Who Dirtied the Water?

Connections to the Massachusetts Science and Technology/Engineering Curriculum Framework May 2001

Guiding Principal V: Investigation, experimentation, and problem solving are central to science and technology/engineering education.

Investigations introduce students to the nature of original research, increase students' understanding of scientific and technological concepts, promote skill development, and provide entry points for all learners.

Guiding Principal VI: Students learn best in an environment that conveys high academic expectations for all students.

School districts should also invite role models from business and the community (including professional engineers and scientists to visit classes, work with students, and contribute to instruction.

Guiding Principal X: Implementation of an effective science and technology/engineering program requires collaboration with experts, appropriate materials, support from parents and community, ongoing professional development and quantitative and qualitative assessment.

In addition, local members of the science and engineering community may be able to lend their own expertise to assist with the implementation of a new curriculum. Teachers and administrators should invite scientists, engineers, higher education faculty, and representatives of local businesses and museum personnel to help evaluate the planned curriculum and enrich it with community connections.

Strand 1: Earth and Space Science

In grades 3 – 5, students explore properties of earth materials and how they change. They conduct tests to classify materials by observed properties, make and record sequential observations, note patterns and variations, and look for factors that cause change. Students observe weather phenomena and describe them quantitatively using simple tools. They study the water cycle, including the forms and locations of water. The focus is on having students generate questions, investigate possible solutions, make predictions and evaluate their conclusions.

Topic	**Learning Standard**	**Example**
The Water Cycle	10. Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.	Through the use of background information and "setting the stage" for this activity, students should become familiar with the movement of water molecules in the water cycle and its effect on water pollution.
	11. Give examples of how the cycling of water, both in and out of the atmosphere, has an effect on climate.	Students discover how precipitation, especially rain storms affect the local environment and transport pollution.

Strand 2: Life Science (Biology)

Grades 3 - 5

Topic	Learning Standard	Example
Adaptations of living things	7. Give examples of how changes in the environment have caused some plants and animals to die or move to new locations.	Through the interactive story students will discover how human actions and pollution changes an ecosystem and can cause organisms to die or become contaminated.
	10. Give examples of how organisms can cause changes in their environment to ensure survival. Explain how some of these changes may affect the ecosystem.	Students also discover how changes made to the environment for human use can be detrimental to the environment. Students also learn steps to take to prevent pollution from entering the environment.

Strand 2: Life Science (Biology)

Grades 6-8

Topic	Learning Standard	Example
Living things and their environment	14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.	Students will discover how pollutants and be passed through the food chain/web and bioaccumulation can occur.
Changes in ecosystems over time	17. Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms and the actions of humans.	Through the activity, students discover how humans have polluted New Bedford Harbor and learn about this effect on the organisms that inhabit the ecosystem.

Strand 2: Physical Science (Chemistry and Physics)

Grades 6-8

Topic	Learning Standard	Example
Elements, compounds and mixtures	5. Recognize that there are more than 100 elements that combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.	Students can be introduced to the basic chemistry of PCBs and how they were produced.
	7. Give basic examples of elements and compounds.	