



BLACKLAND PRAIRIE ECOSYSTEM

Public Awareness Campaign

ABSTRACT

Many K-12 programs throughout the United States are implementing a project based approach to teaching science. This grant proposal uses this approach to address 7th grade science TEKS while maintaining a local focus. Lessons can be adjusted for grade appropriateness.

Helen Arceneaux

Helen.Arceneaux@pisd.edu

Introduction:

My name is Helen Arceneaux and I work at the Holifield Science Learning Center at PISD. I received my Bachelor's degree in Interdisciplinary Studies for biology and geology at UT Dallas with a 4-8 teaching certification from the UTEACH program. I have participated in geology and ecology field studies as well as worked as a biologist for the Dallas Zoo and the Children's Aquarium at Fair Park. I have volunteered for many animal care facilities throughout the metroplex and I am a current participant in a STEM mastery CPE program at the Perot Museum for Nature and Science. Previously, I worked as a facilitator at the HSLC and I am excited about my current role as an animal caretaker at that campus.

The HSLC currently provides a vital role for PISD. Through this center, the city of Plano is able to provide outdoor learning experiences for all of the elementary students for the 44 campuses in the district. Not only do the students get to engage in our local ecosystem but they get to experience real world examples of a food chain, food web and many habitats. There are examples of ecological succession, ecological change, and biodiversity. The students also get to experience the animals in our animal room. The students can touch a snake, a rabbit and even a bird. In second grade, our students get to solve a problem involving adaptation and the introduction of exotic species to our local ecosystem.

In the UTEACH program, I studied problem-based instruction which is very similar to our problem-solving approach for our second graders. This instructional strategy emphasizes using real world application when teaching science concepts. The students develop critical thinking skills and problem solving techniques to become the leaders of tomorrow. The students in PBI are active and engaged in their own learning. The lesson plan I have designed encompasses a real world problem which is affecting the city of Plano. While this lesson plan involves middle school students, any part of this lesson could be used in any age if edited for grade-level appropriateness.

Problem:

I am asking the Plano Educational Foundation for a grant for this lesson application. The Blackland Prairie ecosystem we use to educate our students has almost disappeared from our local landscape. According to Texas Parks and Wildlife, only 1% now exists. I believe that our students could be instrumental to providing public awareness about this local issue while they are learning key science concepts. This project will empower them to be independent thinkers as well as to be active in their community. While this lesson plan specifically involves 7th grade science TEKS, many of these lessons could be adjusted for grade level appropriateness.

The driving question for this lesson is, "In what ways could we educate the public on how the Blackland Prairie ecosystem is changing over time?" The format of this lesson is project based learning which presents a real world issue and challenging the students to investigate this issue using skills needed beyond the K-12 environment. The objectives must include a broad driving question and investigable information that cannot be easily obtained. In this way our students learn to be independent and creative thinkers. "Information in the modern world is easily accessible; what's needed is the ability to ask the right questions, find the best information, and apply it to the real world" (Larmer et al., 2015). To engage students in the learning process, PBL provides a meaningful context in which

students can learn. This meaningful context is, “a teaching methodology that utilizes student-centered projects to facilitate student learning” (Mergendoller, 2006). Teachers should not function as the classroom sage, but should function as a facilitator or guide. This context provides a purpose and application for the content that students are learning. “Project-based science helps students and teachers find solutions to questions about the world around them” (Krajcik et al, 2007). This real-world application is essential in order to engage students and prepare them for life outside of the classroom.

Objectives/Evaluations:

In this lesson, students create pieces of a public awareness campaign for the Blackland Prairie using content pieces for 7th grade science. The final projects include a radio or TV ad, a brochure and a presentation. In each of these products, students are evaluated for comprehension and misconceptions. The lesson is designed so that, if students have had proper scaffolding or need fewer TEKS addressed, individual workshops or DIYs can be altered or removed.

Students will be able to:

- Observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms
- Describe how biodiversity contributes to the sustainability of an ecosystem
- Observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds.

