

SAMPLE ACTIVITY

from

The Water SourceBook

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FLUSH YOUR TROUBLES AWAY

OBJECTIVES

The student will do the following:

1. Identify the basic parts of a septic system.
2. Relate septic system failures and con-tamination of groundwater to human health.
3. Write and illustrate a newspaper article about the effect of septic contamination of groundwater and its prevention.

BACKGROUND INFORMATION

When it comes to septic systems, the most important rule is: If it smells bad it needs to be fixed. Failed septic systems are a big problem for contamination of our groundwater. Most homes in rural areas have septic systems. New construction usually requires that systems be installed. A few older homes without any sanitary system still exist. When we began to use sewers and separate ourselves from human waste we began to live longer; diseases which were passed in these wastes were easier to control.

Today we find groundwater contamination from septic systems still occurs but can be avoided. Some wells in rural areas produce water carrying coliform bacteria (an indicator of fecal contamination). Septic systems or poor management of animal wastes have polluted the water. We must learn not to position wells for drinking water too close to a septic system. Properly maintained septic systems are our way of avoiding disease and preventing pollution of the groundwater. We also protect our groundwater through proper use of the land.

A properly installed and maintained septic system will handle the waste produced in a home. The wastes are carried from the house by water through pipes into a large container called a septic tank. These containers are often made of concrete or steel. Newer designs may be made of other materials. When the waste enters the tank, the liquids rise to the top and the solids go to the bottom. Bacteria help break down the solids. The liquids flow to a pipe which leads to the drainfield lines. The drainfield is an important part of the system and allows the liquid to drain through the soil and be cleansed before coming in contact with the groundwater. Before installing a septic system, a test of the soil should be conducted, since some soils are not permeable enough to allow the water to pass through.

Terms

coliform bacteria: bacteria found in waste products of humans and animals; by themselves, most coliforms are not a health risk, but they often indicate the presence of other microbes that may cause illness if ingested.

contamination: an impurity.

SUBJECTS:

Science, Language Arts, Art, Social Studies

TIME:

3 45-minute class periods

MATERIALS:

2 clear glasses
black tempera paint
water
wax drink sticks (found in the candy section of the grocery store)
markers or crayons
watercolor paints
old newspapers
student sheets (included)

failure: does not work.

groundwater: water under the ground's surface.

septic tank or septic system: a domestic wastewater treatment system into which wastes are piped directly from the home; bacteria decompose the wastes, sludge settles to the bottom of the tank, and the treated effluent flows out into the ground through drainage pipes.

ADVANCE PREPARATION

- A. Fill one clear glass with clean water and fill the other with dirty water (you can add some black tempera paint to make it look dirty).
- B. Photocopy the student sheets.

PROCEDURE

I. Setting the stage

- A. Hold up a glass of clean water and a glass of dirty water. Ask which one the class would prefer to drink. Explain that many rural and urban people rely on groundwater for their drinking water.
- B. Using the student sheet "Flush Your Troubles Away," explain the basic parts of a septic system and drainfield. If you use it as a transparency, cover the labels and ask students to name the sections. This will reinforce these ideas.
 1. Have the students trace the wastewater coming from various points in the house.
 2. Point out the location of the groundwater.
 3. Brainstorm for information on your students' water needs and ways they use water. Ask your students what they see wrong with the student sheet "Flush Your Troubles Away." Point out the clog and the leaks in the system. Remind the students that the tank holds sludge that the bacteria have not broken down. How would they correct the problem?
 4. Relate these problems to groundwater contamination.

II. Activities

- A. Broken field pipes are one source of septic failures. Broken pipes leak and can contaminate the groundwater. Ask your students how polluted groundwater would affect them. Small teams of 3 or 4 students work best in simulating this concept. Make sure newspaper is covering the desk area. Model this activity as the teams simulate it.
 1. Take a drink stick and hold it up. Tell your students it represents a septic system field pipe. If something heavy puts pressure on it (such as a vehicle driving over it) it could break.
 2. Break the stick in half and let the liquid pour out over the newspaper. Discuss how pipes could be reinforced or how better preventive methods (such as not putting field lines where a vehicle would run over them) could be employed. For example, large trucks often deliver home heating oil or gas where drainfields underlie their paths.

