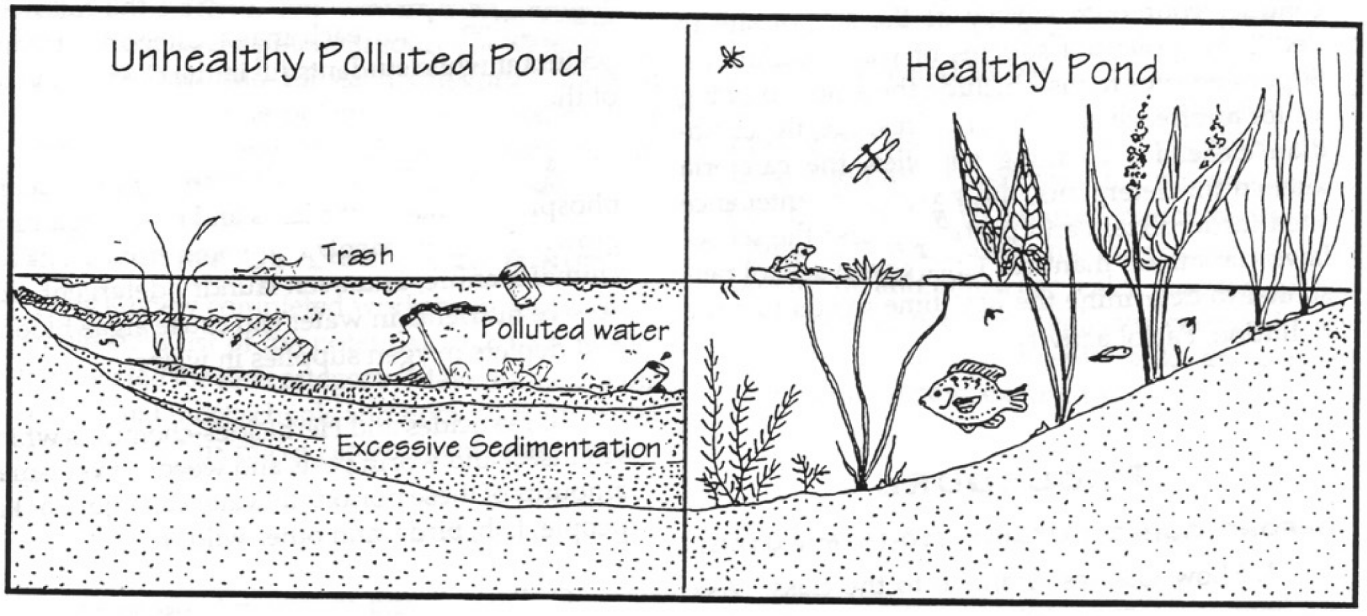
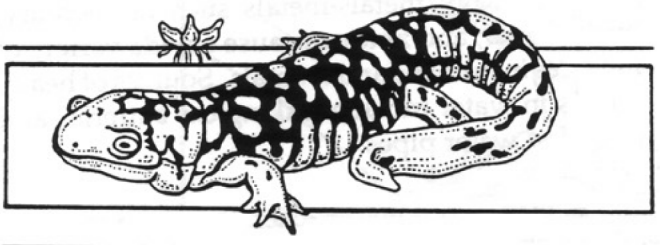
# POLLUTION PATROL




## KEY QUESTION(S)

***What are the major categories of water pollutants?***

***What kinds of potential water pollutants can be found at home and at school?***



**TARGET AUDIENCE:**
*GRADES 3- 5, AGES 8 - 10, Suitable for visual learners. Appropriate for all academic ability levels.*

**SCIENCE PROCESS SKILLS USED:**
*Observation, Classification, Inference*

**TIME REQUIRED TO COMPLETE LESSON:**
*In-class: 25-35 minutes, In-field: 20-25 minutes*

**BEST TIME OF YEAR FOR LESSON:**
*All year*

## BEHAVIORAL OBJECTIVES

As part of this activity, students will:

- (C) 1. survey the school and identify potential sources of water pollutants.
- (C) 2. classify potential water pollutants by category.
- (A) 3. identify actions individuals can take to eliminate potential water pollutants from schools and homes.

## MATERIALS

**ESSENTIAL: (PER CLASS)**

- Glass A: a glass of clean tap water
- Glass B: a glass of water mixed with sand, soil, and sediment
- Glass C: a glass of tap water containing one tablespoon of white vinegar

**(PER GROUP OF 3-4 STUDENTS)**

- "Pollution Patrol" worksheet
- Clipboard or other hard writing surface

## GETTING READY

Before conducting the activity with your students, conduct your own survey of the school site to determine potential sources of water pollutants. Suggested sites to visit include the school parking lot for antifreeze and motor oil residue, the custodian closet for cleaning supplies, the cafeteria kitchen for detergents, the grounds maintenance shed for fertilizers and pesticides, and the school lawn for animal manure. Check with school personnel to determine the best time to conduct the Pollution Patrol activity.

## PROCEDURE

**BEFORE GOING OUTSIDE (10-15 MINUTES):**

1. Show Glasses A and B to the class. Ask students to describe differences between the two samples. Next, ask students which water sample they would want to drink from. Introduce and discuss the term "water quality." Tell students that in addition to worrying about how much water is available in Florida, the Water Management Districts and other agencies such as the Florida Department of Environmental Protection and county health departments also have to worry about the quality of available water. Good quality water is clean, clear, and safe for drinking, cooking, and bathing. Poor quality water is dirty and often unsafe. Drinking, cooking with, or bathing in poor quality water can cause illness or even death.

