

Problem-Based Learning Unit

VISTA

VIRGINIA INITIATIVE FOR SCIENCE TEACHING AND ACHIEVEMENT



Invasives in Virginia

Grade 4 - Life Science

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INNOVATING SCIENCE EDUCATION ACROSS VIRGINIA



UNIT OVERVIEW

TOPIC
Life Processes (4.4) and Living Systems (4.5)
THEME
Impact of Invasive Species on Virginia Ecosystems
SCENARIO
Researchers of the Virginia Department of Conservation and Recreation (DCR) have noticed a lot of non-native species, also known as invasive species, in Virginia. You have been hired as an Educational Research Assistant for DCR. Your job is to identify invasive species in your county/state and educate the people in your community on how to prevent and manage the spread of invasive species, therefore reducing the negative effects on Virginia's ecosystems.
PROBLEM QUESTION
How can we minimize the spread of invasive species and their negative impacts on Virginia's ecosystems?
STUDENT ROLE
Educational Research Assistant Virginia Department of Conservation and Recreation
CULMINATING ACTIVITY
Develop a management plan and way to educate your community about invasive species and ways to prevent and manage the spread of invasive species, therefore reducing the negative effects on Virginia's ecosystems.

UNIT RESOURCES

- VA Dept. of Recreation & Conservation: www.dcr.virginia.gov
- Invasives in Virginia: www.vainvasivespecies.org
- National Invasive Species Council: www.invasivespecies.gov

UNIT BACKGROUND

This 5-9 week unit was created for 4th grade classrooms to address VA standards 4.4 and 4.5 on life processes and living systems. The scenario and problem question for this unit are focused around identifying, understanding, analyzing, and managing invasive species in the local area. To do this, students will work through a number of other questions to help them develop their management plan for what they find within the community.

First, students will learn how we identify invasive organisms and determine how they reproduce.

- Lesson 1: Students will collect, identify, classify, and research real plants and animals from pictures and from samples they collect in the field.
- Lesson 2: Students will design an experiment to test the different components of photosynthesis to understand variables that influence how different plants grow.
- Lesson 3: Students will grow, measure, pollinate, and dissect fast growing plants.
- Lesson 4: Students will observe seed/spore development and dispersal.
- Lesson 5: Students will measure the length and mass of kudzu to experiment with the conditions needed for dormancy.

Next, students will explore where invasives are located in Virginia.

- Lesson 6: Students will collect, identify, and map invasives within their community along with researching the dispersment of invasives across the state.
- Lesson 7: Students will build and observe a habitat including invasives to consider the practical parameters or constraints within the system.
- Lesson 8: Students will design an experiment to test the migration of invasive species within an ecosystem to determine how the invasives could have traveled to Virginia.
- Lesson 9: Students will design an experiment to test beak adaptations to help them understand how adaptations could help a species thrive in Virginia.

Students will then look at the effects of the invasives in the state of Virginia.

- Lesson 10: Students will select, research, and present the positive and negative impacts of a specific invasive organism.

Finally, students will explore how we can manage invasive species in the state.

- Lesson 11: Students will explore and design methods for monitoring and managing invasives.
- Culminating Activity: Students will use their research and experimental data to develop a management plan that will educate the public on the control of invasive species in Virginia, and present their plans to a panel of local and regional experts.

INVASIVE SPECIES QUESTION MAP

Level 1 Question

An over-arching unit question that is presented to effectively solve the problem presented in the scenario.

How can we minimize the environmental impact of invasive species in Virginia?

Level 2 Questions

An informational question needed to answer the Level 1 question which results from initial "what do we need to know to answer this question" brainstorming.

How do we identify invasive organisms and determine how they spread and grow.

Where are they located in Virginia?

What are their effects?

How can we manage them?

Level 3 Questions

Question where the content and standards are being directly addressed. These are questions around which daily activities are centered.

What are invasive plants and animals?

What are native plants and animals? **Virginia Resources SOL4.9b**

How do invasive plants grow? **Photosynthesis SOL 4.4a,c**

How do invasive plants reproduce and spread? **Pollination, structure, Dormancy SOL 4.4a,b,c**

Where are the habitats of native and invasive species? **Niche, populations, communities, ecosystems SOL4.5 b,c**

How did invasive species get here? **Migration SOL4.5**

Did invasive organisms come naturally or were they brought here? **Human influence SOL 4.5**

What adaptations do they have that allows them to thrive in Virginia? **Adaptations SOL 4.5**

Does each region have specific resources that attracts or repels these organisms? **VA resources SOL 4.9**

What are the positive and negative impacts? **Niches, habitats, flow of energy SOL 4.5**

Why should we care?

Are they causing problems in our streams? **Watershed SOL 4.9**

How are they monitored? **Human Influences SOL 4.5**

How can we get rid of them? **Human Influences SOL 4.5**

Do they have natural predators? **Food chains/webs SOL 4.5**

What resources does Virginia have to resolve these problems? **VAresources SOL 4.9**