- B. Discuss with students what coliform bacteria are and why they indicate a health risk. Discuss possible ways they could contaminate the groundwater.
1. Preventive measures include properly maintaining a septic system. For example, we should make careful choices of tissue and never flush cardboard, plastic, or home chemicals that kill bacteria. All these efforts will help maintain a functional septic system.
 2. Septic tanks need bacteria to break down solids. Bacteria can be purchased at home supply stores and flushed into the tank.
 3. Some parts of the United States and other places around the world do not have any method of sanitarily dealing with human waste. Things such as the outdoor privy, or outhouse, (with no home septic tank) still exist. Contaminated groundwater can make you sick and affect all living things that depend on it.
 4. A septic tank needs to be pumped out as frequently as recommended by local health authorities (e.g., every 5 years).
- C. Students will design and lay out the front page of a newspaper (use the student sheet with layout).
1. Each student will independently make a newspaper. (NOTE: For younger students, this may be more suitable as a group activity.)
 - a. Original, creative articles will be written.
 - b. A picture will be included in the space provided. This picture can be hand-drawn, a photograph, or a magazine picture.
 - c. The students will use creative articles written about preventing septic system failures and reasons for protecting our groundwater. Made up stories of the results of groundwater contamination can be included; for example, the story could be about a family that is sick. They have not had their septic tank pumped out for 20 years, and they recently allowed a heating oil company to drive its heavy truck over their field line. The hospital has determined they drank water contaminated with microorganisms that made them sick. The local health department tested the well water on their farm and determined it was contaminated. A local company is pumping the tank and putting in a new field line.
 - d. Have the students describe some problems that may be unusual in your area. (Perhaps you are located near a water body or in the desert.)
 2. You may contact your local health department and find out what regulations exist where you live concerning installation and maintenance of septic systems, such as mandatory soil percolation testing.
 3. Display the newspapers in the classroom and ask the school paper to include some articles in their next edition. If you don't have a school paper ask your community paper to include some articles as a public service.

III. Follow-up

- A. Have the students use the following matching exercise to demonstrate their knowledge of the terms for this lesson.

1. Use the student sheet “Flush Your Trouble Terms” or write the exercise on the chalkboard.
2. The answers are as follows: 1. c, 2. e, 3. d, 4. a, 5. b.

B. Conclude this lesson with question time. Ask the following:

1. If it hasn't rained in several days but it is wet over your drainfield, you should . . . (Tell your parents you suspect a septic system failure.)
2. It is wet over your drainfield all the time. Your well is close to it. You have been sick and many members of your family have too. What will you do? (Ask your parents to have the well tested for coliform bacteria contamination.)
3. The tissue is used up. Should you remove the cardboard tube and drop it in the commode? Why or why not? (No, it takes up space and requires a long time to decompose. It is better to put it in the garbage can.)
4. Your family is having problems with your septic system and it hasn't been pumped out in 15 years. What should you do? (Have it pumped out as often as local health authorities recommend.)

IV. Extensions

- A. Have the students investigate alternative septic systems.
- B. Have each student paint a landscape using watercolor paints. Include at least one water source such as an ocean, lake, or river. Use “dirty” water (mix 1 teaspoon [5 mL] black tempera paint in the water used to paint). The effect will be a dark, “polluted” scene.
- C. Have teams of students design posters with safe septic system tips. If you live in a rural community place the posters in local stores, libraries, or in your school.

RESOURCES

Branley, Franklyn M., Water for the World, T. Y. Crowell, New York, 1982.

Cobb, Vicki, The Trip of a Drip, Little, Brown and Company, Boston, Massachusetts, 1986, p. 11-12.

Haberman, Mary, “Water Magic, Water Activities for Students & Teachers,” American Water Works Association, Denver, Colorado, 1991, p. 31.

