



Service-Learning Unit

Native Species Restoration

Primary Subject: Science/Ecology

Grade Level: 6th and 7th

Additional Subject Area Connections: Math, Technology, Engineering, Language Arts

Unit Title: Native Species Restoration

Type(s) of Service: Indirect

Unit Description: As students study the abiotic and biotic factors that have an environmental impact on an ecosystem, they will research and develop a plan of action to restore the population of a native species that has been diminished in the local area.

Potential Service-Learning Action Experiences:

- Restoring native plant or animal species or creating habitat for native species (examples: growing and planting native plant species -- Bay Grasses in the Classes or American chestnut trees or restoring native animal species and/or their habitats -- Bluebirds or Baltimore Checkerspot Butterflies). *NOTE: Link to four possible projects pertaining to birds: eBird Nationwide Bird Population Data, [The Cornell Lab of Ornithology](https://www.birds.cornell.edu/home/#yearRound) <https://www.birds.cornell.edu/home/#yearRound>*
- Removing invasive species.

Maryland Science Standards Met

Science:

Practice 6: Constructing Explanations and Designing Solutions

The goal of science is to construct explanations for the causes of phenomena. Students are expected to construct their own explanations, as well as apply standard explanations they learn about from their teachers or reading. The Framework states the following about explanation: "The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories." (NRC Framework, 2012, p.52)

Practice 7: Engaging in Argument from Evidence

The study of science and engineering should produce a sense of the process of argument necessary for advancing and defending a new idea or an explanation of a phenomenon and the norms for conducting such arguments. In that spirit, students should argue for the explanations they construct, defend their interpretations of the associated data, and advocate for the designs they propose. (NRC Framework, 2012, p. 73)

Additional course MCS follow.

Additional MD Curriculum Standards Met

Math:

Grade 3 - 3.NBT.1

Use place value understanding and properties of operations to perform multi-digit arithmetic.

Geometry 6.G.1

Solve real-world and mathematical problems involving area, surface area, and volume.

7.G.1

Draw, construct and describe geometrical figures and describe the relationship between them.

Standard 7.0 Processes of Mathematics

Students demonstrate the processes of mathematics by making connections and applying reasoning to solve problems and to communicate their findings.

Topic

A. Problem Solving

Indicator

1. Apply a variety of concepts, processes, and skills to solve problems

Objectives -

- Identify the question in the problem.
- Decide if enough information is present to solve the problem.
- Make a plan to solve a problem.
- Apply a strategy, i.e., draw a picture, guess and check, finding a pattern, writing an equation.

Goal 2: Geometry, Measurement, and Reasoning

The student will demonstrate the ability to solve mathematical and real-world problems using measurement and geometric models and will justify solutions and explain processes used.

Expectation 2.3.2 The student will use techniques of measurement and will estimate, calculate, and/or compare perimeter, circumference, area, volume, and/or surface area of two and three dimensional figures and their parts.

Additional MD Curriculum Standards Met

Reading and Language Arts:

CCSS.ELA-LITERACY.W.7.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)

CCSS.ELA-LITERACY.W.7.5

With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or typing a new approach, focusing on how ell purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grade 7 here.)

CCSS.ELA-LITERACY.W.7.7

Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

Engineering:

Engineering Design and Development

Students will demonstrate knowledge of and apply the engineering design and development process.

Indicator Statement: Develop abilities to apply the design process. (ITEA, STL 11).

Objectives:

- Apply the design process to solve problems in and beyond the classroom. (ITEA, STL 11-H)
- Specify criteria and constraints for design. (ITEA, STL 11-1)
- Test and evaluate the design in relation to the pre-established requirements, such as criteria and constraints, and refine as needed. (ITEA, STL 11-K)
- Make a product or system and document the solution. (ITEA, STL 11-L)
- Design, plan, and construct objects in response to a particular need or problem (e.g., instruments, machines, structures, and systems).



Alignment with Maryland's Best Practices of Service-Learning: *Native Species Restoration*

- 1. Meet a recognized community need**
Restore native species population.
- 2. Achieve curricular objectives through service-learning**
See Maryland Science Standards listed in this unit.
- 3. Reflect throughout the service-learning experience**
Students will keep journals documenting their progress, analyzing the effectiveness and impact of their project, and their thoughts and feelings.
- 4. Develop student responsibility (Students have opportunities to make decisions about the service-learning project.)**
Students will be responsible for researching and developing a project relevant to their area.
- 5. Establish community partnerships**
Partnerships will be established with local businesses such as nurseries, nature parks, outdoor schools, etc. for materials and other assistance.
- 6. Plan ahead for service-learning**
Students will investigate why native species are important to their community and be involved in all aspects of the planning and implementation.
- 7. Equip students with knowledge and skills needed for service**
As background knowledge, students will study the abiotic and biotic factors that have an environmental impact on an ecosystem. Students will need to develop the skills necessary to implement their plan (planting, building a bluebird box, data collection, and analysis). Students will explore the concepts of active citizenship and service-learning.



