

Activity: Pollution Solution

Grade Level: Grade 2

Major Emphasis: Ecology, Pollution, Environmental Ethics

Major Curriculum Area: Science

Related Curriculum Areas:

- Refer to Outdoor Education Curriculum Matrix K-2
- Career Education
- Human Relations
- Language Arts
- Social Studies
- Art



Program Indicator:

The student will be able to describe pollutants in terms of altering the normal composition of air, water and land and their effects on living things.

Student Outcomes: The student will:

1. identify water, air and land pollutants.
2. observe how pollutants alter the normal composition of air, land and water.
3. describe the effects of pollution.

Readiness:

1. Use selected activities from the second grade Unified Science Curriculum.
2. Introduce vocabulary:

cause	machinery	prevention
detergent	pollutants	reaction
litter	pollution	tide
3. Read Supplement A.

Materials:

- | | |
|-----------------|-----------------------------------|
| Supplements A-D | river water |
| cotton | 3 gallons of popcorn |
| tweezers | 1 tablespoon of detergent |
| paper towels | 1 piece of bark |
| spoons | 2 jars with lids |
| tote trays | 1 plant leaf |
| marker | 2 tablespoons of oil |
| netting | Personal Flotation Devices (PFDs) |

Procedures: (DL2,3&4)

Activity A: Oil Spill Simulation

1. Explain to the students that oil, while necessary for the operation of machinery such as cars, airplanes and boats, can be a major cause of water pollution.
2. Discuss ways that oil can pollute water, such as oil tanker spills and used oil from cars, airplanes and boats being poured down drains. Tell the students that popcorn is going to be tossed out in the river. Ask them to pretend that the popcorn is oil that has found its way to the river.
3. Before tossing out the popcorn, ask the students to predict the direction it will move and how long it will take to reach the shore or another designated point. Estimate the impact the spill will have on the landscape, plant life and animal life.
4. Toss out the popcorn and time how long it takes the "oil" to reach the shore or other designated point. Ask the following questions:
 - a. What causes the oil to move over the water (wind, tide, etc.)?
 - b. How might different wind or water conditions affect the oil?
 - c. How can an oil spill be prevented from spreading?
 - d. Who should be responsible for cleaning up the spill?

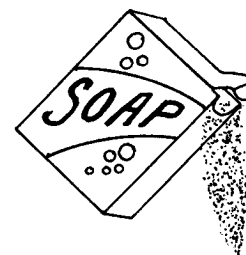


Activity B: Oil Spill Clean Up Simulation

1. Pour 2 tablespoons of oil into a tote tray filled with water.
2. Have the students describe the relationship between oil and water.
3. Present the students with a variety of possible oil removal tools (netting, cotton, spoons & paper towels).
4. Ask which one do they think will work the best to remove the oil.
5. Working in pairs, have each pair try a different technique.
6. Record results on a chart. Refer to Supplement B.

Activity C: Detergent Simulation

1. Explain that detergent, while helpful in cleaning clothes, is a major cause of water pollution.
2. Conduct the following demonstration to show the effect detergent has on plant and animal life living in water.
3. Pour the tablespoon of detergent into a clear jar that is half-full of water, screw the lid on tightly and shake.
4. Have students observe the leaf and piece of bark before they are placed in the jar.
Be sure students note the way the surface of each object feels.
5. Place the leaf and bark in the jar and let them soak for about 5 minutes.



6. While the objects are soaking, explain to the students that detergents clog up the openings where fish take in air making it hard for them to breathe. It also kills many of the small plants that grow in water by cutting off the air they need to grow. When enough of these plants die, the fish that eat them no longer have anything to eat and so they die. Explain that the detergents contain poisons that are harmful to life in water.
7. Remove both objects from the soapy water. Have students feel the slippery surface of both objects and look at the objects with the hand lens. What happened to the objects?
8. Make predictions about how this detergent may affect plant and animal life in the water.

Summary: (DL4&5)

1. What are some ways water can become polluted?
2. How do these water pollutants effect living things?
3. What can you do to help stop water pollution?

