

WHAT'S THE POINT: POINT VS. NONPOINT

K-2

OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Define, orally or in writing, point and nonpoint source water pollution;
2. Identify, orally or in writing, types of point and nonpoint pollution
3. Discuss and evaluate, orally or in writing, lifestyle changes to minimize the damaging effects on habitats;
4. Identify, orally or in writing, ways to prevent water pollution; and
5. Give an oral or written definition of the new terms: bacterial water pollution, conserve, erosion, fertilizer, nonpoint source pollution, point source pollution, sewage, and thermal pollution.

SUBJECTS:

Science, Language Arts, Math

TIME:

50 minutes

MATERIALS:

Verde Frog's habitat from Mudpuppy Pond Story (found in "Surface Water Chapter")
construction paper (red, blue, yellow, green, brown)
bucket, basket, or box
Mudpuppy Pond big book
student activity page
assortment of recycled materials:
fabric scraps, wooden skewers,
popsicle sticks, plastic lids,
wood pieces
11 sheets of 11" x 14" chart paper

BACKGROUND INFORMATION

Water pollution originates from different sources: point sources and nonpoint sources. Nonpoint source pollution is water pollution which cannot be traced to any specific point or location. It literally comes from everywhere and is washed off the land into our lakes and rivers. Rainfall runoff carries soil, pesticides, and other residues of everyday human activity into our lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water.

Pollution contributed to water from a discrete source, such as a pipe, ditch, tunnel, or well, is referred to as point source pollution. Generally, pollution from point sources is controlled to some degree by federal, state, and local agencies. Wastewater treatment plants, storm drains, and factories are places associated with point source pollution.

Cleaning polluted water can be extremely expensive. Keeping pollutants out of the water in the first place is the best way to ensure clean water. Many individuals and industries around the country are taking steps to do just that. For example, some industries are reducing their production of toxic chemicals and developing ways to make their products without using toxic raw materials. Many people have switched to phosphate-free detergents and other less-polluting products. Also,

governments are passing tough water pollution control measures designed to prevent water pollution, from both point and nonpoint sources.

Terms

bacterial water pollution: the introduction of unwanted bacteria into a body of water.

conserve: to use a resource wisely and efficiently.

erosion: the wearing away of the Earth's surface by running water, wind, ice, or other geological agents by which material is removed from the Earth's surface.

fertilizer: natural and synthetic materials including manure, nitrogen, phosphorous, and treated sewage sludge that are worked into the soil to provide nutrients and increase its fertility.

nonpoint source pollution: pollution that cannot be traced to single point, because it comes from many individual places or a widespread area.

nutrient pollution: a nourishing contamination that causes unwanted plant growth.

point source pollution: pollution that can be traced to a single point source, such as a pipe or culvert.

sewage: waste and wastewater produced by residential, commercial, and light industrial establishment; typically discharged into sewers and sometimes into septic tanks.

thermal pollution: varying temperatures above or below the normal condition (e.g., a power plant turbine heated water); heat reduces the ability of water to dissolve oxygen; deep dams often let extra water flow downstream, when the water comes from the bottom of the dam, it is much colder than normal.

toxic pollution: pollution that kills living things.

ADVANCE PREPARATION

- A. Cut two inch squares from red, blue, yellow, green, and brown construction paper. Use enough red, yellow, and blue squares for all of the students but two. Use one green and one brown. Students will get one square of colored construction paper.
- B. Copies of pages 3-13 of Mudpuppy Pond story from "Surface Water Chapter" (8 1/2" x 11" size).
- C. Copy student activity page.
- D. Cut 11 sheets of 11" x 14" chart paper into water drop shapes. Glue a page from Mudpuppy Pond story on back.
- E. Gather assortment of recycled materials for students to use to problem solve ways to prevent pollution from entering waterways.

- F. Gather water pollution reference books from library.

PROCEDURE

I. Setting the stage

- A. Ask the students, “What is pollution?” Tell students there are two types of water pollution, point source and nonpoint source, in the story Mudpuppy Pond. Write the words on the board.
- B. To help students understand these two types, do this pollution simulation activity. Pass out one red, green, blue, yellow, or brown construction paper square to each student. (There will only be one square of green and one square of brown passed out). The squares represent different types of pollution. Tell the students to write the color of their “pollution” square on a piece of scratch paper. Then the students will place the “pollution” squares into a bucket (the pond). Mix the squares, then have all the students with red squares come up and pick out the exact pollution square they put into the bucket. Since all the red squares look alike, it is impossible to find the exact square. Have all red students sit together with pollution squares in the middle. Do this activity with all the colors until all “pollution” squares have been passed out.

Tell students that it is easy to point to the brown and green “pollution” squares. They are called point sources. Point source pollution can be traced to a certain pipe or culvert. Nonpoint source pollution comes from specific areas or the red group, blue group, and yellow group, but it cannot be assigned or pointed to one person or source. Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground carrying pollutants with it. This type of pollution is hard to control because it comes from many different places with people and animals contributing to the problem. We all contribute to the problem without realizing it.

II. Activity

- A. Prior to reading Mudpuppy Pond story again to the class, pass out the student Point/ Nonpoint Source activity page. Pause after reading each page for students to write a naming word that tells who polluted the waterway, recording it under the heading they believe is correct. After reading the story, discuss the various sources of pollution. Record the source under the correct heading on chart paper and discuss.

III. Follow-Up

- A. Tell students each individual can play an important part in stopping pollution by changing certain everyday habits or by using the land responsibly. Brainstorm ways to prevent pollution from entering waterways.
 - 1. Place students in 11 cooperative groups. Pass out chart paper. Have each group read its part of the story. Then, turn the sheet over and semantically map ways to keep pollution from getting into the water. The group may use reference books or brochures which have been placed in the classroom reference center.

2. Display each group's web on a bulletin board.

B. After gathering information, each group will use recycled supplies to correct problems in simulated Mudpuppy Pond community.

IV. Extensions

A. Make a chart with the three headings "Problems, Causes, Solutions," placed where everyone can see it.

B. Write and illustrate an environmental leaflet that addresses the causes and solutions to point source and nonpoint source pollution.

STUDENT RESOURCES

"Water Play," a 15-page color workbook for grades K-3. Connect the dots, decode messages, fill in the missing words, word search, color and more; these are all avenues taken in this workbook to teach children the basic ideas behind water-where it comes from, how to purify it, and how to conserve it. Order from: Innovative Communications, 207 Coggins Drive, Pleasant Hill, CA 94523, (510) 944-0923. Cost: \$.50 each Student Workbook, and \$2.00 for each Teacher's Guide.

RESOURCES

Hansen, Nancy Richardson, Controlling Nonpoint-Source Water Pollution, The Conservation Foundation, Washington, D.C., 1988.

Ranger Rick's Naturescope, Pollution: Problems and Solutions, National Wildlife Federation, Washington, D.C., 1990.

Water Quality: Potential Sources of Pollution, U.S. Geological Survey, Box 25286, Denver Federal Center, Denver, CO, 80225.

What You Can Do To Reduce Pointless Pollution, Alabama Department of Environmental Management, Water Division, Mining and Nonpoint Source Section, 1751 Congressman W.L., Dickinson Drive, Montgomery, AL 36109.

Point Source Pollution

Nonpoint Source Pollution
