Environmental Literacy Model

Title	Protecting Our Pollinators
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School, District	Accident Elementary, Garrett County
Audience (grade, course)	Second grade

Curriculum Anchor	Notes
Defining the Learning Objectives and Curriculum Connection Curriculum indicators, performance expectations, and/or learning objectives. **Curriculum Indicators: NGSS** 2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow. 2-LS2-2: Plants depend on animals for pollination or to move their seeds around. 2-LS2-2: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.* 2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats. **Curriculum Indicators: ELA** RI.2.5: Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently. RI.2.6: Identify the main purpose of a text, including what the author wants to answer, explain, or describe. RI.2.7: Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text. W.2.2: Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.	

W.2.7: Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

Curriculum Indicators: Math

All math standards can be found by clicking the PDF link [here](#).

2.MD.A.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Curriculum Indicators: Environmental Literacy Standards

All environmental literacy standards can be found by clicking the PDF link [here](#).

Standard 1: Environmental Issues- The student will investigate and analyze environmental issues ranging from local to global perspectives and develop and implement a local action project that protects, sustains, or enhances the natural environment.

Standard 8: Sustainability- The student will make decisions that demonstrate understanding of natural communities and ecological, economic, political, and social systems of human communities, and examine how their personal and collective actions affect the sustainability of these interrelated systems.

Learning Objectives

The student will be able to:

- Plan and conduct experiments, make predictions, record observations, and share results.
- Determine what a plant needs to grow.
- Explain seed dispersal and pollination.
- Compare the diversity of life in different habitats.
- Use a variety of nonfiction, informational texts to find information.
- Summarize his/her readings.
- Write an informative text with teacher support.

Describing the Local Context The issue that will serve as the context for learning Accident schoolyard is currently home to a dilapidated and overgrown native plant garden (previously a PIERS Meadow project) that has become an eyesore to students and the community alike. In addition, the garden is not suitable or inviting to native wildlife and a number of invasive plants are taking over the area. *Investigate your schoolyard to determine if you have a similar unkept garden/current garden area. Students will conduct their work on the school property, mostly in the garden and surrounding areas.	*Working on the school property is meaningful and motivating to students because they are directly impacted. *Every Garrett County Elementary school had a PIERS Meadow at one point in time. Other schools (outside of GC) could use an existing meadow/garden or another location on the property.
Identifying the Driving Question A broad, open-ended, life-relevant question that is based on the standards/learning objectives. Guides inquiry for the investigation(s) and prompts the development of actionable claims. Is our (Accident Elementary's) schoolyard environment appealing to and appropriate for wildlife? What can be done to make our current schoolyard a more habitable ecosystem for plants and animals?	*Students will arrive at the driving question through the Issue Investigation section. They will be asked questions, make observations, and with teacher prompting, arrive at an issue to be investigated.

Issue Investigation	Notes
Asking Questions, Defining Issues and Problems Students define the issue, problem, or phenomenon to be investigated and develop questions that are relevant for investigation. **P.L.A.N.T. and Wildlife Needs:** To help students understand what plants and animals need to survive and thrive, students will determine what makes an appropriate wildlife habitat. Incorporate lesson ideas from Junior Master Gardener Resource Book (activity derived from page 2) ❖ To activate prior knowledge, ask: -What does it mean to **survive**? What do you think it means to **thrive**? Is there a difference? (an organism can survive- stay alive, but not be doing well and thriving) -What do YOU need to **survive**? (food, water, shelter, clothing, air) -What do you think plants need to **survive**? What do you think animals need to survive?	- Students may need prompting to uncover the problem being explored in this MWEE. Use the guiding questions to help students begin to think about their schoolyard. - Outdoor Field Experience #1 occurs during Issue Investigation -In the event students are unable to get outdoors because of weather conditions, make and show a

-Do you know of anything that plants need that people do not?
-What is a **habitat**?
-What do you think makes a good habitat?
*Write students' responses on chart paper to refer back to.
- ❖ On chart paper, write down the acronym "P.L.A.N.T.S." Encourage students to figure out what each letter stands for. Ask and answer questions along the way about what plants need to survive. List what each letter represents (see attached document here). Students will have a STEM Journal (spiral notebook) to record data, observations, etc. In the STEM Journal, have students write down the P.L.A.N.T acronym as well. You may also use the differentiated PLANT needs acronym worksheet to glue into journals as well. Discuss with students why each letter is important.
- ❖ Next ask the students:
  -What is a garden?
  -Do you know anyone who has a garden?
  -What can you find in a garden?
  -What lives/grows in a garden?
  -Are gardens important? Why or why not?
  -Are there different types of gardens? (vegetable, plant, water, etc.)
  -Do we have a school garden?
  -If not, do we have a spot that a garden could be? Where?