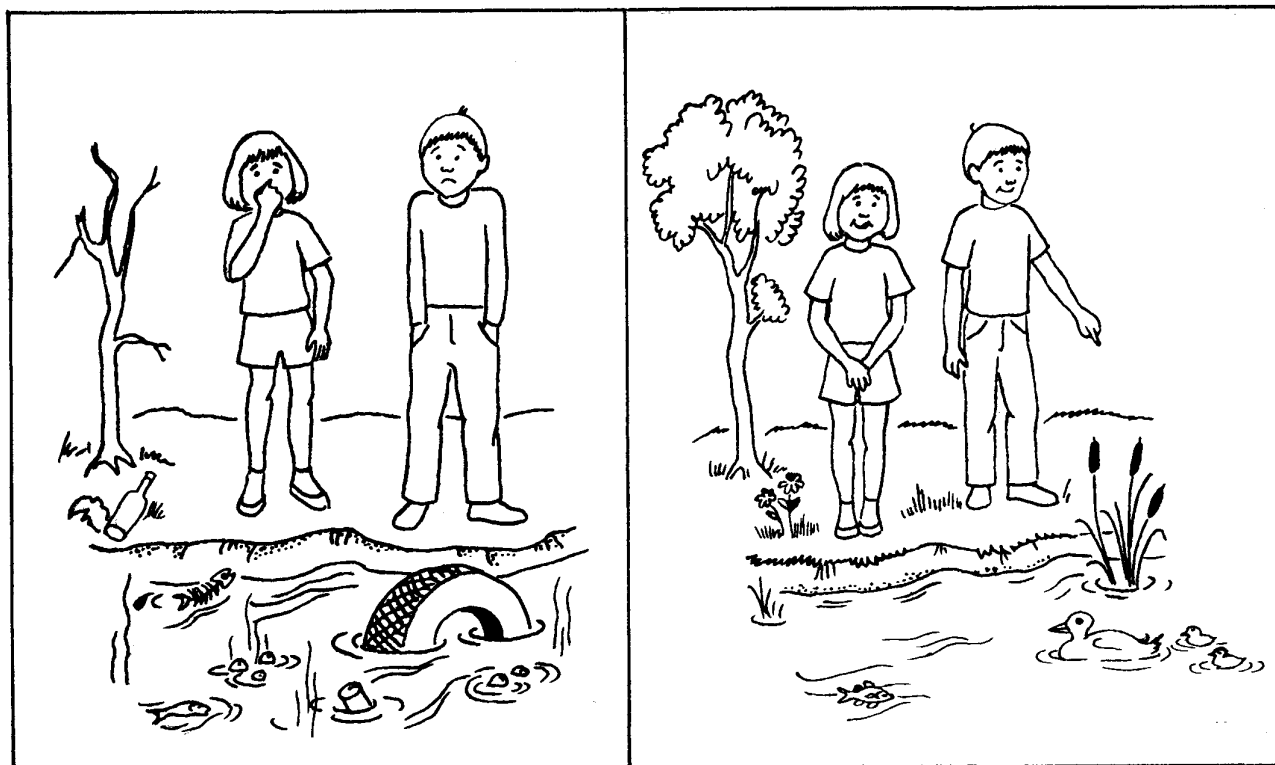
Follow-Up:

1. Bay BC's "Down the Drain Activity," pp. 32-33, U.S. Fish and Wildlife Service. Refer to Supplement C.
2. Break into teams with a 10 minute time limit and list as many items (i.e. detergent, oil, paint, etc.) as they can that pollute the water. Compile a class list.
3. Have students write a rule telling how water pollution can be prevented. Include an illustration and display rules on a bulletin board under the title, "Water Pollution Solutions." (example: Don't Pour Oil Down the Sink)

Extension Activities:

1. Invite a speaker from the Environmental Protection Agency or Natural Resources to discuss ways of combating pollution.
2. Take a pollution hike and make observations concerning various kind of pollution. Refer to Supplement C. Complete the pollution chart. Refer to Supplements C and D. View films:
 - a. #983, "Air Pollution: A First Film," 8 minutes.
 - b. #1113, "Land Pollution: A First Film," 8 minutes.
 - c. #638, "Water: A First Film," 10 minutes.
 - d. #6461, "Pollution-Land, Air, Water and Noise," 3 minutes.
3. Have students draw a rural, urban and/or suburban scene and include three kinds of pollution.
4. "Chessie-A Chesapeake Bay Story," contact U.S. Fish and Wildlife Service, 180 Admiral Cochrane Drive, Suite 535, Annapolis, Maryland 21401, (410) 224-2732.
5. "My Maryland Natural Resources Coloring Book," request in writing from Maryland Department of Natural Resources, Tawes State Office Building, Annapolis, Maryland 21401, (410) 974-3849.
6. Read ABC of Ecology, Harry Milgram and Donald Crews, 1972 Collier Books, to the class and discuss questions presented on each page.

7. Place collector paper (thin coat of vaseline on wax paper) in various places such as indoors, outdoors or teacher's room. Other locations can include out in the open on each of the north, south, east and west sides of the school or in community buildings such as bakery, food store, gas station, machine shop, etc. After one week, retrieve the collector papers and label them. Make a bar graph to show different kinds of air pollution.
8. Do a compare/contrast chart of living things in polluted areas versus non-polluted areas.