2. Show Glass C to the class. Ask students if they would want to drink from this glass. Next, let students smell Glass C. Remind students that water that appears clean can still be unsafe. Ask students what makes water unsafe. Introduce the term "pollutant" and explain that the amount and type of pollutants found in water influences water quality. Some water pollutants come from nature, but most water pollutants are the direct result of human activities. Some pollutants cannot be seen, smelled, or even tasted. Often, special tests must be conducted to determine if water is polluted. Explain that during this activity students will be working in groups to survey the school site and locate potential sources of water pollutants.

3. Divide students into groups of three to four and distribute a "Pollution Patrol" worksheet to each group. Review and discuss the following information about each major category of water pollutant while students fill in the chart at the top of the worksheet:

A. Organics-chemicals such as nitrogen and phosphorus that help plants and other organisms grow. These nutrients can come from fertilizer, animal manure, and even laundry detergent. Excessive nutrients in water can cause algae blooms and deplete oxygen supplies in water.

B. Pesticides and Herbicides-chemicals which kill insect and worm pests and weeds. Even small amounts of these poisons in water can injure or kill people, fish, birds, and other wildlife.

C. Bacteria and Viruses-microscopic bacteria and viruses (and other parasites) which cause diseases such as hepatitis, typhoid fever, and cholera. Human sewage, animal manure, garbage, medical waste, and leaking septic tanks are all sources of infectious bacteria and viruses.

D. Heavy metals-metals such as mercury, lead, cooper, and zinc can cause a wide variety of illnesses in humans and animals. Sources of heavy metals in water include leaking car batteries and corroded water pipes.

E. Hazardous wastes-chemicals such as motor oil, paints, cleaners, waxes, nail polish remover, and antifreeze. When these chemicals get into the water supply they can be poisonous to people, plants, and wildlife.

F. Sediments-dirt that washes off the ground into water supplies can kill water plants and animals and can contain pollutants such as used motor oil which were dumped on the ground. Sediment can come from rain falling on bare exposed ground and construction sites.

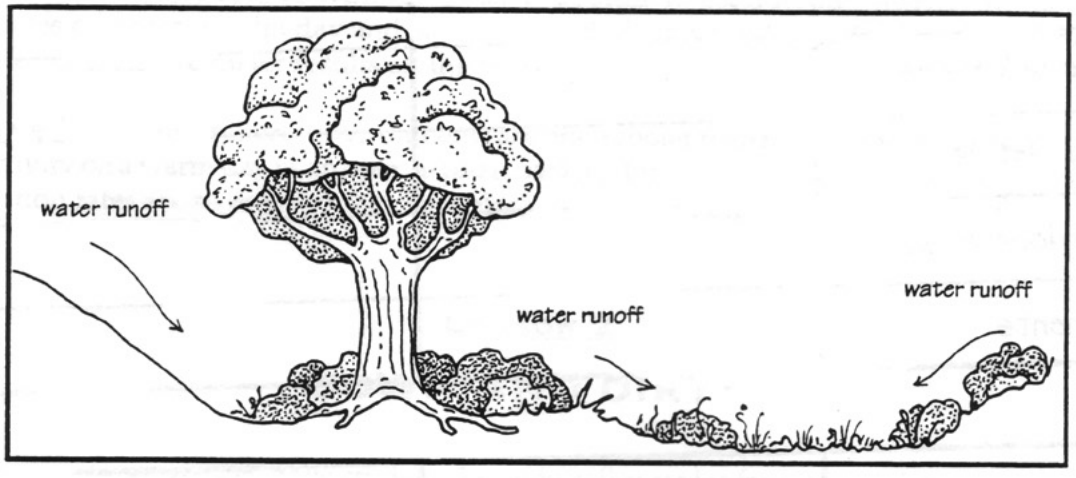
**WHILE OUTSIDE (20-25 MINUTES):**

1. Distribute a clipboard to each group. Lead students on a Pollution Patrol both inside and outside the school site and instruct students to write down every potential source of water pollution they can find for each category. Remind students that some potential pollutants, such as animal manure, may fit under more than one category (e.g. Organics and Bacteria/Viruses).

**AFTER GOING OUTSIDE (15-20 MINUTES):**

1. Review completed worksheets and make a whole-class list of the potential sources of pollution located for each category. Make sure students realize that most schools and homes are potential sources of all six major categories of water pollutants.

2. Conclude the class by asking students what individuals can do to eliminate potential sources of water pollution in schools and homes. Make sure students are aware of the wide variety of potential actions including: properly disposing of animal waste and garbage, minimizing the use of fertilizers, using non-phosphate detergents, minimizing the use of herbicides, fungicides, insect sprays and other pesticides, not pouring hazardous chemicals such as used motor oil or paint thinner down drains or onto the ground, checking cars for oil and antifreeze leaks, properly disposing of old car batteries, replacing corroded water pipes, repairing leaking septic tanks, and planting vegetation on bare, exposed soil.



# POLLUTION PATROL

Name_____ Name_____

Name_____ Name_____

## DIRECTIONS:

Fill in the chart at the top of the page. Then, at each school site you visit, write down all potential sources of water pollution you can find for each category.

| Category | Examples | Potential Sources |
|---|---|---|
| Organics | | |
| Pesticides/Herbicides | | |
| Bacteria/Viruses | | |
| Heavy Metals | | |
| Hazardous Wastes | | |
| Sediments | | |

| Category | School Site | Potential Pollutant |
|---|---|---|
| Organics | | |
| Pesticides/Herbicides | | |
| Bacteria/Viruses | | |
| Heavy Metals | | |
| Hazardous Wastes | | |
| Sediments | | |