Field Experience #1:
1. Take a walk to the school garden (if one is already present) or look for spots that could be potential gardens. At Accident Elementary, we have an existing garden that is overgrown and currently unmanageable. Before going outside, students will glue the "Garden Site Evaluation" in their STEM Journals. While investigating the garden/potential sites, students will use the checklist to help decide if the area is appropriate. The teacher will ask these questions:
Does this garden/potential garden area have:
        *sunny spots/shady spots?
        *water?
        *shelter?
        *variety of plants/trees?
        *food sources for animals?
        *Is the site easy for us to get to or is it difficult?
2. Have students write down observations in STEM Journals. Discuss with partners, as well as a class.
3. Think-pair-share their observations. With your partner(s), answer the question "By using the "Garden Site Evaluation" checklist and your observations, what can you determine about our outdoor garden/potential garden area?"
4. Each team of students records their observations on a sticky note and places it on chart paper.

video clip of the school property.

Optional Teacher Resources:
- P.L.A.N.T.S. acronym poster & student worksheet
- Wildlife Gardeners: A Junior Master Gardener Golden Ray Series (available for purchase here)
- Chart paper
- Post-it notes
- Student STEM journals
- Pencils

5. Read the sticky notes out loud and group similar questions/topics and have students help narrow down the focus to one overarching area/goal to be investigated.
6. Teacher may need to prompt: Is there a problem? What did you conclude from our initial observations? What further questions need investigated?
7. Rewrite the one defined issue/question on the chart paper.

Planning and Conducting Investigations

Students develop plans for collecting, analyzing, and communicating information and/or data to help them answer their questions and understand the problem. Students identify and justify appropriate sources of information and/or data, and determine methodologies for the collection of information and/or data.

Guiding Questions:
- What does a plant need to survive?
- What is a native plant? What is an invasive plant?
- What is a pollinator? What is pollination?
- How does a plant disperse seeds?
- Are seed dispersal and pollination important to plants and animals?
- How can I use my resources (people, books, internet) to help me build a better understanding of the topic?
- How can I take the information gained from investigations and apply it to solving my school yard's problem?

(Procedures and worksheets will be linked to the activities below via another Google doc)
Non-Negotiable/Required Lessons:
- Habitat
- Native Plants
- Pollinators & Insects

Supplemental Lessons/Activities: (to be used at the teacher's discretion, based on needs of students)
- Plant Needs - Mystery Science lesson
- Sunrise and sunset times - relate to plant needs and the growing season
- Seed Dispersal lesson - Mystery Science lesson
- A Sticky Situation! from Better Lesson
- BEEing a Bee! from Better Lesson
- Why Do We Need Bees? from Better Lesson
- A Milkweed Community from Better Lesson

Related Literature:

-Use literature resources to build background knowledge and research practices.

-Integrate technology through the use of video clips as a means of engaging students.

-This MWEE includes a set of required lessons and activities that prepare students for the action project.

-Supplemental lesson ideas are listed if there is time or students need more time and experiences to build background knowledge.

- *The Honey Makers* by Gail Gibbons
- *From Seed to Plant* by Gail Gibbons
- *The Magic School Bus Plants Seeds* by Patricia Relf
- *A Seed is the Start* by Melissa Stewart
- *Animal Pollinators* by Jennifer Boothroyd
- *What Is Pollination?* by Bobbie Kalman
- *What If There Were No Bees?: A Book about the Grassland Ecosystem* by Suzanne Slade
- *The Buzz on Bees: Why Are They Disappearing?* by Shelley Rotner
- *National Geographic Kids: Seed to Plant* by Kristin Baird Rattini
- *Busy Buzzy Bee* by Karen Wallace
- *Helping Habitats* by Barbara Webb
- *Earth Science Rocks: Soil* by Chris Bowman

Other Resources:
- [YouTube Video](#): Wordless pollination video clip
- [Looking Inside a Plant](#) pollination video
- [Like Fruit? Thank a Bee!](#) pollination video
- [Busy Bees](#) video
- [Home Sweet Habitat](#) habitat video
- Local Master Gardeners: Seed bomb lesson

Analyzing and Interpreting Data

Students present and share information and/or data to reveal patterns that indicate relationships. Students apply disciplinary concepts as they analyze and interpret information and/or data to make sense of the issue, problem, or phenomenon.

- Record all data and notes in STEM Journals
- Allow for whole group, small group, and individual reflection often

*Throughout the entire MWEE, students will use STEM Journals to take notes and record data/observations.

Constructing, Communicating, and Refining Explanations

Students identify, synthesize, and apply evidence from their investigations (for example, measurements, observations, and patterns) to draw conclusions about the driving question.

Students will refer back to their data from their initial investigations and all other information in STEM Journals to answer these questions to help draw conclusions about the driving question:

Does our schoolyard habitat have wildlife? If so, what kind?

Does our schoolyard habitat have plants? If so, what kind?