On the first day students will watch a video created by the Texas Parks and Wildlife department detailing some background information on the Blackland Prairie ecosystem. This video anchors this two week lesson in several ways. First, the video takes place here in north Texas. Many of the points mentioned in the video can be easily identified by students as things in their neighborhood such as housing development, road construction and field plowing. The video also explains a real-world problem that wildlife management staff in north Texas are facing. It also ties in well with the products from this lesson as the students will be presenting to Texas Parks and Wildlife staff.

On day two, students will be conducting a field study on plant and animal biodiversity by comparing to land plots. After they observe and record their data, students will calculate the diversity of each of the plots of land using the simplified diversity index. Students will then complete the worksheet questions and discuss how biodiversity contributes to the sustainability of an ecosystem. Later in the week students will attend DIY sessions that address scaffolding and prior knowledge on the subjects of research resources, parts of an ecosystem, food webs/food chains, and presentation or ad design methods.

Additional workshops will include: biomes and microhabitats, Blackland Prairie history and species and ecological succession. These workshops will use laboratory settings as well as photo documentation to introduce, elaborate and explain for content mastery. On day five, students will participate in a global collaboration by designing and posting a ‘Blackland Prairie Zoo Exhibit’ on the iEARN global zoo. These workshops are important for students to learn and practice 21st century and social skills.

On day seven of the lesson, students will participate in a critique session so that they may provide and receive feedback on their projects. The feedback will be limited to ‘warm’ and ‘cool’ comments only so that students learn how to give constructive criticism. The goal is to help students learn the content through benchmark and investigative lessons as well as how to collaborate with others.

The last day of the lessons will be when the students get to present their PowerPoint presentations, show their ads and pass out their brochures. The audience will include Texas Parks and Wildlife Department staff as well as members of environmental activists for the Blackland Prairie.

P R O J E C T C A L E N D A R

Project: Blackland Prairie Ecosystem Public Awareness Campaign

Time Frame: 2 Week Project

M O N D A Y

T U E S D A Y

W E D N E S D A Y

T H U R S D A Y

F R I D A Y

P R O J E C T W E E K O N E

Week 1 Notes: The schedule is designed for 45 minute class periods. Detailed daily student accommodations are italicized. Every day the lessons will consist of clearly defined group roles, frequent assessments, and reminders to turn in daily/weekly assignments.

<ul style="list-style-type: none"> - Show anchor video (5 min) TPWD Blackland Prairie Video - Materials Managers collect handouts including: entry document, rubrics, and the social contracts. (5 min) - Fill out and go over handouts with the class (15 min) - Creation of team names (5 min) - Create knows/Needs to Know List (15 min) <i>Formative Assessment</i> <ul style="list-style-type: none"> • Individually • In groups • As a class <div>LAUNCH</div>	<ul style="list-style-type: none"> - DIY: Research Resources (15 min) <i>Formative Assessment</i> - Workshop: Biodiversity (30 min) <i>Formative Assessment (whole class attending); Think-Pair-Share Content Mastery Checks</i> <p>This workshop will use stakes, calculators provided by grant. Land use will be on current school property.</p> <div>PLAN</div>	<ul style="list-style-type: none"> - DIY: Parts Of An Ecosystem (15 min) <i>Formative Assessment</i> - DIY: Food Chain and Food Webs DIY Quizlet Game (10 min) <i>Content Mastery Checks</i> - Workshop: Biomes and Microhabitats (20 min) <i>Formative Assessment (lab format optional) Content Mastery Checks</i> <p>This workshop will use computers and lab equipment already provided by the school district.</p> <div>RESEARCH</div>	<ul style="list-style-type: none"> - DIY: Blackland Prairie Species and History (15 min) <i>Formative Assessment; Content Mastery Checks</i> <p>This workshop will use computers and lab equipment already provided by the school district.</p> <ul style="list-style-type: none"> - Workshop: Ecological succession (20 min) <i>Formative Assessment; Content Mastery Checks</i> <p>This workshop will use computers and lab equipment already provided by the school district.</p> <ul style="list-style-type: none"> - DIY: Brochure Design (10 min) <i>Formative Assessment; Content Mastery Checks</i> <div>RESEARCH</div>	<ul style="list-style-type: none"> - Workshop: iEARN Global Zoo (15 min) <i>Formative Assessment; Content Mastery Checks</i> <p>This workshop will use computers and lab equipment already provided by the school district.</p> <ul style="list-style-type: none"> - Review Knows/Needs to Know Chart (5 min) <i>Formative Assessment; Content Mastery Checks</i> <ul style="list-style-type: none"> • Individually • In groups • As a class - Project Check-in: Proposal approval by teacher (25 min) <i>Summative Assessment; Content Mastery Checks</i> <div>RESEARCH</div>
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P R O J E C T W E E K T W O

