>2. Bee life cycle, pollination, and plant development <a href="https://youtu.be/-ism7Z-0Qo">https://youtu.be/-ism7Z-0Qo</a> (7:37 minutes total)</p> <p>3. Teacher read-alouds (see bibliography)</p> <p>4. Text sets (see below)</p>	<p>3. Free pollinator seeds <a href="https://www.saveourmonarchs.org/schools.html">https://www.saveourmonarchs.org/schools.html</a></p> <p>4. Text sets (see below)</p>	<p>4. Escape Room for Earth Day (digital)</p>	<p>2. Team Presentations</p> <p>3. <u>Post-test</u></p>	
<b>Text Sets</b>	<b>Text Sets</b>	<b>Text Sets</b>	<b>Text Sets</b>	<b>Text Sets</b>	<b>Text Sets</b>
<ul style="list-style-type: none"> <li>• flower parts models</li> <li>• postcards of pollinator insects</li> <li>• Online <u>Discovery Garden</u></li> </ul>	<ul style="list-style-type: none"> <li>• Flashcard life cycle sets</li> <li>• Flashcard food chain sets</li> <li>• Flashcard water cycle sets</li> <li>• Jars of soils (4 types)</li> </ul>	<ul style="list-style-type: none"> <li>• Printed blueprints for raised gardens: <u>2x2, 4x4</u></li> <li>• Online: <u>building a raised bed</u></li> <li>• Plant <u>flashcards</u></li> </ul>	<ul style="list-style-type: none"> <li>• ALL text sets</li> </ul>	<ul style="list-style-type: none"> <li>• ALL text sets</li> </ul>	n/a

<b>Milestone #1 5 Days</b>	<b>Milestone #2 February (3-4 weeks)</b>	<b>Milestone #3 March (3 weeks)</b>	<b>Milestone #4 (April)</b>	<b>Milestone #5 May (1<sup>st</sup> week)</b>	<b>Milestone #6 Ongoing</b>
<ul style="list-style-type: none"> <li>Books (<a href="#">see bibliography</a>)</li> </ul>	<ul style="list-style-type: none"> <li>Books (<a href="#">see bibliography</a>)</li> </ul>	<ul style="list-style-type: none"> <li>Books (<a href="#">see bibliography</a>)</li> </ul>			
<b>Events</b>	<b>Events</b>	<b>Events</b>	<b>Events</b>	<b>Events</b>	<b>Events</b>
Field trip to Discovery Garden	Guest speaker from TN Extension (native plants)	Engineering workshop with expert; master gardener; ads and invitations to engage community and enlist volunteers	Making the gardens	Public Presentation  Guest List: Chamber of Commerce staff, Mayor, Community, all students in school, other key people (such as the experts we met with)	Watering and weeding rotation schedule for summertime (requires volunteers)

## Project Calendars and Details: Linkable Index

Milestone 1	Milestone 2	Milestone 3	Milestone 4	Milestone 5	Milestone 6
<a href="#">Week 1 Calendar</a>	<a href="#">Week 1 Calendar</a>	<a href="#">Week 1 Calendar</a>	<a href="#">Weeks 1-4 Calendar</a>	<a href="#">Week 1 Calendar</a>	<a href="#">Ongoing (Summer)</a>
	<a href="#">Week 2 Calendar</a>	<a href="#">Week 2 Calendar</a>			
	<a href="#">Week 3 Calendar</a>	<a href="#">Week 3 Calendar</a>			
	<a href="#">Week 4 Calendar</a>				
<a href="#">Rubric link</a>	<a href="#">Rubric link</a>	<a href="#">Rubric link</a>	<a href="#">Rubric link</a>	<a href="#">Rubric link</a>	n/a

[General Journal Rubric](#) (specific to entire unit)

**Bookmark Links Nonfunctional in PDF**  
 External Links (i.e., websites) are functional. Bookmark Links, such as those on this page, only work in .docx format.

## Project Calendar Milestone #1

<b>Major Products and/or Performances</b>	<ul style="list-style-type: none"> <li>• Pre-test (individual) <a href="https://forms.gle/bgTBvPRAWJVTLYN77">https://forms.gle/bgTBvPRAWJVTLYN77</a></li> <li>• Team questions developed to ask expert during field trip.</li> <li>• Students will choose a book from text boxes and summarize its central ideas and supporting key details to peers in teams.</li> <li>• Journal notes and diagrams.</li> </ul>
<b>Entry Events</b>	<p>Multiple videos, pre-test (with embedded videos), walkabout, field trip, text sets, introduction to driving question (of unit), KWL</p>
<b>Driving Questions</b>	<p>Where are the bees and butterflies?</p>
<b>In-Depth Inquiry, Key Student Question(s)</b>	<ul style="list-style-type: none"> <li>• Pollinators (what are pollinators and why are they important?).</li> <li>• Pollination (what is pollination? what is needed for pollination?).</li> <li>• What's the problem? What's causing the problem?</li> <li>• Why do we care?</li> <li>• How can the problem be addressed? What can we do?</li> <li>• Who can we learn from?</li> </ul>
<b>Knowledge/Skills Needed by Students (to successfully complete this phase)</b>	<p>Students will understand:</p> <ul style="list-style-type: none"> <li>• pollinators are in peril</li> <li>• the importance of pollinators and their relationship with plants</li> <li>• the parts of flowering plants</li> <li>• how pollination is related to food production (for human consumption)</li> </ul> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• read and summarize books related to this week's topics</li> <li>• write a paragraph in journals that shares complete thoughts using proper grammatical conventions about this week's topics</li> </ul>
<b>Lesson Details, including scaffolding,</b>	<p>Students will be introduced to unit topics through videos, walk-about, a field trip, text sets, discussion, and reflecting. The pre-test includes multiple short videos to support responses to each question (after responses are submitted).</p>

<b>who is providing (teacher, expert, etc.), voice &amp; choice</b>	<ul style="list-style-type: none"> <li>• Scaffolding is unit-long, but for this week, it moves from a general overview, to problem identification, to asking what can be done about it.</li> <li>• Supports for emerging bilinguals (EBs) and struggling readers: text sets include photos with text (visual supports); videos (auditory learning); peer discussions in teams; teams are mixed ability; journaling may include drawings and home language (for EBs).</li> <li>• Student choice: choosing 3 videos to reflect on in journals; choosing something each day from text sets to share with teammates; team selection of topic for question generation for field trip expert.</li> <li>• Student voice: reflections in journals; sharing with teammates.</li> <li>• Facilitators of knowledge: teacher, expert at Discovery garden, as well as knowledge gleaned from text sets and videos.</li> </ul>
<b>Materials (for this phase)</b>	Student tablets for videos and Google forms, field trip permission slips, student journals, text sets (including flower part models, postcards of pollinator insects, books, online access)
<b>Project Milestone Recap</b>	This milestone is a week of entry events to trigger student thinking about problems and solutions for pollinator habitats.
<b>Critique and Revision</b>	n/a
<b>Audience (class, school, community, experts, web, other)</b>	During milestone 1, the audience is mostly peers, except during field trip.

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Day 1	Day 2	Day 3	Day 4	Day 5
<ul style="list-style-type: none"> <li>• Video <a href="https://youtu.be/8Tr">https://youtu.be/8Tr</a></li> </ul>	<ul style="list-style-type: none"> <li>• Pre-Test (contains multiple videos after</li> </ul>	<ul style="list-style-type: none"> <li>• Problem: Decline in pollinating plants</li> </ul>	Field Trip: Discovery Garden at Hands-On	Unit Driving Question: How will my class and



Day 1	Day 2	Day 3	Day 4	Day 5
<p><a href="#">eF11iuLc</a> - The Ranger Zak Show on pollination; stop at 9:25 minutes</p> <ul style="list-style-type: none"> <li>Text sets (explore, read, share a book to team members)</li> <li>Walkabout (noticing walk around school grounds – bugs, plants, soil, erosion, etc.)</li> <li>Whole class discussion (categorize noticings on anchor chart)</li> <li>Reflection</li> </ul>	<p>“submit”): <a href="https://forms.gle/bgTBvPRAWjVTLYN77">https://forms.gle/bgTBvPRAWjVTLYN77</a></p> <ul style="list-style-type: none"> <li>Text sets (explore, read, share a book to team members)</li> <li>Teach team discussion using fishbowl method <a href="https://youtu.be/p1q7WbWc8dE">https://youtu.be/p1q7WbWc8dE</a></li> <li>Reflection</li> </ul>	<p>and insects</p> <ul style="list-style-type: none"> <li>Videos: <ul style="list-style-type: none"> <li><a href="https://youtu.be/8TreF11iuLc">https://youtu.be/8TreF11iuLc</a> - The Ranger Zak Show on foods; begin at 9:26 minutes &amp; stop at 12:24 minutes</li> <li><a href="https://youtu.be/KOQTlwwvvrS">https://youtu.be/KOQTlwwvvrS</a> (News and trailer for movie <i>The Pollinator</i>)</li> </ul> </li> <li>Text sets (explore, read, share book summary and key details with team member during turn-n-talk)</li> <li>Generate questions for field trip (in teams, by selected topic, in journals)</li> </ul>	<p>Museum</p>	<p>I attract <i>pollinators</i>, especially <i>Monarchs</i>, to become regular visitors to our schoolyard, and why is this important?</p> <ul style="list-style-type: none"> <li><a href="https://youtu.be/8TreF11iuLc">https://youtu.be/8TreF11iuLc</a> - The Ranger Zak Show – what can we do; begin at 12:25 minutes to 14:03</li> <li>Personal reflections in journal related to driving question.</li> <li>Share reflections in teams.</li> <li>Teams share main points to class.</li> <li>KWL and solutions (anchor charts – whole class).</li> </ul>
<p>Reflection: What’s going on? What do you know? What do you want to know more about?</p>	<p>Reflection: List 3 key points from at least 3 of the videos watched after pre-test.</p>	<p>Reflection: Includes questions for field trip (generated in teams but written in each journal)</p>	<p>Reflection (during field trip): Responses to team’s questions and lists of types of plants learned about.</p>	<p>Reflection: Personal ideas about how we can accomplish this. Should include key ideas learned all week.</p>

