



WHO DIRTIED THE WATER: A ROLE PLAYING ACTIVITY

Credits:

From Mass. Bays Stewardship Guide

orig. *New England Coastlines* c. 1992, by the New England Aquarium, Central Wharf; Boston 02210. Written by Constance Gavin and Alexander Goldowsky, graphic design by Sarah Meltzer, illustrations by Carol Bayle. Adapted from *Who Dirtied the Water?* by Christine Turnbull, W. Alton Jones Environmental Education Center, University of Rhode Island. Educational use encouraged. Removal of credits, or use in any publication offered for sale without written permission, is a violation of copyright laws.

* This activity has been modified by the US Environmental Protection Agency and was found at http://www.msp.umb.edu/dirtied_water.html.

Metro Boston Region

Background: SIGNIFICANT RESOURCE MANAGEMENT ISSUES

Pollution Discharges: The pollution discharges of primary treated wastewater from the Deer Island and Nut Island sewage treatment plants along with release from CSO's during precipitation is of most concern. The Massachusetts Water Resource Authority is building a secondary treatment plant and undertaking a program to reduce or treat discharges from CSO's. These efforts will yield cleaner near-shore habitats that will bring more people to the shore to enjoy the marshes, beaches, and flats.

Contaminated Sediments: Industrial and human wastes overtime have contributed to contaminated mud and sand in inner Boston Harbor and the shipping channel. Dredging of the area may cause problems related to stirring up of the mud and their contaminants. Of particular concern are the heavy metals such as lead.

Natural Resources: The Boston Harbor Islands have been named a National Park Area. The National Park Service decided that the Islands deserved this designation after a recent study that examined the natural, cultural, and recreational values of the islands and presented a number of management options.

Other Concerns: The Saugus River Flood Control Project raises significant issues along with the problems associated with *Pilayella littoralis*, smelly seaweed which washes up and decomposes on the beaches of Swampscott, Lynn, Nahant, Revere, and Winthrop.

The Boston Harbor that we are trying to clean up today, as well as for the future, was dirtied over a period of hundreds of years. At first, there were only native people, and then the population grew along with technology and industry until we could no longer



ignore the problem. This activity demonstrates how drop by drop and bit by bit everyone adds to a big problem that is costing 100s of millions of dollars to correct.

Who Dirtied the Water encourages students to think about what has gone into Boston Harbor since the earliest days when only the Native People lived here. The students take on roles of historical and modern characters who contribute something they might throw away in their historic time. At the end, students should have a greater concern for their individual and collective responsibility for water pollution.

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Who Dirtied the Water?

ALLOTTED TIME (MINIMUM): ½ hour

SUGGESTED GRADE LEVEL: 2 and up

NUMBER OF STUDENTS NEEDED: Any

OBJECTIVES:

- This activity should evoke a mood. Though it contains a lot of specific information on sources of pollution, and much material for discussion, primarily it is a dramatic look at the plight of our coastal waters.
- Students should develop a greater concern for local waters and an understanding that we are all partially responsible for water pollution. Solutions will require many groups working together.

OVERVIEW:

This interactive story asks students to take on the roles of different historical and modern characters who have had a role in the pollution of Boston Harbor. As a story is read, each character in turn adds a film container full of pollutants to a jar of clean water representing the Harbor. The story may be modified to fit any local, polluted body of water.

MATERIALS:

- Clear glass or plastic wide-mouth jar, one gallon capacity
- 15 Film containers
- 15 Self-adhesive address labels or a roll of masking tape
- Permanent marker
- Stir stick



- Substances to fill film containers (listed on the right)

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PROCEDURE:

1. Label and fill each film container as follows:
Label:----->Fill with:
RIVER----->Sand
SALT MARSHES----->Dry Grass
SHELLFISH----->Crushed sea shells
MASSACHUSEUCK-->Crushed sea shells
SETTLERS----->Organic garbage
FARMERS----->Potting soil
HOUSES----->Toilet paper
FISHERMEN----->Nylon line
BOATERS----->Plastic pieces
LAUNDROMATS----->Dish detergent
CLEANING----->Baking soda
SUN BATHERS----->Paper & plastic & popped balloons
FACTORIES----->Vinegar
PORT----->Vegetable oil (mix vegetable oil with powdered black tempera paint for added impact)
2. Put a self-adhesive label or piece of masking tape around each film container. Setting up this activity takes some time as you have to collect the various "pollution" materials. Most, however, should be available in your kitchen or house. Feel free to substitute for problematic items.
3. Before class, fill the gallon jar 4/5ths full of tap water.
4. Place the water jar where everyone can see it and can easily walk over to it. Distribute all the film containers to students or pairs of students, with instructions not to open the containers.
5. Explain that they have all become characters in a story. You will be telling the story, but when their character is mentioned they should come forward and pour the contents of their film container into the jar. It also helps if students tell the class what they are pouring into the water. Since some film cans contain less-toxic substitutes for the real thing, students should say what the contents stand for, i.e. "cleanser," not "baking soda". Character names are in bold face in the story, in order to help you prompt students while reading.
6. After each character adds their pollutants, stir the water with the stir stick and continue telling the story. The story should be read slowly, allowing each character to come forward. The repeating questions form a sort of chorus, and should be read one by one, with pauses for the group to answer.