Does our schoolyard habitat have water? If so, what is the water source? **Does our schoolyard habitat have shelter? If so, what kind of shelter?** **With all of this said, is our habitat appropriate?**	

Stewardship and Civic Action	Notes
Developing a Claim and Identifying Solutions Students develop a claim based on conclusions drawn in the Issue Investigation. The claim should reflect a problem, challenge, or opportunity that warrants informed action. Students identify and explore solutions to address the problem, challenge, or opportunity reflected in their claim. Brainstorming Issue: Students will answer the question, **"Based on our research and learning about ecosystems/habitats, is our school yard and garden area an appropriate habitat? Why? Why not?"** in their STEM Journal. Students will then meet in small groups to discuss their responses and develop a claim. Developing Claim: Students will then synthesize their research, observations, and field experiences thus far. Students, with teacher prompting, will determine an appropriate solution(s) to the driving question: *Is our schoolyard environment appealing to and appropriate for wildlife? What can be done to make our current schoolyard a more habitable ecosystem for plants and animals?* Students should be encouraged to brainstorm as many ideas/solutions as possible and all ideas should be accepted by the teacher. Students can then discuss and sort through the ideas presented to determine which are most realistic, attainable, and effective at solving the driving question. In their STEM Journals, students need to complete the statement "The solution is…" before advancing to the planning and action stage.	*Teachers may want to allow for think-pair-share time prior to whole group discussion of solution. *Possible solutions (provided by students) should be recorded on an anchor chart and referred to often. Students should also draw/write possible solutions in their STEM Journal. *At this point, students can answer the questions: **What is the problem? What is a possible solution?**

Designing a Plan and Taking Informed Action

Students design a plan for implementing solutions through informed action in their classrooms, schools, and/or communities. The plans should include criteria for determining the extent to which the action successfully addresses the problem, challenge, or opportunity reflected in the claim. Students implement their plans.

Form Groups to work cooperatively:

Students may work in collaborative small groups to develop a plan of action. Since students have had hands-on lessons about appropriate habitats, native plants, and pollinators, they will now have the knowledge of what needs to be in the schoolyard to create a more habitable ecosystem for plants and animals. The teacher will facilitate and guide learning by prompting students with questions like:

-Look back at your site evaluation form from the beginning of this project. **What types of things were present in the schoolyard? What important things were there and what was missing?**

-What things do living things need to survive and thrive? (water, air, shelter, food) Did our schoolyard/garden have those things? If so, do you think it was the appropriate amount or could there be more?

Design the solution/garden:

Students have already developed a claim, but now they must design a step-by-step plan of action. As a class, hold a discussion about what the schoolyard currently has and what it needs. The teacher will create a "T" chart on anchor chart with one side saying "What our garden has…" and the other side saying "What our garden needs…" Students will work together to fill a chart (students will also record this in their STEM Journals) *Optional: Teacher and student may use this "Designing a Plan" chart to help organize ideas (see notes section).

In small groups, students will use the "Designing a Plan - Questions to Consider" to guide their thinking. Groups need to thoroughly answer each of the 6 questions.

As a whole group, discuss the questions and responses. Work together to develop a step-by-step plan of action to design the improved schoolyard garden.

Optional Teacher Resources:
- Designing a Plan chart
- Designing a Plan - Questions to Consider
- School Yard Garden Data sheet

*Designing a Plan will take course over several days, as students will need time to synthesize their research and develop a logical plan of action.

Finalize the step-by-step plan and record on an anchor chart in the classroom. Optional: students can record the steps in their STEM Journals as well.

Students will complete the [School Yard Garden Data](#) sheet using math skills of measurement, area, and perimeter (these skills have been taught during math time). Students will sketch their ideal gardens/planting spots on the same sheet using knowledge gained from activities/lessons on habitats and native plants (with teachers and Master Gardeners).

Work in the garden:

Recruit resources from the community (Master Gardeners, Discovery Center, Maryland DNR) to help students begin the outdoor field experience of working in the garden. Before going outdoors, students need to present and explain their plan to the organization members that are helping.

Before actually doing any work, students and teachers need to go over rules and expectations for gardening (see Lesson Plan titled "Gardening Expectations"). Show students tools (trowels, shovels, wheelbarrows, buckets, etc.) and model what they do and how to use them.

Students will then use their design to work in the schoolyard garden to create a more habitable ecosystem for plants and animals. This process and timing will vary on weather, number of volunteers, potential extension questions/lessons that come up along the way, etc.

Evaluating Action
Students reflect on the action and determine the extent to which it successfully addresses the problem, challenge, or opportunity reflected in the claim. Students share proposals for sustaining or extending the action.

- Students are constantly evaluating their learning through the use of their STEM Journals.
- Students share out their work/thoughts/ideas and what they learned
- Present at PTO meetings, STEM nights, community events
- Re-evaluate garden eval to determine effectiveness of site

Future goals:

Backyard Buddy Checklist (page 147): interview community/family members and, if receiving a low score, invite them to the school garden for a training session taught by students

-Build partnerships with local groups such as:
- Master Gardeners
- Maryland DNR
- Discovery Center
- Hickory Environmental Center

Optional Teacher Resources:
- [Backyard Buddy Checklist](#) from the Wildlife Gardener book