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## Project Calendar Milestone #2, Week 1: Background Learning – Field Observations

<b>Major Products and/or Performances</b>	Group: Photos from walk-about Individual: Journal Reflections
<b>Entry Event</b>	<u>Jeopardy</u>
<b>Driving Question</b>	Who lives in our neighborhood?
<b>In-Depth Inquiry, Key Student Question(s)</b>	What is poisonous in our neighborhood? Is our neighborhood healthy? What wildlife does it support? What's abundant? What's lacking? Why? How can we help?
<b>Knowledge/Skills Needed by Students (to successfully complete this phase)</b>	Students will be able to: <ul style="list-style-type: none"> <li>• identify and describe the insects, small mammals, birds, arachnids, snakes, and plants around the schoolyard</li> <li>• use appropriate apps to learn the names of various insects, birds, and plants</li> <li>• read and summarize books related to this week's topics</li> <li>• write a paragraph in journals that shares complete thoughts using proper grammatical conventions about this week's topics</li> </ul> Students will understand: <ul style="list-style-type: none"> <li>• how to appropriately and safely view wildlife around the schoolyard</li> <li>• how poop identification is one way to know what lives (or visits) the area</li> </ul>
<b>Lesson Details, including scaffolding, who is providing</b>	Through inquiry and discovery, students will learn about life in the schoolyard (and beyond) from both the animal and plant kingdoms, and how to interact with these safely and respectfully. Students will use apps to aid their discovery as they walk around the schoolyard.

<p><b>(teacher, expert, etc.), voice &amp; choice</b></p>	<ul style="list-style-type: none"> <li>• Scaffolding is unit-long, but for this week, it moves from discussion to field observations to debriefing together.</li> <li>• Supports for emerging bilinguals (EBs) and struggling readers: text sets include photos with text (visual supports); videos (auditory learning); peer discussions in teams; teams are mixed ability; journaling may include drawings and home language (for EBs).</li> <li>• Student choice: inherent during discovery process during walk-about</li> <li>• Student voice: reflections in journals; sharing with teammates.</li> <li>• Facilitators of knowledge: teacher, as well as knowledge gleaned from text sets and videos.</li> </ul>
<p><b>Materials (for this phase)</b></p>	<ul style="list-style-type: none"> <li>• Tablets, cameras</li> <li>• Apps on tablets: MerlinBird ID, PictureInsect, PlantSnap</li> <li>• Student journals, chart paper</li> <li>• <u>Quiz-Quiz-Trade cards</u></li> <li>• Text sets</li> <li>• journals</li> </ul> <p>[Teacher resource: <a href="https://www.tn.gov/twra/wildlife/birds/100-birds-of-tennessee.html">https://www.tn.gov/twra/wildlife/birds/100-birds-of-tennessee.html</a>]</p>
<p><b>Project Milestone Recap</b></p>	<p>During this 4-week phase, called background learning, students will gain the knowledge needed to create thriving pollinator gardens around the schoolyard.</p>
<p><b>Critique and Revision</b></p>	<p>At the end of the week, student photos and descriptions of life found in the schoolyard will be compared to the lists made on day 1. Key questions: Are we surprised with our findings? Did they support our original list, and if not, what is different? What did we learn from this? How does this affect our future steps?</p>
<p><b>Audience (class, school, community, experts, web, other)</b></p>	<p>Photos will be uploaded to Google site, and link will be shared with families and school community.</p>

Day 1	Day 2	Day 3	Day 4	Day 5
<ul style="list-style-type: none"> <li>• Entry Event: <u>Jeopardy</u></li> <li>• Discussion/inquiry of driving question.</li> <li>• Teacher read-aloud (student choice of books)</li> <li>• Lists created (whole-class) of what we might find in our neighborhood in these categories: birds, rodents, small mammals, insects, arachnids, snakes, plants</li> <li>• Direct instruction on 21<sup>st</sup> c. skills, with a focus on collaboration. Modeling and practice using <i>fishbowl technique</i>. (Explanation: <a href="https://youtu.be/p1q7WbWc8dE">https://youtu.be/p1q7WbWc8dE</a>)</li> <li>• Text sets</li> </ul>	<ul style="list-style-type: none"> <li>• Whole-class check-in.</li> <li>• Discussion of poisonous insects to avoid (with photos); where to look</li> <li>• Schoolyard walk-about in teams (birds, insects, arachnids) using ID apps and cameras to identify and photograph</li> <li>• Uploading photos</li> <li>• Debriefing (sharing findings); comparison to lists (day 1)</li> <li>• Text sets</li> </ul>	<ul style="list-style-type: none"> <li>• Poop! (Which belongs to which?) [Book for teacher read-aloud: <i>Poodunnit</i>, Carlton Kids. (2020); Video: <a href="https://youtu.be/fXrR2zpn-go">https://youtu.be/fXrR2zpn-go</a> ]</li> <li>• Discussion of behavior around rodents, mammals, snakes; snakes to avoid; where to look</li> <li>• Schoolyard walk-about in teams (rodents, mammals, snakes) using cameras to photograph</li> <li>• Uploading photos</li> <li>• Debriefing (sharing findings); comparison to lists (day 1)</li> <li>• text sets</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion of poisonous or prickly plants to avoid; where to look</li> <li>• Schoolyard walk-about in teams (flowers, trees, shrubs, grasses) using PlantSnap app and cameras</li> <li>• Uploading photos</li> <li>• Debriefing (sharing findings); comparison to lists (day 1)</li> <li>• Text sets</li> </ul>	<ul style="list-style-type: none"> <li>• Discussions of driving &amp; key questions using Kagan routine (<u>quiz-quiz-trade</u>)</li> <li>• Photos review (whole class)</li> <li>• Intro to next week's activities</li> <li>• Text sets</li> </ul>

Day 1	Day 2	Day 3	Day 4	Day 5
<p>Reflection</p> <p>Oral: share key ideas and summarize text from 2 different books on same topic with teammates</p> <p>Written: document the title and key ideas of book shared with teammates</p>	<p>Reflection</p> <p>Write about the most exciting find during the walk-about.</p>	<p>Reflection</p> <p>Write about the most exciting find during the walk-about.</p>	<p>Reflection</p> <p>Write your thoughts about this prompt: Who lives in our neighborhood?</p>	<p>Reflection</p> <p>Write about what you hope to learn about next week and what you already know about the topic.</p>

**Additional Notes:** Photo uploads will occur directly from student tables to folders in Google Drive, to be assembled by teacher onto a Google site. [Back to Linkable Index](#)

## Project Calendar Milestone #2, Week 2: Background Learning – Food Chains & Cycles (Monarch, water, plants)

<b>Major Products and/or Performances</b>	<p>Group: Teams create artistic diagrams of water cycle; may use technology. Teams create Flip videos to share individually created models (see below).</p> <p>Individual: Students individually create labeled models illustrating food chains, a pollinator insect’s life cycle, or a pollinator plant’s life cycle. Journal reflections.</p>
<b>Entry Events</b>	<p><a href="https://youtu.be/76J9Omo4ecE">https://youtu.be/76J9Omo4ecE</a> (Lion King)  <a href="https://youtu.be/CZhE2p46vJk">https://youtu.be/CZhE2p46vJk</a> (informational)</p>
<b>Driving Questions</b>	<p>How does the work of nature continue without us noticing, without our help?</p>
<b>In-Depth Inquiry, Key Student Question(s)</b>	<ul style="list-style-type: none"> <li>• How do models help us explain important concepts to others?</li> <li>• How do various natural cycles play a part in pollination?</li> <li>• Analyze what would happen if there were a break in a food chain.</li> <li>• Where does the energy in almost all food come from?</li> <li>• Why is a weed a weed? Is it a weed? What is a weed? Why do we kill weeds? Do we need to kill weeds?</li> </ul> <p>Related to artistic diagrams, essential questions about art will be discussed.</p> <ul style="list-style-type: none"> <li>• How do objects, places, and design shape lives and communities?</li> <li>• How do artists and designers determine goals for designing or redesigning objects, places, or systems?</li> <li>• How do artists and designers create works of art or design that effectively communicate?</li> </ul>
<b>Knowledge/Skills Needed by Students (to successfully complete this phase)</b>	<p>Students will understand:</p> <ul style="list-style-type: none"> <li>• the importance of food chains</li> <li>• how the water cycle works</li> <li>• how the life cycle of monarchs and bees depend upon plants</li> <li>• how foods depend upon pollination</li> </ul> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• read and summarize books related to this week’s topics</li> </ul>