Week 2 Notes: The schedule is designed for 45 minute class periods. Detailed daily student accommodations are italicized. Every day the lessons will consist of clearly defined group roles, frequent assessments, and reminders to turn in daily/weekly assignments.

<ul style="list-style-type: none"> - Workshop: Radio/TV ad Creation (25 min) <i>Formative Assessment</i> <p>This workshop will use the recording equipment provided by the grant.</p> <ul style="list-style-type: none"> - Workshop: Scripts, Timing, and Rehearsal for recording sessions (20 min) <i>Formative Assessment</i> <p>This workshop will use the recording equipment provided by the grant.</p> <div>CREATE</div>	<ul style="list-style-type: none"> - Crit Session of written scripts and layout proposal (15 min) <i>Formative Assessment</i> - DIY: Presentation Design (10 min) <i>Formative Assessment</i> - Project Check-in: Scripts, brochure outline approval by teacher (20 min) <i>Summative Assessment</i> <div>CREATE</div>	<ul style="list-style-type: none"> - Begin Rehearsal and recordings of TV/radio ad (25 min) <i>Formative Assessment</i> <p>This workshop will use the recording equipment provided by the grant.</p> <ul style="list-style-type: none"> - Finish Brochures (10 min) <i>Formative Assessment</i> - Finish script for presentations (10 min) <i>Formative Assessment</i> <div>CREATE</div>	<ul style="list-style-type: none"> - Rehearsal of presentations and/or finish recordings of TV/radio ad (30 min) <i>Formative Assessment</i> <p>This workshop will use the recording equipment provided by the grant.</p> <ul style="list-style-type: none"> - Finish edits (15 min) <i>Formative Assessment</i> <div>CREATE</div>	<ul style="list-style-type: none"> - Presentations (45 min) <i>Summative Assessment</i> <div>SHARE</div>
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Week # and Portion of Project	Artifact	Type of Assessment (Formative or Summative and description)
Week 1	Copy of Knows/Needs to Know Chart, Group Contracts	Formative Assessment: Students will update and discuss what they know and what they need to know to complete the project. Checking for prior knowledge and students misconceptions. Discuss group contracts to make sure that students are meeting 21 st century and social skills.
	DIY: Research Resources	Formative Assessment: Exit Ticket created from each group based on info from DIY using QR codes. Ensures that students know how to research properly and are using appropriate source materials.
	Workshop: Biodiversity	Formative Assessment: The workshop teaches the importance of biodiversity in an ecosystem. Will check for prior knowledge, possible misconceptions and mastery of the concept of biodiversity.
	DIY: Parts of An Ecosystem	Formative Assessment: Matching Game to review and assess prior knowledge and any misconceptions about ecosystems. Checking for student understanding of material.
	DIY: Food Chains and Food Web	Formative Assessment: Quizlets Game to review and assess students understanding of material including prior knowledge and any misconceptions.
	Workshop: Biomes and Microhabitats	Formative Assessment: This workshop will have students interactively discuss, compare and contrast biomes and microhabitats with a lab setting option. Comprehension will be checked regarding prior knowledge and possible misconceptions.
	DIY: Blackland Prairie Species and History	Formative Assessment: Ensures that students understand the

