

Environmental Literacy Model



Title	PIERS Survival Issue Investigation Unit
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School, District	Garrett and Allegany Counties, Maryland
Audience (grade, course)	GR 3 (originally GR 1 prior to adoption of NGSS)

Defining the Learning Objectives and Curriculum Connection

Curriculum indicators, performance expectations, and/ or student learning objectives.

NGSS

PE 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

SEP. Constructing Explanations and Designing Solutions

DCI LS4.B. Natural Selection Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.

CCC. Cause and Effect

PE 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

SEP. Engaging in Argument from Evidence

DCI LS4.C. Adaptation For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

CCC. Cause and Effect

PE 3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

SEP. Engaging in Argument from Evidence

DCI LS4.D. Biodiversity and Humans Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

CCC. Systems and system models

MD E. Lit. Standards

(1) Environmental Issue Investigation & Action. Environmentally literate students investigate environmental issues in order to develop and implement local actions that protect, sustain or restore the natural environment.

(3) Environmental Impact of Human Activity. Environmentally literate students construct and apply understanding of the environmental impact of human activities on Earth’s systems and resources.

Students will understand that:

- Birds satisfy their need for food by eating plants, other animals or plants and other animals.
- Birds’ beaks help them get their food, and birds with similar beaks eat similar food.
- Humans can increase or decrease food that is available for birds.

Students will know that...

- All birds have beaks, and these beaks help them get food.

- The shape of a bird’s beak determines what it eats. Birds with long straw-like beaks mostly eat plants (drinking nectar from flowers). Birds with sharp hooked beaks mostly eat animals (catching and eating small rodents, other birds, fish, etc.). Birds with broad cone-shaped beaks eat both plants and animals (seeds, fruit and bugs).
- Schoolyards can be improved to provide food for birds and other animals. For example, fruit- or seed-bearing plants can provide food when it is limited in the environment.
- The location of a food source can affect whether a bird will eat it. For example, near a building or busy playground may scare birds away.
- A science investigation can be conducted to determine where birds prefer to eat, and bird feeders can be substituted for plants in the investigation.
- A science investigation follows specific directions so that if someone else does it, he/she will get similar results. For example, we need to observe and measure in the same way each time.

Students will be able to ...

- Classify what a bird eats based on the shape of its beak.
- Conduct a science investigation including making and recording observations and measurements; calculating changes in amounts; and summarizing findings.

Describing the Local Context

The life-relevant issue that will serve as the context for learning.

Students recognize that they can see different birds living in their communities, including their schoolyard. They also recognize that human activity affects the types and amounts of birds they see in their schoolyard.

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), prompts the development of actionable claims.

Students will examine birds’ diets and explore things that can impact birds’ food. This will lead them to the driving question: Which location in the schoolyard will attract more birds?

issue Investigation

Asking Questions, Defining Issues and Problems

Students define the issue, problem, or phenomenon to be investigated and develop supporting questions that are relevant for investigation.

Issue Investigation 1	Issue Investigation 2	Issue Investigation 3
<p>Students are introduced to the problem that schools and other buildings have reduced food available for birds. This discussion leads students to ask the question: What do birds eat?</p>	<p>The conclusion of Issue Investigation 1 – that they can add seed bearing plants to the schoolyard to attract certain birds – leads students to ask the question: Where do birds eat in our schoolyard?</p>	

Planning and Conducting Investigations

Students plan and conduct investigations and classroom activities (indoor and outdoor) that actively address students' supporting questions. Students collect data that will be used to inform actionable claims.

Issue Investigation 1	Issue Investigation 2	Issue Investigation 3
<ol style="list-style-type: none"> Students discuss birds' diets, and categorize birds by their beaks and the type of food they eat. Students read portions of the <i>BEAKS!</i> book to reinforce beak adaptations and how they support bird survival. 	<ol style="list-style-type: none"> Students walk around the schoolyard and identify two locations that might attract birds (these locations will differ in one simple way, such as near/far from play area). Students or teachers make two simple bird feeders from 2L soda bottles and fill them with bird seed. Students hang a bird feeder in each location they wish to study, and measure change in the amount of seed in each feeder over several weeks. Optional activities: <ul style="list-style-type: none"> Students collect data on the number and types of birds visiting the feeders. Students draw bird feeders of their own design to attract different types of birds based on their diet. Students construct their own bird feeders to collect similar data at home. 	

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Analyzing and Interpreting Data

Students analyze data through graphs, models, and other methods to reveal patterns and relationships. Students synthesize and apply evidence from their investigations to draw conclusions that address the supporting questions.

Issue Investigation 1	Issue Investigation 2	Issue Investigation 3
<p>From their discussion and reading, students determine that some birds have hard, cone-shaped beaks to eat seeds, and they can get those seeds from plants in the schoolyard.</p>	<p>Students gather, graph, and interpret the results from their science investigation. They use these results to determine where birds eat in their schoolyard.</p>	

Constructing and Communicating a Claim

Students draw on the conclusions from their investigations to make a claim about the driving question and communicate these evidence-based claims to internal and/or external audiences.

Issue Investigation 1	Issue Investigation 2	Issue Investigation 3
<p>Students claim they can add a seed-bearing plant to the schoolyard to attract certain birds by providing them with food.</p>	<p>Each student completes a “science report” detailing the results of their investigation and proposing the ideal location to plant a seed-bearing plant to attract certain birds to the schoolyard by providing them with food.</p>	

Stewardship and Civic Action

Identifying Solutions

Students identify and explore solutions that directly address the problem, challenge, or opportunity reflected in their claim. Students use decision making processes to identify the solution(s) to implement.

As a class, students determine they can support birds by providing them with a seed-bearing plant for food. They then identify the best location in their schoolyard to plant the seed-bearing plant for the birds.

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.

By conducting an experiment with seed-bearing bird feeders, students make an informed decision on the best location to plant a seed-bearing plant on the schoolyards as a source of food for certain birds.

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 communicate their findings and share proposals for sustaining or extending the action.

Students complete the “Reflections” questions at the end of their “student report” (i.e., worksheet) without teacher’s guidance (except to clarify questions as necessary).