	<ul style="list-style-type: none"> <li>• write a paragraph in journals that shares complete thoughts using proper grammatical conventions about this week’s topics</li> </ul>
<b>Lesson Details, including scaffolding, who is providing (teacher, expert, etc.), voice &amp; choice</b>	<p>Students will learn about food chains, life cycles (bees, butterflies, plants, water) and their interconnectedness; create models and videos; create diagrams.</p> <ul style="list-style-type: none"> <li>• Scaffolding is unit-long, but for this week, students create models and diagrams after learning events. They can use flash cards, posters, websites, and books to support the development of their models and diagrams.</li> <li>• Supports for emerging bilinguals (EBs) and struggling readers: text sets include photos with text (visual supports); videos (auditory learning); peer discussions in teams; teams are mixed ability; journaling may include drawings and home language (for EBs).</li> <li>• Student choice: Topic choice for journal writing (day 1). Choice of which model to create. Choice of how to create a water cycle diagram (digital or paper).</li> <li>• Student voice: reflections in journals; sharing with teammates; whole-class discussion.</li> <li>• Facilitators of knowledge: teacher, as well as knowledge gleaned from text sets and videos.</li> </ul>
<b>Materials (for this phase)</b>	<p>[for the teacher only: <a href="https://www.weareteachers.com/food-webs/">https://www.weareteachers.com/food-webs/</a>]</p> <ul style="list-style-type: none"> <li>• String for food web game</li> <li>• text sets</li> <li>• journals</li> <li>• student tablets</li> <li>• model materials for students (paper, pipe cleaners, paper towel rolls, decorative items, paints, color pencils, markers, etc.)</li> <li>• art materials for students (paper, paints, markers, colored pencils, etc.)</li> </ul>
<b>Project Milestone Recap</b>	<p>During this 4-week phase, called background learning, students will gain the knowledge needed to create thriving pollinator gardens around the schoolyard.</p>
<b>Critique and Revision</b>	<p>At this point, the whole class pauses on Day 1 to recap what’s been learned so far, how teamwork and behavior is going (i.e., during walk-about) and how it might be improved, and how we’re feeling about the project overall. Do we need to make changes?</p>

<b>Audience (class, school, community, experts, web, other)</b>	<p>Water diagrams will be posted in the hallway outside the classroom. If they are digital, they will be posted on the class Google site (and a poster with links will be included with diagrams posted in hallway).</p> <p>Models will be displayed on a table in the hallway underneath the water diagrams. Videos will be posted on class Google site and Flip links will be shared with parents.</p>
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Day 1	Day 2	Day 3	Day 4	Day 5
<ul style="list-style-type: none"> <li>• Whole-class reflection of where we're at thus far (circle time).</li> <li>• Project assignment explained (Students individually create labeled models illustrating food chains, a pollinator insect's life cycle, or a pollinator plant's life cycle. Using 21<sup>st</sup> century skills, teams each create a Flip in which each team member presents and explains model.)</li> <li>• Discovery: <u>Food chains</u> (incl. role of sun and pollination)</li> <li>• <u>Quiz</u></li> <li>• Text Sets</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Food Web game</u></li> <li>• Discovery: <u>Monarch &amp; Bee</u> Life Cycle</li> <li>• <a href="https://www.brainpop.com/games/foodfight/">https://www.brainpop.com/games/foodfight/</a></li> <li>• Text Sets</li> <li>• Project Development (models)</li> </ul>	<ul style="list-style-type: none"> <li>• Discovery: <u>Plant Cycle</u></li> <li>• Discussion: Why is a weed a weed? Is it a weed? What is a weed? Why do we kill weeds? Do we need to kill weeds?</li> <li>• Text Sets</li> <li>• Project Development (models)</li> </ul>	<ul style="list-style-type: none"> <li>• Text Sets</li> <li>• Project Development (Flip videos created by teams highlighting each team member's model.)</li> </ul>	<ul style="list-style-type: none"> <li>• Discovery: <u>Water Cycle, #2</u></li> <li>• Whole-class discussion on interconnectedness of this week's topics.</li> <li>• Discussions of driving &amp; key questions.</li> <li>• Art discussion, whole-class (see key questions)</li> <li>• Teams create artistic diagrams of water cycle (NGSS 5-PS1-1); may use technology.</li> </ul>



Day 1	Day 2	Day 3	Day 4	Day 5
<p>Reflection (Journal)</p> <p>Exit Ticket Response: Explain your current understanding of how all the neighbors in our schoolyard are dependent upon each other. OR Explain your current understanding of how the food we eat depends upon pollination.</p>	<p>Reflection (Journal)</p> <p>Exit Ticket Response: List the requirements pollinators need to survive. Then choose one and elaborate.</p>	<p>Reflection (Journal)</p> <p>Exit Ticket Response: List the requirements plants need to survive. Then choose one and elaborate.</p>	<p>Reflection (Rubric)</p> <p>Exit Ticket Response: Complete the <u>self-assessment and peer-assessment rubric</u>.</p>	<p>Reflection (Journal)</p> <p>Respond to these questions:</p> <ul style="list-style-type: none"> <li>• How do objects, places, and design shape lives and communities?</li> <li>• How do artists and designers determine goals for designing or redesigning objects, places, or systems?</li> <li>• How do artists and designers create works of art or design that effectively communicate?</li> </ul>

**Additional Notes:**

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## Project Calendar Milestone #2, Week 3: Background Learning – Soil Study

<b>Major Product or Performance</b>	<p>Group: Teams collaborate with soil temp data collected to create line plots.</p> <p>Individual: Individuals record soil temps and sunshine in journals. Journal reflections.</p>
<b>Entry Event</b>	<p><i>Kiss the Ground</i> (Netflix-1.5 hours)</p>
<b>Driving Question</b>	<p>Have you ever considered the dirt beneath your feet?</p>
<b>In-Depth Inquiry, Key Student Question(s)</b>	<ul style="list-style-type: none"> <li>• Explain the connection between soil and healthy plants.</li> <li>• What is healthy soil?</li> <li>• How do we support and assure healthy soil?</li> </ul>
<b>Knowledge/Skills Needed by Students (to successfully complete this phase)</b>	<p>Students will understand:</p> <ul style="list-style-type: none"> <li>• the importance of soil</li> <li>• desertification (definition, causes, regeneration)</li> </ul> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• read and summarize books related to this week’s topics</li> <li>• write a descriptive essay in journals that shares complete thoughts using proper grammatical conventions, as well as reflections about this week’s topics</li> </ul>
<b>Lesson Details, including scaffolding, who is providing (teacher, expert, etc.), voice &amp; choice</b>	<p>Soil types, life, temperature, and drainage are studied through data collection (temperature of soil in various locations), videos, discussions, experiments, walk-about, and text sets.</p> <ul style="list-style-type: none"> <li>• Scaffolding is unit-long, but for this week, soil health is introduced first with a movie, and then with exploration and hands-on activities. The learning is supported by text sets, too.</li> <li>• Supports for emerging bilinguals (EBs) and struggling readers: text sets include photos with text (visual supports); videos (auditory learning); peer discussions in teams; teams are mixed ability; journaling may include drawings and home language (for EBs).</li> <li>• Student voice: reflections in journals; sharing with teammates.</li> <li>• Facilitators of knowledge: teacher, as well as knowledge gleaned from text sets and videos.</li> </ul>

<b>Materials (for this phase)</b>	<ul style="list-style-type: none"> <li>• Text sets (books, jars of soil, flashcards of food chains and life cycles)</li> <li>• bins of various soils</li> <li>• magnifying glasses</li> <li>• Carbon Cycle handout</li> <li>• Thermometers for soil temperatures</li> <li>• Materials for experiments (day 5)</li> <li>• journals</li> </ul> <p>Teacher info on Carbon Cycle and connection to engineering:  <a href="https://www.teachengineering.org/lessons/view/cub_carbon_lesson01">https://www.teachengineering.org/lessons/view/cub_carbon_lesson01</a></p>
<b>Project Milestone Recap</b>	<p>During this 4-week phase, called background learning, students will gain the knowledge needed to create thriving pollinator gardens around the schoolyard.</p>
<b>Critique and Revision</b>	<p>At this point, the whole class pauses on Day 1 to recap what’s been learned so far, how teamwork and behavior is going (i.e., during games, project development, filming, diagrams) and how it might be improved, and how we’re feeling about the project overall. Do we need to make changes?</p>
<b>Audience (class, school, community, experts, web, other)</b>	<p>Classmates (sharing essays)</p>

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Day 1	Day 2	Day 3	Day 4	Day 5
<ul style="list-style-type: none"> <li>• Whole-class reflection of where we’re at thus far (circle time).</li> <li>• Entry Event: <i>Kiss the Ground</i> (Netflix- first</li> </ul>	<ul style="list-style-type: none"> <li>• Entry Event: <i>Kiss the Ground</i> (Netflix- last 45 minutes)</li> <li>• Read aloud essays (from Day 1)</li> <li>• Text sets</li> </ul>	<ul style="list-style-type: none"> <li>• Discovery: <u>Soil Life</u>: ants, worms, grubs, earwigs, roly pollies, ants, <u>fungus/bacteria</u>, decaying matter.</li> </ul>	<ul style="list-style-type: none"> <li>• Soil Temperature &amp; Sunshine Collection (walk-about in teams). Instructions: Individuals record temperatures of soil</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to experiments (see below), students use text sets and the internet to research soil to</li> </ul>

Day 1	Day 2	Day 3	Day 4	Day 5
<p>45 minutes)</p> <ul style="list-style-type: none"> <li>Discovery: Bins with silt, sand, hummus, clay are circulated among teams. Students feel, smell, and inspect the soils with magnifying glasses.</li> </ul>		<ul style="list-style-type: none"> <li>Walk-about in teams (any rocks lifted, holes dug, grasses moved must be replaced how they were found) and document in journals with drawings and labels the life that is discovered.</li> <li>Text sets</li> </ul>	<p>in different zones as well as sunshine in journals during walkabout with team (CCSS 5-PS1-3); back in the classroom, teams collaborate and use data to create line plots of temps in various zones. (5.MD.B.2)</p>	<p>build knowledge.</p> <ul style="list-style-type: none"> <li>Discussions of driving &amp; key questions.</li> <li>Soil drainage (<u>experiment</u> in teams, document steps in journals)</li> <li><u>Soil type</u> (experiment in teams, document steps in journals)</li> <li><u>Self- and peer-assessments</u></li> <li>Team-generated questions for next week's guest speaker</li> </ul>
<p>Reflection</p> <p>Write a descriptive essay about soil. Use the <u>Write-Tools T-Chart</u> to create outline first, then add transition words and copy it into your journal.</p>	<p>Reflection</p> <p>Discuss in teams, then journal individually: Reflect on the carbon cycle (from the movie). May use handouts <u>one</u> and <u>two</u> to guide reflections, or <u>diagram on supporting website</u>.</p>	<p>Reflection</p> <p>Discuss in teams, then journal individually: Soil dead or alive – what determines this? Why does this matter?</p>	<p>Reflection</p> <p>Discuss in teams, then journal individually: Why do you think soil temperatures differed around the schoolyard?</p>	<p>Reflection</p> <p>Discuss in teams, then journal individually: What were the results of your experiments? What effect might this have on plants? Did the results of your experiments align with knowledge gained during research? Quote from your</p>

Day 1	Day 2	Day 3	Day 4	Day 5
				research and cite it.