		material on ecosystems, food chains, food webs and history in regards to the Blackland Prairie ecosystem.
	Workshop: Ecological Succession	Formative Assessment: Annotated Student Drawings to demonstrate understanding of ecological succession, prior knowledge and possible misconceptions.
	DIY: Brochure Design	Formative Assessment: Students knowledge will be checked through their brochure design.
	Workshop: iEARN Global Zoo	Formative Assessment: Global collaboration component. Student knowledge of ecosystems, biomes, and food chains will be assessed through 'Blackland Prairie Zoo Exhibit' design.
	Updated Knows/Needs to Know Chart	Formative Assessment: Students will update and discuss what they know and what they need to know to complete the project. Checking for comprehension of material and to make sure that students will achieve 21 st century and social skills.
	1 st Project Check-In	Summative Assessment: Student knowledge of science content will be assessed through the group research and project plan.
Week 2	Workshop: Radio/TV ad creation	Formative Assessment: Students grasp on concepts will be assessed through their outline for their radio/TV ad.
	Workshop: Scripts, Timing and Rehearsal for recording sessions	Formative Assessment: Students grasp on concepts will be assessed through their script and rehearsals for their radio/TV ad.
	Critique Session	Formative Assessment: Students will distribute and

		receive warm and cool feedback. Information on project will be assessed for mastery by other students and the teacher.
	2 nd Project Check-In	Summative Assessment: Information that the students have learned throughout the research process will be checked and make sure that project goals are being met through project progress and design.
	Presentations	Summative Assessment: Students will present their projects to representatives of TPWD. Students will be graded on rubrics given at the beginning of the project including 21 st century skills and social skills.

Project Assessment Plan:

To measure students' understanding of content, both formative and summative assessments will be given throughout the two week project. This assessment plan details each assessment, when it will be given and the type of assessment.

21st Century Skills Rubric:

Category	4	3	2	1
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares, with, and supports the efforts of others. Does not cause "waves" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.
Focus on the Task	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done some of the time. Other group members must sometimes prompt and remind to keep this person	Rarely focuses on the task and what needs to be done. Lets others do the work.

			on-task.	
Quality of Work	Provides work of the highest quality. Has a completed project with extra features and a detailed and organized presentation.	Provides high quality work.	Provides work that occasionally needs to be checked/redone by other group members to ensure quality.	Provides work that usually needs to be checked/redone by others to ensure quality
Contributions	The student routinely provides useful ideas when participating in the group and in classroom discussion.	The student usually provides useful ideas when participating in the group and in classroom discussion.	The student sometimes provides useful ideas when participating in the group and in classroom discussion.	The student rarely provides useful ideas when participating in the group and in classroom discussion.

Presentation Rubric:

Category	4	3	2	1
<p>Scientific knowledge:</p> <p>(10.A) Describe how different environments support different varieties of organisms</p> <p>(10.B) describe how biodiversity contributes to the sustainability of an ecosystem</p> <p>(10.C) Describe the role of ecological succession such as in a microhabitat.</p>	The student can describe and compare the concepts of biodiversity, how different environments support a variety of organisms, and the role of ecological succession in an environment as it relates to the Blackland Prairie.	The student can describe the concepts of biodiversity, how different environments support a variety of organisms, and the role of ecological succession in an environment as it relates to the Blackland Prairie.	The student can describe most of the concepts of biodiversity, how different environments support a variety of organisms, or the role of ecological succession in an environment as it relates to the Blackland Prairie.	The student is unable to describe the concepts of biodiversity, how different environments support a variety of organisms, or the role of ecological succession in an environment as it relates to the Blackland Prairie.
Preparedness	Student are completely prepared and has obviously rehearsed.	Student seems pretty prepared but might have needed a couple more rehearsals.	The student is somewhat prepared, but it is clear that rehearsal was lacking.	Student does not seem at all prepared to present.

Speaks clearly	Speaks clearly and distinctly all (100-95%) the time, and mispronounces no words.	Speaks clearly and distinctly all (100-95%) the time, but mispronounces one word.	Speaks clearly and distinctly most (94-85%) of the time. Mispronounces no more than one word.	Often mumbles or cannot be understood OR mispronounces more than one word.
Stays on Topic	Stays on topic all (100%) of the time.	Stays on topic most (99-90%) of the time.	Stays on topic some (89%-75%) of the time.	It was hard to tell what the topic was.
Quality of Sources	Students include 4 or more high quality sources.	Students include 2-3 high quality sources.	Students include 2-3 sources but some of are questionable quality.	Students include fewer than 2 sources.
Time Limit	Presentation is 3-4 minutes long.	Presentation is 2:45-3 minutes or 4-4:15 minutes long.	Presentation is 2:30-2:45 minutes long or 4:15-4:45 minutes long	Presentation is less than 2:30 minutes OR more than 4:45 minutes.

