366840

Detergents and Fertilizers as Pollutants: Studying an Algal Bloom Lab Activity

Aligned With All Published National Standards

ward's science

IMGN 250 8051

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Instruction IMGN2508051 (250-8074)- V. 6/13

framework for K-12 science education © 2012

* The Dimension I practices listed below are called out as **bold** words throughout the activity.

DIMENSION 1 Science and Engineering Practices

X	Asking questions (for science) and defining problems (for engineering)		Use mathematics and computational thinking
X	Developing and using models	X	Constructing explanations (for science) and designing solutions (for engineering)
X	Planning and carrying out investigations	X	Engaging in argument from evidence
X	Analyzing and interpreting data	X	Obtaining, evaluating, and communicating information

DIMENSION 2 Cross Cutting Concepts

	Patterns	X	Energy and matter: Flows, cycles, and conservation
X	Cause and effect: Mechanism and explanation		Structure and function
X	Scale, proportion, and quantity	X	Stability and change
X	Systems and system models		

DIMENSION 3 Core Concepts

Discipline	Core Idea Focus
Earth and Space Science	ESS3: Earth and Human Activity
Life Science	LS2: Ecosystems: Interactions, Energy, and Dynamics

X Indicates standards covered in activity

next generation science standards © 2013

Middle School Standards Covered	High School Standards Covered
MS.ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	HS.ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
MS.ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	HS.ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations and biodiversity.
	HS.ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
	HS.LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

(continued on next page)

standards/learning objectives

national science education standards © 1996

Content Standards (K-12)			
X	Systems, order, and organization	X	Evolution and equilibrium
X	Evidence, models, and explanation	X	Form and Function
X	Constancy, change, and measurement		

Science in Personal and Social Perspectives Standards Middle School		Science in Personal and Social Perspectives Standards High School	
X	Populations, resources, and environments	X	Population growth
X	Risks and benefits	X	Natural resources
		X	Environmental quality
		X	Natural and human-induced hazards

X Indicates standards covered in activity

benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
4. The Physical Setting	4B: The Earth
	4C: Processes That Shape the Earth
11.Common Themes	11A. Systems
	11B. Models
	11C. Constancy and Change

activity objectives:

- Create an algal bloom by varying concentrations of nitrogen and phosphorus.
- Perform visual inspections to determine qualitative effects of nitrogen and phosphorus on water samples.
- Examine water samples microscopically to determine quantitative effects of nitrogen and phosphorus on an algae population.

time requirement:

- Day 1: 30 Minutes
- Day 10: 30 Minutes