

Problem-Based Learning Unit

VISTA

VIRGINIA INITIATIVE FOR SCIENCE TEACHING AND ACHIEVEMENT



Virginia Watersheds

Grade 6 - Water and Matter

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INNOVATING SCIENCE EDUCATION ACROSS VIRGINIA



UNIT OVERVIEW

TOPIC

Water & Living Systems

THEME

Human Impact on Water and Living Systems

SCENARIOS (THIS UNIT HAS MULTIPLE SCENARIOS BASED ON LOCATION)

1. Because of easy access to I-77 Carroll County has been selected as a proposed site for the Southwest Virginia Regional Landfill. Where in Carroll County could this landfill be built that would mitigate the effect on the New River Watershed? You are to present your findings to Carroll County Supervisors on the cost/benefits of facility.
2. The city of Roanoke is considering the construction of a new reservoir to serve the SE community. The proposed location of the new reservoir is beside the Roanoke River on what used to be an Indian Settlement. You have been tasked to assess the impact of this project on the community, and develop a cost/benefit analysis. You will present your findings to the town council.

PROBLEM QUESTION

How can we mitigate the effects of human activity on the community and Virginia watersheds?

STUDENT ROLE

Student Environmental Scientists with the Southwest Virginia Water Authority

CULMINATING ACTIVITY

Develop a report for the County Board of Supervisors. Your report could include presentations, project demonstrations, videos, interviews, debates and other forms of communication to address the pros and cons of this landfill or reservoir project.

UNIT BACKGROUND

This 5-9 week unit was created for 6th grade classrooms to address VA standards 6.1, 6.4, 6.5, 6.7, and 6.9 on water and matter. The scenario and problem question for this unit are focused around developing strategies to mitigate the impact of human activity on Virginia watersheds from either landfill or reservoir development. This unit has two scenerio options that will both work for the same unit. This is an example of modifying scenarios to appropriately fit your particular location. As students work through the selected scenerio a number of other questions will be addressed to help them develop their ideas and mitigation plans.

First, students will learn about the basics of water, watersheds, and water quality testing.

Lesson 1: Student will experiment with atom builders to understand the different elements, molecular attractions, and solvent characteristics of water.

Lesson 2: Students will learn and experiment with water quality testing and use this knowledge to conduct water quality analyses in the field.

Lesson 3: Students will explore watersheds and where the water comes from?

Next, students will explore the environmental impacts of this reservoir/landfill project.

Lesson 4: Students will analyze and experiment with landfill/reservoir designs and their potential impact on the physical and chemical characteristics of the watershed system.

Lesson 5: Students will explore what organisms will be affected by the development of the landfill/reservoir and investigate how these organisms will potentially be affected by the development.

Lesson 6: Students will explore the topography of the region to determine potential locations for development that would mitigate the impact on the environent.

Next, students will explore the economic impacts of the project.

Lesson 7: Students will research budgets for developing this project and identify organizations to complete the construction.

Lesson 8: Students will experiment with economic methods for filtering water associated with project.

Lesson 9: Students will research and debate/discourse to determine how the city/county will pay for the project and how the money that will be generated be used.

Finally, students will explore the cultural/community impacts of the project.

Lesson 10: Students will investigate any potential impacts on the community that the development of the project may create or affect throughout the project and after its creation.

Lesson 11: Using all of their research and experimental data, they will develop a plan to minimize the impact of the development of the landfill/reservoir.

UNIT RESOURCES

VA Dept. of Recreation & Conservation: www.dcr.virginia.gov

Virginia Department of Environmental Quality: www.deq.virginia.gov

Virginia Department of Game and Inland Fisheries:

<http://www.dgif.virginia.gov>

WATERSHEDS 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 mitigate the effects of human activity on Virginia watersheds?

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.

What are the environmental impacts of this project?

What are the economic impacts of this project?

What are the cultural impacts of this project?

Level 3 Questions

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