Radio or TV Ad Campaign Rubric:

Category	4	3	2	1
Scientific knowledge: (10.B) describe how biodiversity contributes to the sustainability of an ecosystem	The student can describe and apply the concepts of biodiversity, and the history of the Blackland prairie to inform the public about the current and future implications for the ecosystem.	The student can describe and apply the concepts of biodiversity, and the history of the Blackland prairie to inform the public about the ecosystem.	The student can describe most of the concepts of biodiversity, and the history of the Blackland prairie to inform the public about the ecosystem.	The student is unable to describe most of the concepts of biodiversity, and the history of the Blackland prairie to inform the public about the ecosystem.
Preparedness	The student is completely prepared and have obviously rehearsed.	Student seem pretty prepared but might have needed a couple more rehearsals.	The student are somewhat prepared, but it is clear that rehearsal was lacking.	Students do not seem at all prepared to present.
Time Limit on	Recorded ad is 30-	Recorded ad is 25-	Recorded ad is 20-	Recorded ad is less

Recorded Ad	60 seconds long.	30 seconds or 60-65 seconds long.	25 seconds long or 65-70 seconds long	than 20 seconds OR more than 70 seconds long.
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Brochure Rubric:

Category	4	3	2	1
Scientific Knowledge: (10.C) observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds.	95% or more of the plant diagram is drawn accurately and are recognizable. All assigned structures are labeled accurately.	Brochure has a labeled diagram of ecological succession	94-85% of the plant diagram is drawn accurately and are recognizable. 94-85% of the assigned structures are labeled accurately.	Less than 85% of the plant diagram is drawn AND/OR labeled accurately.
Brochure Graphics and Text	Brochure is free of grammatical errors and provides a visually pleasing layout using appropriate graphics and text.	Brochure is free of grammatical errors after teacher feedback and provides a visually pleasing layout using appropriate graphics and text.	Brochure has 1-2 grammatical errors after teacher feedback and/or brochure lacks appropriate graphics and text.	There are several grammatical mistakes after teacher feedback and/or graphics are not appropriate with text.

Budget:

The total amount requested is: \$888.05. The budget assumes that the project will be implemented on a PISD campus as each campus already has computers for students.

Pictures of each item are included in the appendix.

Product Needed	Quantity Needed	Place To Be Purchased	Individual Price	Total Price
Sharp EL233SB Standard Function Calculators	30	Amazon	\$2.45	\$73.50
Universal Forest 1334 1"x2"x12" Grading Stakes (Bundle of 24)	1	Amazon	\$12.71	\$12.71

Tradequest Letter Sized Clipboards Hardwood (Pack of 30)	1	Amazon	\$14.95	\$14.95
Fancier Studio 2000 Watt Green Screen Lighting Kit 10x12	1	Amazon	\$149.99	\$149.99
72' Pro Tripod for Camcorders	1	Amazon	\$26.95	\$26.95
NEEWER® 160 LED CN-160 Dimmable Ultra High Power Panel Digital Camcorder Video Light	2	Amazon	\$29.99	\$59.98
Sony HD Video Recording HDCX405 HDR- CX405/B Handycam Camcorder (Black) + Sony 32GB microSDHC/SDXC High speed Memory Card + Camera Bag + Replacement NP- BX1 Battery and Charger + Accessory Bundle	1	Amazon	\$228.00	\$228.00
Photo and Video Editing Software Cyberlink PowerDirector 14 Deluxe	1	Amazon	\$69.99	\$69.99
Neewer 3.5 Hands Free Computer Clip On Mini Lapel Microphone	8	Amazon	\$6.50	\$52.00

Zoom H1 Handy Portable Digital Recorder	2	Amazon	\$99.99	\$199.98
			Total due for Supplies	\$888.05

