

Case Details

Case Title:

Save the Pond

Author(s):

Aimee Webb, Emory University
Janel Chatraw, Emory University
Molly Embree, Emory University
Angela Wade, Renfroe Middle School
Michael Amodio, Renfroe Middle School

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Grade Level(s):

Middle School

Subject(s):

Life Science

Summary:

Your class has been chosen to lead the "save the pond campaign." Devise safety guidelines, a detailed description of the pond's ecology and an improvement plan; the county is counting on you!

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Learning Objectives:

1. Apply and demonstrate lab safety rules and practices.
2. Evaluate the current status of the pond using a variety of laboratory techniques and observation skills.
3. Analyze data gathered in the field and in laboratory exercises and use their analyses to summarize the critical problems of the pond.
4. Research various aspects of pond ecology using a variety of print and nonprint references.
5. Compare and contrast healthy and unhealthy pond systems.
6. Design a healthy pond.
7. Propose a plan for restoring the pond within a given budget.
8. Use a transect line in field research.
9. Identify organisms in and around a local pond.
10. Explain the role of sunlight in the pond environment.
11. Determine the difference between a systematic observation and a biased observation.
12. Estimate the size, area, and volume of a pond.
13. Identify the sources of nitrate and nitrogen in a pond, and explain the

- functions they perform.
14. Explain the significance of pH in a pond and the effects of a pH that is too high and too low.
 15. Explain the relationship between temperature and dissolved oxygen.
 16. Explain the importance of dissolved oxygen in a pond.
 17. Define coliform bacteria and explain their importance.

National/State Standards:

Georgia Performance Standards

SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science. (NSES Content Standard A, G). b. Recognize that different explanations often can be given for the same evidence. c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations

SCSh6. Students will communicate scientific investigations and information clearly. (NSES Content Standard G) d. Participate in group discussions of scientific investigation and current scientific issues

SCSh8. Students will understand important features of the process of scientific inquiry. (NSES Content Standard A, G) c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting. e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases. f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.

SCSh9. Students will enhance reading in all curriculum areas by: a. Reading in all curriculum areas c. Building vocabulary knowledge d. Establishing context.

S7L1. Students will investigate the diversity of living organisms and how they can be compared scientifically. (NSES Content Standard C) a. Demonstrate the process for the development of a dichotomous key. b. Classify organisms based on physical characteristics using a dichotomous key of the six kingdom system (archaeobacteria, eubacteria, protists, fungi, plants, and animals).

S7L4. Students will examine the dependence of organisms on one another and their environments. (NSES Content Standard C) a. Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments. b. Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism. c. Recognize that changes in environmental conditions can affect the survival of both individuals and entire species. d. Categorize relationships between organisms that are competitive or mutually beneficial. e. Describe the characteristics of Earth's major terrestrial biomes (i.e. tropical rain forest, savannah, temperate, desert, taiga, tundra, and mountain) and aquatic communities (i.e. freshwater, estuaries, and marine).

