

**Lesson Title: Working Together to Prevent Pollution**

**Ohio Standards Connection:**

**Standard(s):** Earth Science

**Benchmark(s):** (grades 3-5) C. Describe Earth's resources including rocks, soil, water, air animals and plants and the ways in which they can be conserved.

**Indicator(s):**

**Grade(5):** 5. Explain how the supply of many non-renewable resources is limited and can be extended through reducing, reusing and recycling but cannot be extended indefinitely.

Investigate ways Earth's renewable resources (e.g., fresh water, air, wildlife and trees) can be maintained.

**Benchmark(s):** (grades 3-5) C. Describe the interactions of matter and energy throughout the lithosphere, hydrosphere and atmosphere (e.g. water cycle, weather and pollution).

**Indicator(s):** 4. Analyze data on the availability of fresh water that is essential for life and for most industrial and agricultural processes. Describe how rivers, lakes and groundwater can be depleted or polluted becoming less hospitable to life and even becoming unavailable or unsuitable for life.

**Lesson Summary:** The student will distinguish between point source and non-point source pollution; list ways to prevent non-point source pollution; sing a song about working together.

**Estimated Duration:** class period

**Background:** The sources of pollutants that cause water pollution vary. In some cases, pollutants may come from a pipe discharging into a river, from a boat, irrigation ditch, underground storage tank, or other single source, called a "point source" of pollution. But frequently they are varied sources, collectively called "non-point sources," that could include pollutants from industries, agriculture, and other human activities.

Point source problems are the easiest to correct. Their causes — wastewater emptied into bodies of water through pipes — can be dealt with directly. Additional treatment can be required, water conservation programs can be started, or other measures can be used to prevent water quality problems.

Non-point source problems are more difficult to fix. They result when rain from your lawn, city streets, parking lots, and barnyards runs off into lakes and streams. This runoff may contain oil, fertilizers, antifreeze, pesticides, bacteria, and other substances harmful to water quality. Another type of non-point source pollution is erosion of soil from farm lands, construction sites, and stream banks.

Fixing non-point source problems usually requires a great deal of cooperation.

Communities, farmers, homeowners, forest managers, developers, and companies —all

of us— must all take better care of the land to reduce non-point source pollution out many non-point source pollutants before they reach bodies of water. They also help prevent flooding by allowing storm water to soak into the soil.

### **Instructional Procedures:**

#### **ADVANCE PREPARATION**

A. Gather needed materials. Use travel, outdoor sports, and home and garden magazines for the most appropriate pictures.

B. Make a transparency of the teacher sheet.

C. Copy the student sheet for distribution.

#### **I. Setting the stage**

A. Begin by asking the students what water pollution is. Help them clarify their definition.

B. Ask them whose fault water pollution is. Discuss the issue of responsibility with them.

C. Tell the students that protecting water quality and controlling pollution is everybody's business! The Clean Water Act gives states the authority to control pollution sources, but each of us must share in the responsibility.

#### **II. Activity**

A. Write "point source pollution" and "non-point source pollution" on the board. Can the students guess what these mean?

1. Give the students the definition of each term.
2. Ask them to give examples of each one.
3. Ask them which kind of water pollution they would be most likely to cause by their own actions (non-point source) Have them identify some ways they might prevent this. (e.g., not littering, using the right amount of fertilizer and bug spray)

B. Have the students complete the exercise on the teacher sheet "Point or Non-point?" (use it as a transparency). These answers are 1.P, 2.N, 3.N, 4.P, 5.N.

C. Give each student a copy of the mini-poster "Do What You Can Do." Discuss it with them. Let the students decorate the sheet. Have them take it home to their families.

#### **III. Follow-Up**

A. Have the students work in teams of three or four. Supply them with posterboard, scissors, glue, old magazines, and markers. Each team should prepare a poster display on ways to reduce non-point source pollution. Suggest collages of applicable photos and words. Have the teams share their posters. Hang them in local libraries, sporting goods shops, and community centers.

B. Have the students sing the following to the tune of "The More We Get Together."

The more we work together, together, together,  
The more we work together, the happier we'll be.  
For your lake is my lake and my lake is your lake.  
The more we work together, the cleaner it will be.

#### **IV. Extensions**

A. Take a field trip to your local lake or river. If there is a dam there, arrange to have someone give your class a guided tour. Have the students ask pre-prepared questions about point source and non-point source pollution.

B. Have the students make up more verses to the song. Suggest they use local water bodies and point/non-point differentiation in their lyrics.

C. *What Can I Do?* Have students write brief reports on what they can do to reduce non-point source pollution. Have them use Life Depends on Water website (<http://www.wviz.org/edsvcs/Water/>) for their research.

#### **RESOURCES**

Gay, K., *Water Pollution*, Franklin Watts, New York, 1990.

"Your Lake is Unique," RiverPulse, Tennessee Valley Authority, Water Resources Division, July 1992.

#### **Materials and Resources:**

- posterboard (one per group)
- old magazines
- scissors
- glue
- markers
- crayons
- teacher sheet (included)
- acetate sheet
- overhead projector
- student sheet (included)

#### **Vocabulary:**

**conservation:** preserving from loss, waste, or harm.

**contaminant:** an impurity that causes air, soil, or water to be harmful to human health or the environment.

**erosion:** the wearing away of the earth's surface by running water, wind, ice, or other geological agents; processes, including weathering, dissolution, abrasion, corrosion, and transportation, by which material is removed from the earth's surface.

**fertilizer:** any one of a large number of natural or synthetic materials, including manure and nitrogen, phosphorous, and potassium compounds, spread or worked into the soil to increase its fertility.

**Non-point source pollution (NPS):** pollution that cannot be traced to a single point, because it comes from many individual places or a widespread area (e.g., urban and agricultural runoff).

**point source pollution:** pollution that can be traced to a single point, such as a pipe or culvert (e.g., industrial and wastewater treatment plant discharges).

**pollutant:** an impurity (contaminant) that causes an undesirable change in the physical, chemical, or biological characteristics of the air, water, or land that may be harmful to or affect the health, survival, or activities of humans or other living organisms.

**pollution:** contaminants in the air, water, or soil that cause harm to human health or the environment

Teacher Sheet

**POINT OR NON-POINT**

Identify the following as point sources or non-point sources of water pollution. Write “P” or “N” in the blanks.

1. Leaking underground storage tank \_\_\_\_\_
2. Neighborhood yards to which weed killer has been applied \_\_\_\_\_
3. Farmlands to which fertilizer has been applied \_\_\_\_\_
4. Factory with wastewater discharge pipe \_\_\_\_\_
5. All the town’s construction sites \_\_\_\_\_