Appendix A: Resume

HELEN ARCENEUX
3353 Tarkio Rd. Plano, TX 75074

Mobile: 972-965-3437
Helen.Arceneux@pisd.edu

Education

University of Texas at Dallas – BS Interdisciplinary Studies, Teaching Certifications 4-8 Science (Spring 2017)

- Currently teaching science lessons for 6th grade (MISD)
- Created and taught science lessons at 5th grade (RISD), 8th grade (GISD) and high school levels (RISD)
- License: *Psychological Profiles of Students by Subject* (NHIH Human Research License # 1360426)
- Current Research: *Preliminary Study of Energetics, Pollution and Flow of Cottonwood Creek, Richardson TX*

Collin College – Associates of Science
Texas A&M University- Marine Biology program

Work Experience

Animal Caretaker; Holifield Science Learning Center (PISD)- March 2015 - present

- Current position- providing animal care, clinical student instruction and support for PISD teachers
- Previous position; facilitator Mar 2015 to Feb 2016- Implemented lesson plans for K, 2nd and 4th grade

Site Director; Club Scientific Dallas Science Camp- Summer 2013 – Jan 2016

- Support and leader for group of 12 counselors including scheduling, disciplinary referrals, and parent contacts. Also coordinated weekly open house with a total of 1300 students attending. Implemented weekly science unit lesson plans and daily science demonstrations for ages 6-8 and ages 9-13.

Aquarist; Dallas Zoo/Children's Aquarium at Fair Park- January 2006 – April 2011

- Cleaned and maintained animal exhibits. Prepared food for all exhibits, included lab work, necropsies and medical treatment. Gave daily zookeeper talks to educate the general public on animals. (Jan 2006-March 2010 volunteer, March 2010-April 2011 employed)

Related Experience

Participant; Kosmos Pre-Service Teacher Workshop: Perot Museum of Nature and Science 2016 - 2017

Presenter; UTEACH Institute Conference- May 2014

Research; National Science Foundation Grant Recipient- Summer 2013

- Real world geology research in Sierra Nevada Mountains translated into K-12 lesson plans.

Volunteer Experience

Volunteer; Perot Science Museum of Nature and Science Jan 2013 – Feb 2016

Volunteer; Texas Parks and Wildlife Dec 2007 - present

- Catalogues population of indigenous mussel species with endangered species scientific permit.

Volunteer; Texas Stream Team Dec 2006 - Dec 2007

- Water quality testing, included lab work.

Volunteer; Lewisville Aquatic Ecosystem Research Facility- Summer 2005

- Grew and maintained native aquatic plants and fish for repopulation of Caddo Lake to combat invasive species.

Professional Affiliations

Member; Phi Delta Kappa Honors Society

Member; National Scholars Honors Society

Member; Texas Education Association

Member; Marine Aquarium Society of North America



Member; Phi Theta Kappa International Honors Society

Member; National Science Teachers of America

Member; Association of Zoos and Aquariums

Appendix B: Photo Identification of Items Requested

Sharp EL233SB Standard Function Calculator	
Universal Forest 1334 1"x2"x12" Grading Stakes (Bundle of 24)	
Tradequest Letter Sized Clipboards Hardwood (Pack of 30)	
Fancier Studio 2000 Watt Green Screen Lighting Kit 10x12	
72' Pro Tripod for Camcorders	
NEEWER® 160 LED CN-160 Dimmable Ultra High Power Panel Digital Camcorder Video Light	

<p>Sony HD Video Recording HDR-CX405 HDR-CX405/B Handycam Camcorder (Black) + Sony 32GB microSDHC/SDXC High speed Memory Card + Camera Bag + Replacement NP-BX1 Battery and Charger + Accessory Bundle</p>	
<p>Photo and Video Editing Software Cyberlink PowerDirector 14 Deluxe</p>	
<p>Neewer 3.5 Hands Free Computer Clip On Mini Lapel Microphone</p>	
<p>Zoom H1 Handy Portable Digital Recorder</p>	

Citations:

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Link-Perez, M.A. & Schussler, E.E. (2013). Elementary botany: how teachers in one school district teach about plants. *Plant Science Bulletin*, 59, 99-110.

Mergendoller, J.R. (2006) *Project Based Learning Handbook*, 2nd edition. Novato, CA: Buck Institute for Education.

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