



Environmental Literacy Model

Title	VWU ELM
Author	
School, District	
Audience (grade, course)	

Curriculum Anchor

Defining the Learning Objectives and Curriculum Connection

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

4.8 The student will investigate and understand that Virginia has important natural resources. Key resources include a) watersheds and water; b) plants and animals; c) minerals, rocks, and ores; and d) forests, soil, and land.

4.3 The student will investigate and understand that organisms, including humans, interact with one another and with the nonliving components in the ecosystem. Key ideas include a) interrelationships exist in populations, communities, and ecosystems;

4.1 The student will demonstrate an understanding of scientific and engineering practices by a) asking questions and defining problems identify scientific and non-scientific questions develop hypotheses as cause-and-effect relations define a simple design problem that can be solved through the development of an object, tool, process, or system b) planning and carrying out investigations identify variables when planning an investigation collaboratively plan and conduct investigations use tools and/or materials to design and/or build a device that solves a specific problem take metric measurements using appropriate tools measure elapsed time c) interpreting, analyzing, and evaluating data organize and represent data in bar graphs and line graphs interpret and analyze data represented in bar graphs and line graphs compare two different representations of the same data (e.g., a set of data displayed on a chart and a graph) analyze data from tests of an object or tool to determine whether it works as intended d) constructing and critiquing conclusions and explanations use evidence (i.e., measurements, observations, patterns) to construct or support explanations and to make inferences e) developing and using models develop and/or use models to explain natural phenomena identify limitations of models 9 f) obtaining, evaluating, and communicating information read and comprehend reading-level-appropriate texts and/or other reliable media communicate scientific information, design ideas, and/or solutions with others

Describing the Local Context

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

Campus areas around stormwater ponds at Greer. Lake Taylor at the back of campus, and Diamond Lake. Teaching candidates noted that Lake Taylor and the stormwater ponds look “dirty and gross.” They wonder if that was due to activities on campus.

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.

How do students and campus activities impact the health of our local environment?

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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

What species can we find in our local stream and what does that tell us about the health of that stream?

Issue Investigation 2

What is the pH, dissolved oxygen, temperature, etc. of our local surface waters, and what does that tell us about the health of that body of water?

Issue Investigation 3

What plant species do we find along Lake Taylor, and how much might that impact the health of the waters and other plant life?

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

Leaf pack-- species identification in Lake Taylor.

Issue Investigation 2

Use water quality test kits

Issue Investigation 3

Quadrat investigation in an area near Lake Taylor.

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Issue Investigation (con't)

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

Students categorize findings into different species. Tally the number of species found and then check for indicator species.

Issue Investigation 2

Use water quality test kits and follow directions for each one. Write findings in notebook.

Issue Investigation 3

Use grid paper to record placement of plants, and then use species identification app to find the species.

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

Presence of indicator species will help to generate claims.

Issue Investigation 2

Research on appropriate levels of chemicals in water and DO2 will assist in making claims.

Issue Investigation 3

Looking for invasive species here or biodiversity. This will assist in making claims. Also, they will be looking for bare spots for runoff issues.

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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.

Students may have many claims after their investigations. Review the claims and ask them if any seem like ones they could take meaningful action on. Have students work in small groups to complete Moving from Claims to Informed Action (instructions p. 2, worksheet p. 6 in the [MWEE Student Worksheets Toolbox](#)). They should copy the claim they want to address at the top of the worksheet and then brainstorm different actions or solutions.

After this, you may have many solution ideas! As a class, use Choosing an Action Project (instructions p. 7, worksheet p. 8 in the [MWEE Student Worksheets Toolbox](#)) to narrow down all the ideas to a single idea. Incorporating student voice from the initial brainstorming to the selection of the final project can help them feel a sense of ownership even if it isn't their idea that is ultimately selected.

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.

Use the Environmental Action Planning worksheets (instructions p. 3, worksheets p. 9-14 in the [MWEE Student Worksheets Toolbox](#)) to plan the Environmental Action Project. The worksheets cover basic steps in planning and implementing an action project and can be used by students independently, in small groups, or as a class. There are five total worksheets in this planning set. Use the worksheets that make sense for your students' action project and/or assign different pages to small groups or individuals to complete.

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.

In what ways could students reflect on the action project and determine the extent to which it successfully addresses the issue? After the action project has been completed, reserve time for students to reflect individually and as a group. Keep in mind, this evaluation is not about them analyzing everything they investigated, but rather it is about reflecting on the planning process, implementation, and completion. Below are some discussion or question prompts that might work for your students.

- Reflect on the whole action experience from start to finish. Name a Rose (something that went great), a Thorn (something that didn't go as expected), and a Bud (something you are excited to see one year from now as a result of your project).
- What was our original action plan and goal? Did we stick to that plan or did we have to make some changes? Why were changes made?

- How were you a good team member during this project? How could you have been better?
- Students next year will complete this MWEE too. Like you, they will select their action project but will be investigating the same environmental issue and repeat some of the same investigations. Do you have any advice to share with them?