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## Project Calendar Milestone #2, Week 4: Background Learning – Native Plants

<b>Major Product or Performance</b>	<p>Group: Class book created from narrative writing. Bulletin board created from individual sketches.</p> <p>Individual: Narrative writing. Sketches.</p>
<b>Entry Event</b>	<p>Guest speaker from TN Extension (native plants)</p>
<b>Driving Question</b>	<p>Why does it matter what plants you plant?</p>
<b>In-Depth Inquiry, Key Student Question(s)</b>	<ul style="list-style-type: none"> <li>• How does a healthy garden support pollinators?</li> <li>• Why are plants called native or invasive, and why is that important?</li> <li>• What are <i>plant hardiness zones</i> and how are they used in decisions for gardening?</li> <li>• What would it be like to be a bee, butterfly, earthworm, raindrop, etc.?</li> </ul>
<b>Knowledge/Skills Needed by Students (to successfully complete this phase)</b>	<p>Students will understand:</p> <ul style="list-style-type: none"> <li>• the difference between native and invasive plant species</li> <li>• the importance to gardening of knowing plant hardiness zones</li> </ul> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• identify some native and invasive plant species for our area</li> <li>• write a narrative from a different point of view that shares complete thoughts using proper grammatical conventions, as well as reflections about this week’s topics</li> </ul>
<b>Lesson Details, including scaffolding, who is providing (teacher, expert, etc.), voice &amp; choice</b>	<p>Plants – types (native &amp; invasive), zones, requirements for growth (amount of sun, type of soil, water needs), germination timeline. Students will create sketches with labels/captions, and they will write a narrative from the point of view of a bee, butterfly, caterpillar, hummingbird, flower, raindrop, or earthworm.</p> <ul style="list-style-type: none"> <li>• Scaffolding is unit-long, but for this week, an overview will be provided by the guest speaker, followed by student activities that allow them to go deeper with this week’s topic.</li> <li>• Supports for emerging bilinguals (EBs) and struggling readers: text sets include photos with text (visual supports); videos (auditory learning); peer discussions in teams; teams are mixed ability;</li> </ul>

	<p>journaling may include drawings and home language (for EBs).</p> <ul style="list-style-type: none"> <li>• Student choice: choice of plants to sketch/label; choice of narrative point of view</li> <li>• Student voice: narratives; sketches; reflections in journals; sharing with teammates.</li> <li>• Facilitators of knowledge: teacher, expert guest, as well as knowledge gleaned from text sets and videos.</li> </ul>
<b>Materials (for this phase)</b>	<ul style="list-style-type: none"> <li>• 6x6 cardstock for sketches</li> <li>• Text sets (including websites)</li> <li>• journals</li> </ul>
<b>Project Milestone Recap</b>	During this 4-week phase, called background learning, students will gain the knowledge needed to create thriving pollinator gardens around the schoolyard.
<b>Critique and Revision</b>	At this point, the whole class pauses on Day 1 to recap what's been learned so far, how teamwork and behavior is going (i.e., during experiments, walk-about, data collection) and how it might be improved, and how we're feeling about the project overall. Do we need to make changes? Are we learning what we need to?
<b>Audience (class, school, community, experts, web, other)</b>	Student narrative essays and illustrations will be made into a book (lulu.com) and offered (for sale to cover costs) to parents. One copy will be added to the classroom library.

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Day 1	Day 2	Day 3	Day 4	Day 5
<ul style="list-style-type: none"> <li>• Whole-class reflection of where we're at thus far (circle time).</li> <li>• Guest speaker from TN Extension (native</li> </ul>	<ul style="list-style-type: none"> <li>• Whole-class instruction: Gardening zones (national) and what they mean. Identifying our zone.</li> </ul>	<p><i>Sketching &amp; Labeling:</i> Each student chooses one flowering plant from a list a native or invasive plants to sketch in detail and label on 6x6</p>	<p><i>Narrative Writing:</i> Each student is to write a creative story from the point of view of a bee, butterfly, caterpillar, hummingbird, flower,</p>	<ul style="list-style-type: none"> <li>• Discussions of driving &amp; key questions.</li> <li>• Sharing narratives.</li> <li>• Text sets</li> </ul>

Day 1	Day 2	Day 3	Day 4	Day 5
plants)	<p>Tying this with sun and moisture requirements for native plant species.</p> <ul style="list-style-type: none"> <li>Resource: <a href="https://planthardiness.ars.usda.gov/">https://planthardiness.ars.usda.gov/</a></li> </ul>	<p>cardstock. Captions (attached to bottom of 6x6 drawing) should include requirements for growth (amount of sun, type of soil, amount of water, days till germination) and size and spacing requirements for planting. Finished sketches will be added to bulletin board that is divided into native/invasive categories. Books and photos are provided as guides, and students may use the internet.</p>	<p>raindrop, or earthworm. Students are to illustrate their narratives.</p> <p>Using lulu.com, a class book will be made of student narratives and drawings.</p>	
<p>Reflection</p> <p>After guest speaker leaves, discuss in teams and then summarize in journals the main points made by the guest speaker and explain the supporting evidence and key details presented. (5.SL.CC.3)</p>	<p>Reflection</p> <p>Briefly explain what you learned about plant hardiness zones. List the characteristics of our zone.</p>	<p>Reflection</p> <p>How does your finished art effectively communicate?</p>	<p>Reflection</p> <p>(none)</p>	<p>Reflection</p> <p>How are all the neighbors in our schoolyard dependent upon each other? What roles do the sun, soil, and rain play? What role does pollination play?</p>



**Project Calendar Milestone #3, Weeks 1-3: Planning – site selection, seed/seedling selection; community engagement and invitations for volunteers; engineering planning**

<b>Major Product or Performance</b>	Group: Team site selection presentations; ad design (inform and engage community) Individual: Letters to caregivers to ask for volunteering
<b>Entry Event</b>	Guest (construction basics, tools, and safety)
<b>Driving Question</b>	Are we expert enough to plan and carry out a project of this scope? Prove it.
<b>In-Depth Inquiry, Key Student Question(s)</b>	<ul style="list-style-type: none"> <li>• What must we consider when choosing the best places on our school property for pollinator gardens?</li> <li>• Which plants will thrive in the various locations we choose for our pollinator gardens?</li> <li>• What is the process for creating our gardens?</li> <li>• How do we determine amount of soil and amendments needed?</li> <li>• How can we make maps to scale so that our measurements for raised beds and soil are accurate?</li> <li>• What materials will we need for this project (going forward)?</li> <li>• Who can help us? How can we engage them?</li> <li>• Who is interested in our finished project?</li> </ul>
<b>Knowledge/Skills Needed by Students (to successfully complete this phase)</b>	<p>Students will understand:</p> <ul style="list-style-type: none"> <li>• maps to scale</li> <li>• how to calculate volume</li> <li>• basic construction and safety methods, basic carpentry tools</li> <li>• what blueprints are</li> <li>• how to calculate volume</li> </ul> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Use software to create maps to scale</li> <li>• Create data-backed presentations, using previously learned information throughout this unit, and quoting the relationships between two ideas from two texts on the same topic.</li> </ul>

<p><b>Lesson Details, including scaffolding, who is providing (teacher, expert, etc.), voice &amp; choice</b></p>	<p>Key activities during this milestone (over 3 weeks) include site selection, seed/seedling selection, inviting volunteers, determining tools and supplies needed, engineering planning (of gardens) and design (mapping of gardens in schoolyard, mapping of plants within gardens, mapping of soil amendments), calculating volume. Team site selection presentations backed by evidence. Field trip to nursery to purchase plants, seeds, bags of soil and soil amendments.</p> <ul style="list-style-type: none"> <li>• Scaffolding is unit-long, and this week, students will draw upon what they’ve learned so far to make site preparation plans while working with experts and volunteers.</li> <li>• Supports for emerging bilinguals (EBs) and struggling readers: text sets include photos with text (visual supports); videos (auditory learning); peer discussions in teams; teams are mixed ability; journaling may include drawings and home language (for EBs).</li> <li>• Student choice: platform to use for presentations (i.e., Prezi, Google Slides, video, etc.)</li> <li>• Student voice: presentations, reflections in journals.</li> <li>• Facilitators of knowledge: teacher, guest speakers (carpenter, master gardener), volunteers (in-class) to assist with student presentations, as well as knowledge gleaned from text sets and videos.</li> </ul>
<p><b>Materials (for this phase)</b></p>	<ul style="list-style-type: none"> <li>• Google Earth access (may require district IT assistance)</li> <li>• Map scaling <u><a href="#">practice worksheet</a></u></li> <li>• Shopping lists for seeds/seedlings/small plants</li> <li>• Free pollinator seeds <u><a href="https://www.saveourmonarchs.org/schools.html">https://www.saveourmonarchs.org/schools.html</a></u></li> <li>• Student edition of AutoCAD loaded on tablets (requires district IT assistance). Alternate software: SketchUp</li> <li>• Zone markers (paint stirring sticks labeled Zones 1-6)</li> <li>• Movie: <i>The Lorax</i></li> </ul>
<p><b>Project Milestone Recap</b></p>	<p>During this 3-week phase, called planning (Milestone #3), students will plan the details of garden locations (mapping), plants and plant locations, as well as materials, expertise, and assistance needed to implement the plans during implementation (Milestone #4).</p>

<b>Critique and Revision</b>	At this point, the whole class pauses on Day 1 to recap what’s been learned so far and how this will help us with the planning and implementation of our project, as well as how we will engage volunteers and what expert learning we still need.
<b>Audience (class, school, community, experts, web, other)</b>	The class reaches out to engage volunteers and others from the community who will help us plan, and looking toward implementation, will help us build and create our gardens. We work together.