THE STORY:

Once upon a time, there was a beautiful piece of land. The land was surrounded on



three sides by a bay; a bay filled with clear ocean water and dotted with green islands. (Point to the jar.) Fish lived in the water, and the land was covered with trees. Both the land and the bay teemed with wildlife.

Chorus:

(Wait for group to answer each question.)

- Would you want to swim in this bay?
- Would you eat fish caught in this water?
- Would you like to go boating on this bay?

A **RIVER** ran along one side of the land, carrying sediment and sand with it as it flowed into the bay.

SALT MARSHES grew along the edges of the bay. Grasses from the salt marshes washed into the bay and became food for the fish.

SHELLFISH grew in the shallow water, including clams, oysters, and scallops.

A small group of people lived on the land near the bay. They called the land Shawmut. The people called themselves the **MASSACHUSEUCK**. The Massachuseuck fished for food and shellfish in the bay. They also dumped some of their garbage near the bay. In fact, we still find the piles of the shells they left.

Chorus:

(Answers will vary as students consider each question in light of the new substances added to the bay.)

- Would you want to swim in this bay?
- Would you eat fish caught in this water?
- Would you like to go boating on this bay?

After many years **SETTLERS** from Europe came to live on the land called Shawmut. The settlers built a town much larger than the Massachuseuck villages. Some of the town's garbage was also dumped into the bay.

As the town grew, the settlers filled in the salt marshes to provide more land on which to build. **FARMERS** cut down trees to clear their fields. Without trees and marshes, rain carried soil into the bay.

Chorus:

- Would you want to swim in this bay?
- Would you eat fish caught in this water?
- Would you like to go boating on this bay?

More and more **HOUSES** and shops were built, and the town grew into the city of New Bedford. Sewer pipes were constructed to remove the waste from homes and bathrooms. The sewage flowed through the sewer pipes into the bay.



Since the salt marshes had been filled in, **RUNOFF** water washed pollution from the streets directly into the bay.

FISHERMEN found that nets made of plastic or nylon were stronger than those made of rope. Sometimes these plastic nets got lost in the water.

Fishermen and other **BOATERS** sometimes threw trash overboard.

Chorus:

- Would you want to swim in this bay?
- Would you eat fish caught in this water?
- Would you like to go boating on this bay?

The city of New Bedford continued to grow. The city built **LAUNDROMATS** where people could wash their clothes. The laundry detergents went down the sewage pipes and into the bay.

People **CLEANING** their houses used poisonous cleansers and drain cleaners, which also flowed through the sewage system and into the bay.

Even swimmers and **SUN BATHERS** going to enjoy the beach sometimes left garbage on the beaches, or balloons would float out over the ocean and pop.

FACTORIES built along the water's edge often dumped their wastes and chemicals into the water. And as New Bedford Harbor - as the bay was now called - grew into a major sea **PORT**, large oil tankers and ships came to unload their cargo. Sometimes oil spilled into the bay.

Chorus:

- Would you want to swim in this bay?
- Would you eat fish caught in this water?
- Would you like to go boating on this bay?

- Who dirtied the water?
- Who is responsible for cleaning it up?

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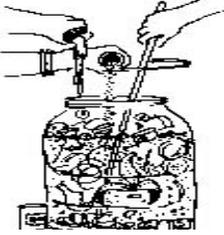
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Applying the Concepts

- Discuss how students felt.
- Do students know of other local bodies of water that have been polluted? Research who is responsible for their pollution.
- Talk about the different pollutants added. Is all pollution equally dangerous? Can students invent categories of pollutants?



Research actions you can take to help reduce your class's polluting impact on water. Cutting down on toxic household products is one way. Water conservation also helps because it allows sewage treatment plants to work more effectively. What other steps can you take?



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