



Maryland State Department of Education

Service-Learning Unit

Native Species Restoration

Primary Subject: Science/Ecology

Grade Level: 7th

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

Unit Title: Native Species Restoration

Type(s) of Service: Direct & 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,

www.birds.cornell.edu/LabPrograms/citSci/index.html#yearRound.

- Removing invasive species.

VSC Indicators Met

Science:

Standard 1.0 Skills and Processes:

Students will demonstrate the thinking and acting inherent in the practice of science.

Topic

B. Applying Evidence and Reasoning

Indicator

1. Review data from a simple experiment, summarize the data, and construct a logical argument about the cause-and-effect relationships in the experiment.

Objectives

a. Organize and present data in tables and graphs and identify relationships they reveal.

Standard 3.0 Life Science:

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Topic

F. Ecology

Indicator

1. Give reasons supporting the fact that the number of organisms an environment can support depends on the physical conditions and resources available.

Objectives:

a. Explain the populations increase or decrease relative to the availability of resources and the conditions of the environment.

b. Identify and describe factors that could limit populations within any environment, such as disease, introduction of a nonnative species, depletion of resources, etc.

c. Explain that within any environment organisms with similar needs may compete with one another for resources.

d. Cite examples to illustrate that competition is reduced when organisms use different sets of resources, such as birds in a forest eat different kinds and sizes of seeds.

Addition course VSC follows.

Additional VSC Indicators Met

Math:

Standard 2.0 Knowledge of Geometry

Students will apply the properties of one-, two-, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects.

Topic

C. Representation of Geometric Figures

Indicator

1. Represent plane geometric figures.
- b. Construct geometric figures using a variety of construction tools.

*Assessment limit: Construct a line segment congruent to a given line segment.

Standard 6.0 Knowledge of Number Relationships and Computation/Arithmetic

Students will describe, represent, or apply numbers or their relationships or estimate or compute using mental strategies, paper/pencil or technology.

Topic

C. Number Computation

Indicator

2. Estimation

Objective - Determine approximate sums, differences, products, and quotients.

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 VSC Indicators Met

Reading and Language Arts:

Standard 4.0 Writing

Students will compose in a variety of modes by developing content, employing specific forms, and selecting language appropriate for a particular audience and purpose.

A. Writing

1. Compose texts using the prewriting and drafting strategies of effective writers and speakers.
 - a. Use a variety of self-selected prewriting strategies to generate, select, narrow, and develop ideas.
 - Evaluate topics for personal relevance, scope, and feasibility.
 - Begin a coherent plan for developing ideas.
 - Explore and evaluate relevant sources of information.
 - b. Select, organize, and develop ideas appropriate to topic, audience, and purpose.
 - Organize information logically.
 - Use effective organizational structures.
 - Select or eliminate information as appropriate.
 - Verify the effectiveness of paragraph development by modifying topic, support, and concluding sentences as necessary.

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 VSC objectives 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 www.servicelearning.org/resources/bring_learning/.

2. Students and teachers keep a journal as they complete the project.

3. Define the term native species,
www.mdflora.org/ (MD Native Plant Society)
www.nps.gov/plants/pubs/nativesMD/info.htm
www.dnr.state.md.us/invasives/
www.mdinvasivesp.org/news.html
www.en.wikipedia.org/wiki/Native_species.

4. Research the types of native species & communities in your area.

Plants

www.wildflower.org/collections/
www.wildflower.org/plants/

American Chestnut Trees

www.acf.org/
www.acf.org/Chestnut_history.htm
www.ppws.vt.edu/griffin/blight.html

Bluebirds

www.birdsforever.com/bluebird.html
www.nabluebirdsociety.org/bluebirdfacts.htm
www.mbr-pwrc.usgs.gov/Infocenter/i7660id.html
www.news.cornell.edu/Chronicle/99/5.6.99/bluebird_count.html

Baltimore Checkerspot Butterfly

www.msa.md.gov/msa/mdmanual/01glance/html/symbols/insect.html
chicagowildernessmag.org/issues/summer2001/checkerspot.html

Additional Interdisciplinary Connections



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

Math – Developing a budget and completing and design needs (ex. measuring area or designing bird houses).

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. Or 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:
www.goodcharacter.com/SERVICE/primer-9.html
Examples:
www.goodcharacter.com/SERVICE/primer-2.html
www.hamline.edu/cgee/watershed/action/projects/
Grant opportunities:
www.cbtrust.org/site/c.enJIKQNoFiG/b.2020181/k.A9BD/Types_of_Grants.htm
www.servicelearning.org/resources/funding_resources/index.php
www.servicelearning.org/resources/funding_sources/index.php

9. Implement the plan. Resource - Cornell bluebird count – Citizen Science, www.ebird.org/content/ebird/.

10. Upon completion, critique the plan to evaluate the successful completion of the objective and overall success of the project. Also reflect 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* which can be found at www.mdservice-learning.org.

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Division of Student, Family, and School Support
Youth Development Branch
200 West Baltimore Street
Baltimore, Maryland 21201
410-767-0358
www.mdservice-learning.org
www.marylandpublicschools.org