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Day 1	Day 2	Day 3	Day 4	Day 5
<ul style="list-style-type: none"> <li>• Whole-class reflection of where we’re at thus far (circle time).</li> <li>• Guest speakers (Carpenter: construction basics of raised beds, tools (CCSS MP.5), and safety; Master Gardener: assists with determining zones).</li> <li>• In a walk-about with guests, decide how many raised beds will be included in the project and where. Decide and label garden zones.</li> </ul>	<p><i>Explanation of project:</i> In team presentations, students convey information from multiple sources (including texts, experts and guest speakers, activities, and investigations) about pollinator gardens in pre-determined zones in the schoolyard that includes formatting features, illustrations, facts, definitions, concrete details, and a conclusion that justifies plant selection, soil needs &amp; amendments (including calculated</p>	<p><i>Whole class:</i></p> <ul style="list-style-type: none"> <li>• How can we make maps to scale so that our measurements for raised beds and soil are accurate?</li> <li>• master map creation with garden zones using AutoCad.</li> <li>• Addition of sun, soil, and temperature data from previous lessons to master map.</li> </ul> <p><i>Step 1 presentation work:</i></p> <ul style="list-style-type: none"> <li>• Teams create their own copies of master map using AutoCAD</li> </ul>	<p><i>Step 2 presentation work:</i></p> <ul style="list-style-type: none"> <li>• Students discuss key question: What is the process for creating our gardens?</li> <li>• On maps, students add sun, soil, and temperature data from previous lessons (copied from class map).</li> <li>• Teams use knowledge of native flowering plants (requirements) to map placement of plants in gardens through zones.</li> <li>• Layout designs are</li> </ul>	<ul style="list-style-type: none"> <li>• Discussions of driving &amp; key questions.</li> <li>• <i>Instruction:</i> Calculating volume to determine needed number of bags of soil or amendments for soil (5.MD.C.5)</li> <li>• Teams continue to work on maps and presentations, including calculations of soil and amendments, number of plants per type, location of plants in beds and zones, with</li> </ul>

<p>Markers will be placed to identify zones. Key student questions addressed (see above).</p> <ul style="list-style-type: none"> <li>• Students will examine printed blueprints for raised gardens: <u>2x2</u>, <u>4x4</u></li> <li>• Students will watch the building of a raised bed online: <u><a href="#">building a raised bed</a></u></li> </ul>	<p>volume), and best location for one or more pollinator gardens. Students must include quotes illustrating the relationships between two ideas from two texts on the same topic and cite the source. (5.RI.IK1.9)</p> <p><i>Instruction:</i></p> <ul style="list-style-type: none"> <li>• <u>Map scaling video.</u></li> <li>• <u>Introduction worksheet</u></li> <li>• Video tutorial for using AutoCAD to create map to scale: <u><a href="https://youtu.be/wdeAnOqhuDE">https://youtu.be/wdeAnOqhuDE</a></u>.</li> </ul> <p><i>Free time</i> to mess with AutoCAD.</p>	<p>to use in their presentations. After zones are placed on maps, maps are printed out for next steps.</p> <ul style="list-style-type: none"> <li>• During map creation with software, students will apply iterative thinking (5.ETS.1.1 – research, test, re-test, and communicate a design to solve a problem.)</li> </ul>	<p>supported by input from Master Gardener (guest).</p> <ul style="list-style-type: none"> <li>• Teams continue to work on maps and integrate them into presentations.</li> </ul>	<p>assistance from master gardener.</p> <ul style="list-style-type: none"> <li>• Student journal entry includes recommendations for amount of soil and/or amendments required for the gardens, accompanied by diagrams or illustrations.</li> </ul>
<p>Reflection</p> <p>After guest speakers leave, discuss in teams and then summarize in journals the main points made by the guest speakers and explain the supporting evidence and</p>	<p>Reflection</p> <p>(none)</p>	<p>Reflection</p> <p>How do objects, places, and design shape lives and communities?</p>	<p>Reflection</p> <p>What is going well with presentations? What do you need more help with to finish up?</p>	<p>Reflection</p> <p>Calculating volume practice exercises are to be completed in journal.</p>

key details presented. (5.SL.CC.3)				
<b>Day 6</b>	<b>Day 7</b>	<b>Day 8</b>	<b>Day 9</b>	<b>Day 10</b>
Continue working on team presentations	<p>Today, students will shift gears. Each student will write a letter to his/her caregivers to explain the need for volunteers during Milestone #4, Implementation, in the month of April, and to invite them to presentation this Thursday and Friday. Letters go home today.</p> <p>After letters, students will work in four teams to create ads to engage community volunteers. Each team will work on one of the following ad types:</p> <ul style="list-style-type: none"> <li>• social media (internet presence)</li> <li>• flyer (community centers, churches, hardware and gardening stores)</li> </ul>	Completion of team presentations	<i>Presentations Day 1</i> [During presentations, the teacher is keeping track of student choice for plants, locations of plants. This will assist in final decision making to facilitate seed/seedling purchase, soil and amendments purchase.]	<i>Presentations Day 2</i> [During presentations, the teacher is keeping track of student choice for plants, locations of plants. This will assist in final decision making to facilitate seed/seedling purchase, soil and amendments purchase.]

	<ul style="list-style-type: none"> <li>• letter (community stakeholders, experts)</li> <li>• poster (school entrances, public bulletin boards)</li> </ul>			
Reflection  What is going well with presentations? What do you need more help with to finish up?	Reflection  <u>Online self- and peer-assessments.</u>	Reflection  (none)	Reflection  (none)	Reflection  (none)
<b>Day 11</b>	<b>Day 12</b>	<b>Day 13</b>	<b>Day 14</b>	<b>Day 15</b>
<ul style="list-style-type: none"> <li>• Whole-class check-in.</li> </ul> <p>Master shopping lists created for:</p> <ul style="list-style-type: none"> <li>• seeds</li> <li>• seedlings</li> <li>• small plants</li> <li>• soil</li> <li>• soil amendments</li> </ul> <p>Lists will be divided according to the number of volunteers for tomorrow's field trip.</p>	Field Trip to Nursery for plant selection and purchase. This requires volunteers. Students will be placed in groups with volunteers and will shop for the items on their lists.	<p>Planning for informal classroom visits: On Thursday, student partners will visit each classroom to talk up the project, build excitement, and answer questions.</p> <p>To prepare for classroom visits, partners will decide on what to take to share (photos, plant specimen, books, soil samples,</p>	Classroom visits	<p><i>Envisioning Day</i></p> <p>A silent walk-about happens in which students are to "picture" in their minds the upcoming work, and what the finished project will look like.</p> <p>Afterward, students may write, draw, or paint their thoughts and visions of the</p>

<p>(Lumber needs for raised beds will be handled by volunteers.)</p> <p>Movie: <i>The Lorax</i></p>		<p>diagrams, etc.) and who will say what.</p> <p>Teacher shares schedule and classrooms that partners will visit.</p> <p>After planning, students should interact with text sets.</p>		<p>completed gardens.</p> <p><i>Whole class reflection:</i> What values will guide our hard work and interactions with others during the implementation process? How can this learning be used, and how could each of you personally use what you have learned in different academic and real-world contexts? (DOK-4)</p> <p>Discussions of driving &amp; key questions.</p>
<p>Reflection</p> <p>Describe how you were inspired by the movie. If it didn't inspire you, explain what was missing.</p>	<p>Reflection</p> <p>(none)</p>	<p>Reflection</p> <p>What is most exciting to you about this project that you plan to share tomorrow?</p>	<p>Reflection</p> <p>(none)</p>	<p>Reflection</p> <p>Write the guiding values in your journal and reflect on how those values will translate to other parts of your life now and in the future.</p>

**Additional Notes:** Funding for materials is either grant provided, gifted, or if the project is done through the FWS Schoolyard Habitat Project, they provide funds. Teacher and volunteers will help distribute ads. The teacher works behind the scenes with all teachers and school staff on a master plan for implementation, in which all classes (all grades) rotate through the activities and all teachers are

supervisors. Included in the rotation time is playground time (not all students will be working at once).