Procedures with Resources:

Native Species Restoration

These procedures represent an example of a service-learning lesson on this specific topic, but can be changed to meet individual classroom interests or varying community needs. You are encouraged to adapt this unit to fit your unique classroom and community and to solicit student input in planning and decision making.

1. Introduce the service-learning project by discussing service-learning and citizenship with students and engaging in activities to explore those themes. A resource to support this topic can be found at [Bringing Learning To Life](https://www.youtube.com/watch?v=o2-eoEi6FCo) (<https://www.youtube.com/watch?v=o2-eoEi6FCo>).
2. Students and teachers keep a journal as they complete the project.
3. Define the term native species,
 - o [Maryland Native Plant Society](https://mdflora.org/) (<https://mdflora.org/>)
 - o [Department of Natural Resources, Maryland](https://dnr.maryland.gov/Invasives/Pages/default.aspx) (<https://dnr.maryland.gov/Invasives/Pages/default.aspx>)
 - o [Maryland Invasive Species Council](http://mdinvasives.org/) (<http://mdinvasives.org/>)
4. Research the types of native species & communities in your area.
 - o **Plants**
[Lady Bird Johnson Wildflower Center](https://www.wildflower.org/collections/) (<https://www.wildflower.org/collections/>)
 - o **American Chestnut Trees**
[The American Chestnut Foundation](https://www.acf.org/) (<https://www.acf.org/>)
 - o **Bluebirds**
[Wild Birds Forever](http://www.birdsforever.com/bluebird.html) (<http://www.birdsforever.com/bluebird.html>)
[Eastern Bluebird](https://www.mbr-wrc.usgs.gov/Infocenter/i7660id.html) (<https://www.mbr-wrc.usgs.gov/Infocenter/i7660id.html>)
 - o **Baltimore Checkerspot Butterfly**
[Baltimore Checkerspot Butterfly](#)
5. As a class, compile a list of native species that is being threatened in your area. *Extension idea: Use jigsaw or expert groups to research each species on the list, then report back to the class.*
6. As a class, choose one of the native species from the list to address, and compose an objective to be accomplished. For example, students could plant a native plant garden on school or community grounds or they could remove invasives. They could recommend/support legislation to ban sales of exotic invasive animals (as pets) and plants in Maryland. Or, they could participate in the Acorn Project or Growing Native Project (collect seeds of native plants for cultivation and distribution). Other ideas include establishing a native plant nursery on school grounds and distributing plants for free to other schools. Alternatively, they might work with a state or national park to remove invasives.

7. Have small groups research:
 - The cause or causes threatening the selected species.
 - Factors needed for the success of the selected species.
8. Develop an action plan.
 - **Project worksheet:**
Example:
[The GoodCharacter Service-Learning Primer](https://www.goodcharacter.com/service-learning-primer/#project-planning-sheet)
 (https://www.goodcharacter.com/service-learning-primer/#project-planning-sheet)
 - **Grant opportunities:**
[Chesapeake Bay Trust](https://cbtrust.org/grants/) (https://cbtrust.org/grants/)
9. Implement the plan. Resource - [Cornell bluebird count](https://ebird.org/home) - Citizen Science (https://ebird.org/home).
10. Upon completion, critique the plan to evaluate the successful completion of the objective and overall success of the project. Also, reflect on the project using various reflection activities and evaluate the effectiveness of the project by completing the [Rubric for Assessing the Use of the Maryland's Seven Best Practices of Service-Learning](http://marylandpublicschools.org/programs/Documents/Service-Learning/rubric_best.pdf) (http://marylandpublicschools.org/programs/Documents/Service-Learning/rubric_best.pdf).

Additional Interdisciplinary Connections



Reading & Language Arts – Grant & action plan writing embedded in the writing curriculum.

Financial Literacy – Developing a budget and completing design needs (e.g. measuring area or designing birdhouses).

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[Maryland Public Schools Service-Learning Website](http://www.mdservice-learning.org) (www.mdservice-learning.org)
[Maryland Public Schools](http://www.marylandpublicschools.org) (www.marylandpublicschools.org)



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