Teacher Resources:

Books:

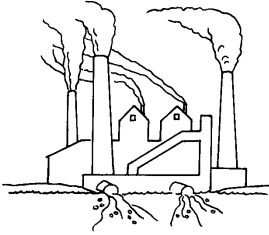
- < *Bay BC, U.S. Fish and Wildlife Service.
- < *Pollution, Wentworth. 628.5.
- < *Magic School Bus at the Waterwork.
- < *Wump World, Peet.
- < *Bay Book, A Guide to Reducing Water Pollution at Home, U.S. Department of Agriculture.

Filmstrip:

- < *"Air Pollution: A First Film," #983, 8 minutes.
- < *"Land Pollution: A First Film," #1113, 8 minutes.
- < *"Water: A First Film," #638, 10 minutes.
- < *"Pollution-Land, Air, Water and Noise," 3 minutes.

Supplementary Materials:

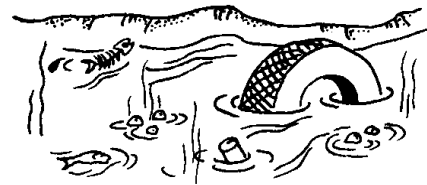
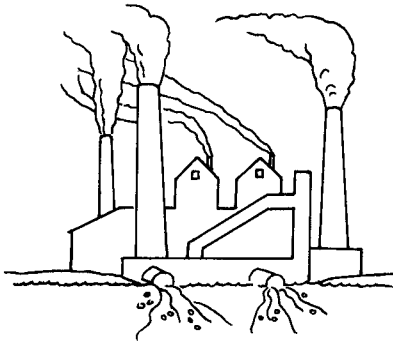
- < *Outdoor Biology Instructional Strategies (OBIS), "Oil Spill Activity," Set II.
- < "The Chesapeake Bay: It Starts with You" (activity suggestions), Chesapeake Bay Foundation, (301) 269-0481.
- < Ranger Ricks NatureScope - "Pollution: Problems and Solutions," p. 36.



Water Pollution Facts "An Introduction to Water Pollution"

The three worst sources of water pollution are:

1. Sewage: poured by communities into major streams.
2. Industrial Wastes: loaded with chemicals and dumped into streams.
3. Agricultural Use: pesticides washed into streams kill fish, poison birds and kill animals that prey on them.



Three ways to stop water pollution:

1. Build treatment plants for sewage.
2. Have industries build plants to treat their wastes.
3. Control use of dangerous pesticides.

Things students can do:

1. Don't dump things in streams and rivers.
2. Plant grass and other plants near water's edge.
3. Put up warning signs. Participate in a Storm Drain Program.

Control erosion by rain and water by:

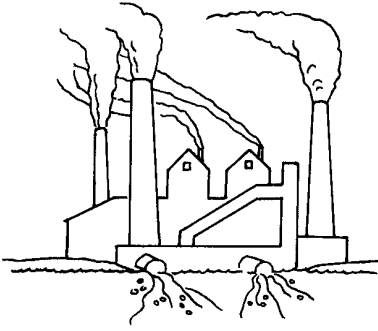
1. Contour farms.
2. Build dams and reservoirs.
3. Build irrigation ditches.
4. Build canals.

Things students can do:

1. Plant grass.
2. Put down bark chips.
3. Look for erosion in their own yards. Make an adult aware of the problem.

**Oil Removal
How Well Does Each Item Work?**

	Good	Fair	Not At All
Paper Towels			
Cotton			
Spoon			
Netting			
Tweezers			



Pollution Hike
Check the Items Found



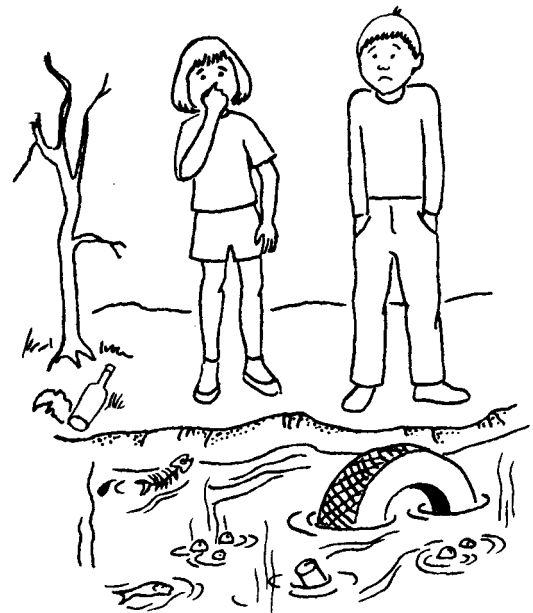
Pollution Items

Area	Plastic	Paper	Metal	Oil	Other (List)
Land/Marsh					
Water/Rivers					

Which area was more polluted? _____

List two ways this area can be cleaned up:

1. _____
2. _____



Pollution Chart

Type of Pollution	Pollutants	Ways to Control Pollution
Air		
Noise		
Water		
Land		