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### Project Calendar Milestone #4, Weeks 1-4: Implementation

ROTATIONS			
WEEKS 1-2		WEEKS 3-4	
<i>Site Prep</i>	<i>Construction</i>	<i>Plants/Seeds</i>	<i>Planting/Mulching/Watering</i>
<ul style="list-style-type: none"> <li>weed removal</li> <li>soil amendments</li> </ul>	<ul style="list-style-type: none"> <li>raised beds</li> <li>edging</li> </ul>	<ul style="list-style-type: none"> <li>sorting</li> <li>distributing to sites</li> </ul>	<ul style="list-style-type: none"> <li>plant</li> <li>mulch</li> <li>water</li> </ul>
<b>Alternates:</b> photographers, voice recorders (interviewing participants), runners (bringing tools, water, etc., to workers)			

<b>Major Product or Performance</b>	<p>Group: Whole-school, volunteer-based implementation!</p> <p>Teams: Online Escape Room (for team building)</p> <p>Individual: Individual responsibility during implementation.</p>
<b>Entry Event</b>	This event is it! We will start the morning each day reviewing the guiding values we identified last week.
<b>Driving Question</b>	Will the rewards of our labor be worth it?
<b>In-Depth Inquiry, Key Student Question(s)</b>	<ul style="list-style-type: none"> <li>How will we check our progress to see how we are doing?</li> <li>How will we deal with discouragement, unexpected problems, perceived unfair labor distribution, perceived “slackers,” and other such situations?</li> </ul>
<b>Knowledge/Skills Needed by Students</b>	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>work collaboratively and responsibly to implement the garden plans under the supervision of</li> </ul>



<b>(to successfully complete this phase)</b>	teachers and volunteers
<b>Lesson Details, including scaffolding, who is providing (teacher, expert, etc.), voice &amp; choice</b>	<ul style="list-style-type: none"> <li>• We have reached the implementation part of the unit. Here, scaffolding can be thought of in terms of matching labor to student ability and willingness. Several non-labor positions are included in the project for students who need such jobs (photographer, reporter, runner).</li> <li>• Each morning will begin with a whole-class check-in to troubleshoot, explain, support and encourage students, or to modify the day's plans.</li> <li>• A team-building activity will be worked into this phase, most likely on a rainy day. It is an online Escape Room focused on Earth Day that helps students develop collaboration skills. Access here: <a href="https://view.genial.ly/640e6941c76fbf0012e3806c">https://view.genial.ly/640e6941c76fbf0012e3806c</a></li> <li>• Student voice: reflections in journals</li> <li>• Facilitators of knowledge: teachers, volunteers and experts</li> </ul>
<b>Materials (for this phase)</b>	<ul style="list-style-type: none"> <li>• Tools (provided by volunteers)</li> <li>• Soil and amendments</li> <li>• Seeds/seedlings/small plants</li> <li>• Student-created maps and layout designs (laminated for durability)</li> <li>• Digital access for online Escape Room activity</li> </ul>
<b>Project Milestone Recap</b>	During this milestone, the gardens are prepped, prepared, and planted. Raised beds are built by volunteers and students.
<b>Critique and Revision</b>	This involves troubleshooting when it arises during implementation.
<b>Audience (class, school, community, experts, web, other)</b>	This process will be documented by student photographers and journalists. TV news media will be invited.

<b>Daily Journal Reflections</b>	Each day after working in gardens, students will use the <u>self- and peer-assessment tool</u> to reflect on the day. In addition, students will create a daily entry in their journals—thinking strategically and reflecting on 1.) what went well, and 2.) problems encountered and how they were solved. (DOK-3, Thinking strategically about how and why procedures were used to attain desired outcomes and results.)
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**Additional Notes:** *Students should be prepared to get muddy. Child-sized garden gloves are required for each child.*

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**Project Calendar Milestone #5, Week 1 (Unveiling):**

<b>Major Product or Performance</b>	Group: Presentations to Public Attendees
<b>Driving Question</b>	What is most important to share with the public during your presentation?
<b>Knowledge/Skills Needed by Students (to successfully complete this phase)</b>	<p>Students will be able to synthesize their learning into presentations that will educate the public about the unit’s driving question and quote:</p> <p>How will my class and I attract <i>pollinators, especially Monarchs</i>, to become regular visitors to our schoolyard, and why is this important?</p> <p>Driving Quote: “The beauty of the situation is that by supporting pollinators’ need for habitat, we support our own needs for food and support diversity in the natural world” (The Pollinator Partnership™/North American Pollinator Protection Campaign, 2023)</p>
<b>Project Milestone Recap</b>	Students will create presentations for the public unveiling event. Presentations will be video recorded and added to the class Google site.
<b>Critique and Revision</b>	Students will view each other’s presentations prior to unveiling day and offer feedback for any final revisions.
<b>Audience (class, school, community, experts, web, other)</b>	This event is for the public to attend. TV news media will be invited as well. Individual classroom teachers can arrange on their own schedules time to visit the completed gardens and use them as teaching and learning tools.

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Day 1	Day 2	Day 3	Day 4	Day 5
<p>Student-Led Inquiry to prepare for presentations</p> <ul style="list-style-type: none"> <li>• how to present (formats, key ideas)</li> <li>• who will present what?</li> <li>• how will you back it with evidence (i.e., what resources of information will you use, such as books, articles, websites, or videos?)?</li> </ul>	<p>Presentation Prep: Teams work on assigned portion of presentation (topic based).</p> <p>Last 15 minutes of class are reserved for teams to share with the class how their presentation is coming along. Feedback is welcome and encouraged.</p>	<p>Presentation Prep: Teams work on assigned portion of presentation (topic based).</p> <p>Last 15 minutes of class are reserved for teams to share with the class how their presentation is coming along. Feedback is welcome and encouraged.</p>	<p>Presentation Rehearsal</p>	<p>Public Presentation</p>
<p>Reflection</p> <p>Is there anything you think the teacher should know about the implementation process? about the gardens? If not, reflect on what went well.</p>	<p>Reflection</p> <p>(none)</p>	<p>Reflection</p> <p><u>Self- and peer-assessments.</u></p>	<p>Reflection</p> <p>In lieu of reflection, students complete the <u>Post-Test</u></p>	<p>Celebration Party!</p>

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**Project Calendar Milestone #6, Ongoing (Summertime): This milestone involves volunteers who will weed and water throughout the summer.**

Daily and Weekly Logs:

1. watering
2. weeding
3. pests (count, type)
4. monarchs (count)
5. bees (count)
6. hummingbirds (count)

Volunteers will be asked to log in and log out in a journal kept inside the school shed. Volunteers will be asked to document in writing watering, weeding, and a count of noted pests, monarchs, bees, and hummingbirds. Volunteers will be asked to take photographs and share to a shared Google Drive folder.

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## Appendix A

### General Rubric for Journals

	<i>Developing (Needs Improvement)</i>	<i>At Standard (Meets Expectations)</i>	<i>Advanced (Exceeds Expectations)</i>
<p>Student journals include daily entries related to the content being learned that demonstrate extensive, strategic thinking during problem solving, summarizing, and reflecting (DOK-3 &amp; 4). Journal entries use academic language (CCSS RI.5.4, ELA 5.RI.CS.4). Journal entries include illustrations and diagrams when appropriate to task (NGSS 5-PS1-1). Journals entries are supported through citation of sources of facts or ideas, drawing from multiple texts and digital sources on the topics related to the unit (5.RI.KID.1, 5.W.RBPK.7).</p>	<p>Student journal entries are not completed daily, do not expressly relate to the content being learned, and lack evidence of problem solving, summarizing, and/or reflecting. Entries do not use academic and content language. Illustrations and/or diagrams are scant or not present, or are illegible. Sources are infrequently or not cited.</p>	<p>Student journal entries are daily, are related to the content being learned, and demonstrate problem solving, summarizing, and reflecting. Entries use academic and/or content language. Illustrations and/or diagrams are used when appropriate. Sources are cited. Two or more sources are used.</p>	<p>Student journal entries are daily, are clearly tied to the content being learned, and demonstrate extensive thinking during problem solving, summarizing, and reflecting. Entries use academic and content language. Illustrations and diagrams are detailed and abundant. Sources are cited. Multiple sources are used.</p>

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## Milestone 1 Rubric

	Feedback	Developing (Needs Improvement)	At Standard (Meets Expectations)	Advanced (Exceeds Expectations)
During entry week, student summarizes the central ideas and supporting key details from a self-selected book (from text boxes) to peers. (5.RI.KID.2)		Student attempts to summarize central ideas from a self-selected book (from text boxes) to peers but does not provide supporting key details.	Student summarizes the central ideas and supporting key details from a self-selected book (from text boxes) to peers.	Student summarizes the central ideas and supporting key details from a self-selected book (from text boxes) to peers, answers questions from peers to deepen understanding, and uses evidence from the text to support statements made.
Student worked collaboratively with team to create questions on specific topics to ask during field trip. (21 <sup>st</sup> c. skill)		Student did not collaborate well, and quality of work needs improvement. Student did not always stay on task.	Student displayed collaboration through quality and thoroughness of work, and student stayed on task most of the time.	Student took a leadership role during collaboration while respecting the ideas of others, took responsibility for the quality of work, and stayed on task.
Student selected a book from the text sets and summarized it to the team, including central ideas and supporting details. (WIDA ELD-SI-4.14.Inform; ELD-SI-4-12.Explain)		Oral summary of book included title and author but struggled to identify and share central idea, and/or supporting details. Student might have shared key photos or text features with team.	Oral summary of book included title, author, central idea, some supporting details. Student shared key photos or text features with team.	Oral summary of book included title, author, central idea, multiple supporting details. Student shared key photos or text features with team.

<p>Student journal includes reflections from 3 videos watched this week.</p>		<p>For 1 video watched, student reflection might include title of video, central idea, a key fact or interesting detail.</p>	<p>For at least 2 videos watched, student reflection includes title of videos watched, central ideas, key facts and interesting details.</p>	<p>For 3 videos watched, student reflection includes title of videos watched, central ideas, key facts and interesting details.</p>
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## Milestone 2 Rubric

	Feedback	Developing (Needs Improvement)	At Standard (Meets Expectations)	Advanced (Exceeds Expectations)
Student worked collaboratively throughout group work. (21 <sup>st</sup> c. skill)		Student did not collaborate well, and quality of work needs improvement. Student did not always stay on task.	Student displayed collaboration through quality and thoroughness of work, and student stayed on task most of the time.	Student took a leadership role during collaboration while respecting the ideas of others, took responsibility for the quality of work, and stayed on task.
Student selected two similar books from the text sets and summarized it to the team, comparing and contrasting the information, including central ideas and supporting details. (5.RI.IK1.9)		Oral summary of books included titles and authors but struggled to identify and share similarities and differences, central ideas, and/or supporting details. Student might have shared key photos or text features with team.	Oral summary of books included titles, authors, similarities and differences, central ideas, some supporting details. Student shared key photos or text features with team.	Oral summary of books included titles, authors, similarities and differences, central ideas, multiple supporting details. Student shared key photos or text features with team.
Students individually create labeled models illustrating food chains, a pollinator insect's life cycle, or a pollinator plant's life cycle. (NGSS 5-PS1-1)		Student model is incomplete, unclear, or not done.	Student model is complete and accurate; model is labeled.	Student model is complete, detailed, and accurate; model is labeled.
Using 21 <sup>st</sup> century skills, teams each create a Flip video in		Flip video may be original, but student did not collaborate	Flip video is original and focuses on appropriate audience. Student	Flip video is original and focuses on appropriate audience. Student takes

which each team member presents and explains model. (ISTE 1.6.b. Creative Communicator)		effectively or at all during its making. Student offers a partial explanation or lacks an explanation of a model.	collaboration (per 21 <sup>st</sup> c. skills) is evident during creation of video. Student's explanation of model during video is complete.	a leadership role during collaboration (per 21 <sup>st</sup> c. skills) and is evident during creation of video. Student's explanation of model during video is precise and detailed.
Students collaboratively create water cycle diagrams (NGSS 5-PS1-1) using 21 <sup>st</sup> c. collaboration skills.		Student diagram may be complete and mostly accurate, but collaboration during creation of diagram needs improving or was not evident.	Student diagram of the water cycle is complete and accurate. Student collaboration is evident during planning and development of diagram.	Student diagram of the water cycle is complete and accurate. Student takes a leadership role during collaborative activities and is evident during planning and development of diagram.
Students will write a narrative from a different point of view (a bee, butterfly, caterpillar, hummingbird, flower, raindrop, or earthworm) that shares complete thoughts using correct grammatical conventions. (5.W.TTP.3)		Student narrative identifies whose point of view but only attempts to or fails to develop an imagined experience. Grammatical conventions are noticeably absent.	Student narrative of an imagined experience meets the basic requirements of the assignment by writing from a different perspective. Narrative mostly uses correct grammatical conventions.	Student narrative of an imagined experience is well developed and uses plenty of descriptive details and event sequences. Narrative uses correct grammatical conventions.
Student conducts short research projects from multiple sources to build knowledge through investigations		Student journal fails to state knowledge learned from different sources and/or fails to quote and cite correctly. Journal	Student journal states knowledge learned from at least two different sources, quoting and citing correctly while	Student journal clearly states knowledge learned from multiple sources, quoting and citing correctly while

of different aspects of a topic (soil drainage and soil types) and reflects this knowledge in journal entries by correctly quoting and citing what the text says (5.RI.KID.1, 5.W.RBPK.7)		entries lack reflection of processes and results of experiments.	supporting results of experiments. Journal entries reflect processes and results of experiments.	supporting results of experiments. Journal entries accurately reflect processes and results of experiments.
Student creates an accurate line plot of soil temperatures taken around the schoolyard (CCSS 5-PS1-3), using tools strategically (5.MD.B.2, CCSS MP.5).		Student journal includes a minimum amount of data about soil temperatures around the schoolyard.	Student journal includes data such as location, time, and temperature of soil in multiple locations around the schoolyard.	Student journal includes a well-organized presentation of data, including location, time, and temperature of soil in multiple locations around the schoolyard.
Using 21 <sup>st</sup> century skills, students work collaboratively to take soil temperatures using appropriate tools in various locations around the schoolyard and create line plots on chart paper from the data.		Student collaboration during collection of data and in final product needs improvement because of difficulties with some or all of the following key indicators: sharing responsibility, contributing to others' understandings, using appropriate discussion and decision-making strategies, and respecting others.	Student collaboration (per 21 <sup>st</sup> c. skills) is evident during collection of data and in final product. Key indicators: accepts shared responsibility; helps improve the quality of the work; helps group members with their understanding; uses discussion and decision-making strategies; respects the ideas, opinions, abilities, values, language	Student takes a leadership role during collaborative activities (collection of data and in final product). Key indicators: delegates shared responsibility; models quality work; demonstrates knowledge and patience when helping other group members with understanding, including using active listening; effectively uses discussion and decision-making strategies; and

			abilities, and feelings of other group members.	intervenes appropriately within the group to assure that all members' ideas, opinions, abilities, values, language abilities, and feelings are respected and valued.
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### Milestone 3 Rubric

	Feedback	Developing (Needs Improvement)	At Standard (Meets Expectations)	Advanced (Exceeds Expectations)
Student worked collaboratively throughout planning process with guests and teammates. (21 <sup>st</sup> c. skill)		Student did not collaborate well, and quality of work needs improvement. Student did not always stay on task.	Student displayed collaboration through quality and thoroughness of work, and student stayed on task most of the time.	Student took a leadership role during collaboration while respecting the ideas of others, took responsibility for the quality of work, and stayed on task.
Using mathematical problem solving, student recommends the number of bags of soil and/or soil amendments for the project in their journals. (5.MD.C.3, 5.MD.C5)		Student journal entry attempts to include a recommendation for amount of soil and/or amendments required for the gardens, but difficulties with or lack of concern for mathematical computation hindered process.	Student journal entry includes recommendations for amount of soil and/or amendments required for the gardens. Mathematical computation process is clearly and completely included in journal entry.	Student journal entry includes recommendations for amount of soil and/or amendments required for the gardens, accompanied by diagrams or illustrations. Mathematical computation is accurate, and process is clearly and completely included in journal entry.
While using AutoCAD and designing maps in teams, each student participated in researching, testing, re-testing maps to communicate a design		While using AutoCAD and designing maps, student did not participate in the iterative process and let others do most of the work.	While using AutoCAD and designing maps, student helped research, test, re-test maps to communicate a design to solve a problem.	While using AutoCAD and designing maps, student took a leadership role and diligently researched, tested, re-tested maps to



to solve a problem. (5.ETS.1.1)				communicate a design to solve a problem.
<p>In team presentations, using 21<sup>st</sup> c. skills, each student conveys information (WIDA ELD-SI.4-14.Inform, ELD-SI.4-12.Explain) from multiple sources, including texts, experts and guest speakers, activities, and investigations (ELA 5.RI.IKI.9, 5.W.RBPK.7, 5.SL.CC.3), about pollinator gardens in pre-determined zones in the schoolyard that includes formatting features, illustrations, facts, definitions, concrete details, and a conclusion that justifies plant selection, soil needs &amp; amendments (including calculated volume (5.MD.C.3)), and best location for one or more pollinator gardens (5.ETS.1.1). Students address key questions for Milestone #3 in their presentations.</p>		<p>Team presentation fails to include information from multiple sources; formatting features and illustrations are scant or not present; facts, definitions, and/or concrete details are scant, incorrect, or not present; conclusion may or may not suggest plant selection, soil needs &amp; amendments (including calculated volume), and best location for pollinator gardens, and if it does, it is based more on opinion than data collected and acquired content knowledge. Not all team members presented to class, and/or one team member(s) presented most.</p>	<p>Team presentation includes information from multiple sources; includes some formatting features and illustrations; includes facts, definitions, and/or concrete details; provides a logical conclusion justifying plant selection, soil needs &amp; amendments (including calculated volume), and best location for pollinator gardens (tying the two together). Team members all presented to class, some shared more than others.</p>	<p>Team presentation includes information from multiple sources; includes a variety of formatting features and illustrations that are supporting and aesthetically logical (balance, clarity); clearly states facts, definitions, and concrete details; provides a logical conclusion justifying plant selection, soil needs &amp; amendments (including calculated volume), and best location for pollinator gardens (tying the two together). Team members all presented equally to class.</p>

<p>Students' presentations use academic language (CCSS RI.5.4, ELA 5.RI.CS.4) and are based on knowledge learned through books, internet research (5.W.RBPK.7), and activities.</p>		<p>Student presentations lack the use of academic language, and knowledge collected from one or more sources.</p>	<p>Student presentations include the use of academic language and draw upon knowledge collected from two or more sources.</p>	<p>Student presentations include the use of academic language and draw upon knowledge collected from multiple sources.</p>
<p>Students work collaboratively with experts from the community to select appropriate native plants, list them, and design a master layout for planting them. (21<sup>st</sup> c. skills)</p>		<p>Student collaboration with experts during design process lacked appropriateness due to lack of participation and/or behavior issues that demonstrated disinterest and/or disrespect for others.</p>	<p>Student collaboration with experts during design process is appropriate. Key indicators: Accepts shared responsibility for the work of the group; raises relevant questions and issues; considers alternatives; respects the ideas, opinions, abilities, values, language abilities, and feelings of other group members.</p>	<p>Student collaboration with experts during design process is extensive and appropriate. Key indicators: includes groups' ideas when asking questions or adding comments; raises multiple relevant questions and issues clearly and precisely; considers alternatives; and intervenes appropriately within the group to assure that all members' ideas, opinions, abilities, values, language abilities, and feelings are respected and valued.</p>
<p>After guest speakers leave, summarize their main points and explain the supporting</p>		<p>Student journal entry attempts to summarize guest speakers' main points and leaves out</p>	<p>Student journal entry summarizes guest speakers' main points and explains the</p>	<p>Student journal entry explicitly summarizes guest speakers' main points and explains in</p>

evidence and key details presented in journals. (5.SL.CC.3)		supporting evidence and key details presented by each.	supporting evidence and key details presented by each.	depth the supporting evidence and key details presented by each.
Envisioning Day: Guiding Values. (DOK-4)		During class discussion and in journals, student lacked evidence of thinking about how learning can be used, and how he/she could personally use what they have learned in different academic and real-world contexts.	During class discussion and in journals, student demonstrated some thinking about how learning can be used, and how he/she could personally use what they have learned in different academic and real-world contexts.	During class discussion and in journals, student demonstrated extensive thinking about how learning can be used, and how he/she could personally use what they have learned in different academic and real-world contexts.

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## Milestone 4 Rubric

	Feedback	Developing (Needs Improvement)	At Standard (Meets Expectations)	Advanced (Exceeds Expectations)
Using 21 <sup>st</sup> c. skills, student worked collaboratively with other students, volunteers, experts, and teacher to implement garden plans.		Student did not collaborate well, and quality of work needs improvement. Student did not always stay on task.	Student displayed collaboration through quality and thoroughness of work, and student stayed on task most of the time.	Student took a leadership role during collaboration while respecting the ideas of others, took responsibility for the quality of work, and stayed on task.
Each day after working in gardens, students will use the <u>self- and peer-assessment tool</u> to reflect on the day. In addition, students will create a daily entry in their journals— thinking strategically and reflecting on 1.) what went well, and 2.) problems encountered and how they were solved. (DOK-3, Thinking strategically about how and why procedures were used to attain desired outcomes and results.)		Student reflections lack details and fail to reflect strategic thinking. Student reflection fails to relate procedures to outcomes.	Student reflections reflect strategic thinking, including comments on what went well, what problems were encountered, and how they were solved. Student reflection attempts to relate procedures to outcomes.	Student reflections are detailed and reflect strategic thinking, including comments on what went well, what problems were encountered, and how they were solved. Student reflection relates procedures to outcomes.

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## Milestone 5 Rubric

	Feedback	Developing (Needs Improvement)	At Standard (Meets Expectations)	Advanced (Exceeds Expectations)
Using 21 <sup>st</sup> c. skills, student worked collaboratively with other students to create a presentation to present to the public during the unveiling event.		Student did not collaborate well, and quality of work needs improvement. Student did not always stay on task.	Student displayed collaboration through quality and thoroughness of work, and student stayed on task most of the time.	Student took a leadership role during collaboration while respecting the ideas of others, took responsibility for the quality of work, and stayed on task.
Team Presentations (to public): Students report on a topic, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas. Presentations include multimedia components and visual displays to enhance the development of main ideas or themes. Students adapt speech to context, using formal English. (5.SL.PKI.4, 5.SL.PKI.5, 5.SL.PKI.6)		Students failed to meet some or most of the requirements for the public presentation.	Students met the requirements for the public presentation.	Students went above and beyond the requirements for the public presentation.

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## Lesson Planner: Supporting Resources

### 1. Checking Prior Knowledge

Prior knowledge is used throughout the lesson in a variety of ways. First, it is checked at the start of the unit with a pre-test. At the end of every period, with a few exceptions, students are given a prompt related to the learning of the day or the next day's topic and have to respond briefly in their journals. On the days that journal reflections are not required, other activities, such as a KWL chart, end the period.

Entry events, such as playing a Jeopardy game I created or STEM-related videos, often are used to set up student learning either for the day or the week. Also, many days begin with discussions, and while the lesson plan states the topic of the discussion, it should be noted that check-ins occur first as part of every discussion.

### 2. Learning Outcomes

To me, this means learning goals and success criteria. Learning goals are basically unpacked standards, and success criteria are a restatement of the learning goals using "students will be able to" or "students will understand. Success criteria can also be written as "I can" statements for younger students. Success criteria form the basis of all rubrics. Rubrics are handed out to students at the start of each section and reviewed as a whole class. For this unit, both the overarching learning goals and success criteria are written at the start of the entire unit on pages 5-7. Within each milestone, key student questions, and knowledge needed by students to successfully complete the phase, are shared with students. These, too, are aligned with the overarching learning goals and success criteria.

### 3. Key Vocabulary

A non-exhaustive list of key vocabulary for the unit is broken down into content words and academic words (CALP) on page 4 of the unit. All students may need instruction in both, but English Learners in particular may need more instruction and support with academic language. Vocabulary instruction and support occurs throughout daily lessons as needed. English Learners are provided extra support with visuals and bilingual dictionaries.

### 4. Formative Assessment

Formative assessment is used throughout the entire lesson in multiple ways. One of the biggest pieces is students' reflections in their journals, which are written almost daily. These include diagrams and sketches, questions, and summaries of the day's events, to name just a few examples. Daily reviews by the teacher of student reflections informs the next day's content and academic vocabulary review, and allows the teacher to plan for addressing any noted knowledge gaps. Self- and peer-assessments are scheduled regularly throughout the unit and are completed on a Google form, and these are used by the

teacher to determine student use of 21<sup>st</sup> century skills. When students are not collaborating well in their groups (indicated by the peer-assessments or teacher checklists), the teacher will provide the needed supports for students to improve. Teacher checklists and anecdotal notes are also used throughout the unit to note student progress, behavior, questions, misunderstandings, or other areas during activities that indicate the need for teacher intervention or re-teaching. Key question reviews each Friday also allow teachers to assess student learning. The unit pre-test is formative, but the unit post-test is summative.

## **5. Major Instructional Activities**

Instructional activities over this months-long unit vary greatly and include direct instruction, self-guided learning, whole class discussions and group discussions, hands-on activities including the culminating event of building and planting the gardens, various types of reflections and check-ins (including self and whole class), walk-about for making observations and data collection, reading and writing, learning from videos, field trips and guest speakers. Direct instruction is de-emphasized and only provided for very specific purposes, such as teaching and modeling best ways for teams to collaborate together. One team-building activity is planned for Earth Day (during Milestone #4) and is an online escape room.

## **6. Scaffolds**

From a grand perspective, the entire unit is built on scaffolding because so much knowledge and experience must be built step-by-step before the final event, which is the building and planting of the gardens, along with presentations to the community. Specifically, schema building happens daily as new topics are explored, and students' learning styles are accommodated through the wide range of instructional methods used throughout the unit.

However, zooming in to the day-to-day activities, scaffolding is built into lessons in a variety of ways. Some days, information is provided through videos prior to the commencement of related activities. Some scaffolding involves providing leveled books in the text sets. However, the text sets include more than books. They may also include hands-on items such as jars of soil samples, models of insects, or other items that stimulate student curiosity and prepare students for learning. Students often share within their teams what they read or discovered in the text sets, and this type of support is a scaffold to deeper learning.

Scaffolding learning for readers who struggle or for English learners is also built into the lessons—especially during reading. First of all, my teaching approach to reading encourages students to partner read or to stop and talk about a book. This allows students to ask for support from a peer when an unfamiliar word comes up or a difficult concept is

presented. In addition, small groups of students who need the greatest support during reading interact with their text sets at my table. Secondly, visuals (flashcards) and dictionaries are available for English Learners. I also support the use of translanguaging in all student work, which helps English Learners learn and integrate content first. Language learning follows at its own pace and is dependent upon many external factors. My focus is to help students learn the content in any way they can.

## **7. Reflection**

Reflection is built into the unit almost daily through the use of journal writing at the end of class. Other forms of reflection include whole-class check-ins, where we discuss what we have learned so far, where we are heading next, and what we need to review, and what we still need to learn.

## **8. Student Need to Know Questions**

Key questions are provided each week. Review of key questions occurs every Friday during a class discussion.

## **9. Tools/Resources**

- a. Worksheets, videos, and activities are online, such as the team-building Earth Day activity (student-facing) online escape room <https://view.genial.ly/640e6941c76fbf0012e3806c> ; and the self- and peer-assessments (Self- and peer-assessments). Links are included throughout the lesson plans.
- b. Guests and experts: Field trip guides, Master Gardener, TN extension office expert, nursery expert, carpenter, environmental engineer (also see the guest list for final presentations on page 13 of unit).
- c. Special equipment needed includes gardening tools such as shovels and wheelbarrows, and will be provided by volunteers. Other equipment such as soil and plants will be purchased.
- d. Materials lists and links to videos and other resources are built into each week's plans. Standard classroom and teacher materials, such as journals and checklists, are assumed to be present and therefore are not listed.

## **10. Student Handouts**

All student materials are linked to in this document, including self- and peer-assessments, videos, instructional guides (e.g., blueprints, making a food web), experiment guides, flash cards, T-Chart writing guide, and activities (quiz-quiz-trade, Escape Room, map skills worksheets). I have not individually uploaded these to the Dropbox because of the sheer bulk of these materials, and simply because they are accessed easily by linking to them as you move through the unit.

## **11. Delivery of Final Product (unveiling even with student presentations)**

Teams will present to the school community, volunteers, parents, and community



leaders and guests. Guest List: Chamber of Commerce staff, Mayor, Community, Families, all students in school, other key people (such as the experts we met with).

## **12. Post-Test**

<https://forms.gle/zqSsVWFNo7WYpcA28>

## **13. Final Reflections (including teacher self-reflection)**

Final reflection is included in the post-test students will take. Teacher reflection will occur during the summer months as each student journal is read again, post-test data are assembled and analyzed, and the process is redesigned where needed.

Plans for the students to reflect on their learning and what they have accomplished?  
Plans for you to reflect on the unit design and implementation - what worked, what didn't work?

## **14. Unit celebration (structured)**

- Students will share a lesson learned, a favorite memory, wisdom, or poignant reflections with the whole class. Peers will use accountable talk to respond.
- The teacher will share a slideshow she created consisting of photos taken throughout the entire project.
- Food and relaxation!

Note to Dr. Robertson: Please feel free to complete the online Google forms (pre-test, post-test, self- and peer-assessment). In that way, you will be able to see all the content. This is because the pre-test has videos to watch after the test is submitted, and the post-test is in sections which can only be seen if the previous section is completed. You can just enter the word "test" for each constructed response to move quickly through the forms.