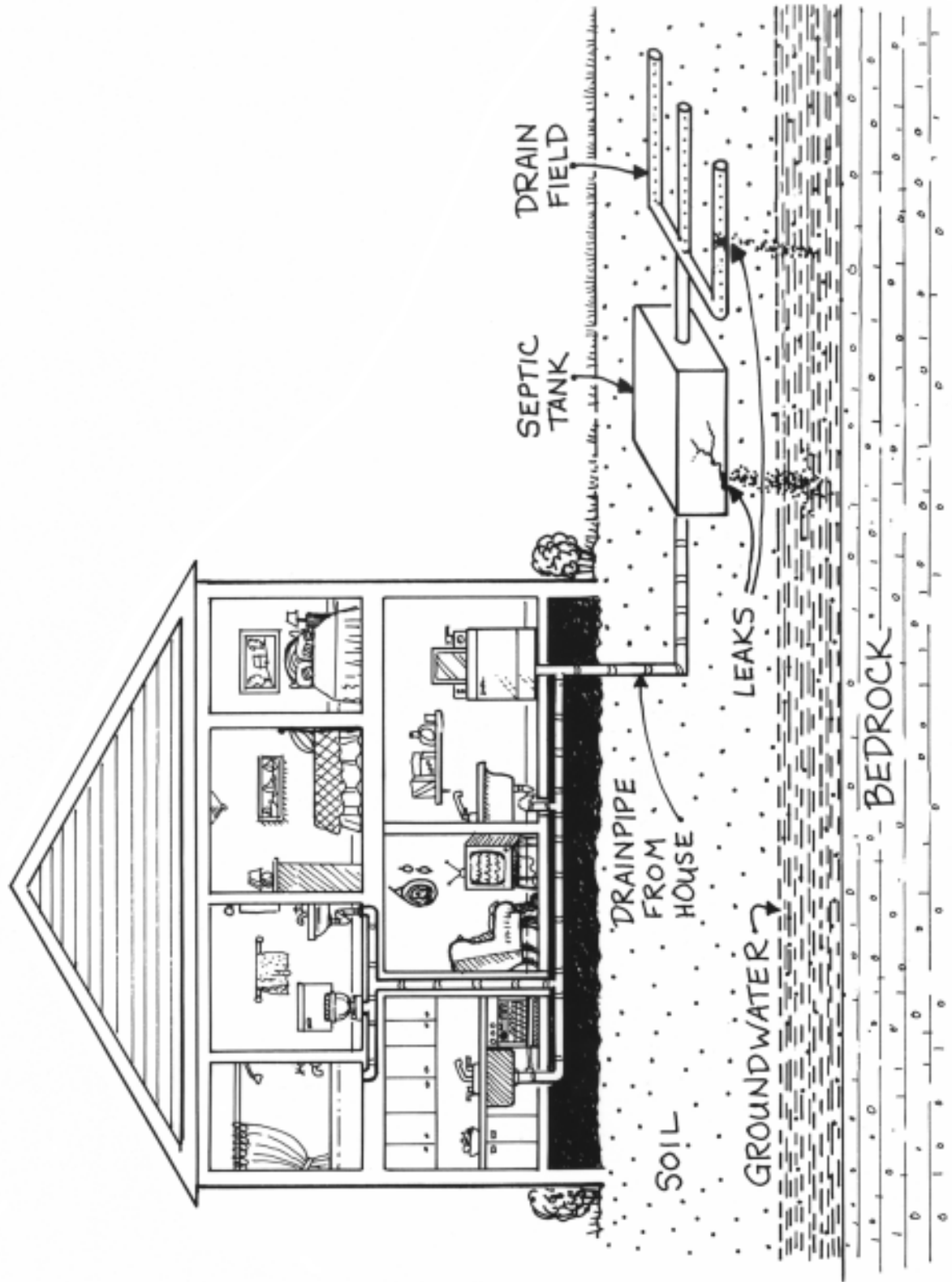
“Is Your Drinking Water Safe?” U.S. Environmental Protection Agency, Washington, DC, 1989.

Lord, John, Hazardous Wastes from Home, Enterprise for Education, Santa Monica, California, 1986. (Address: 132A Santa Monica Mall, Santa Monica, California 90401.)

Tennessee Valley Authority, Environmental Resource Guide: Nonpoint Source Pollution Prevention (Grades 6-8), Air and Waste Management Association, Pittsburgh, Pennsylvania, 1992.

Waste: A Hidden Resource, Tennessee Valley Authority, 1988.

FLUSH YOUR TROUBLES AWAY



FLUSH YOUR TROUBLE TERMS

Match the word to the correct definition.

- | | |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| _____ 1. septic system | a. does not work |
| _____ 2. contamination | b. bacteria found in human and animal wastes |
| _____ 3. groundwater | c. a tank and pipe system where human wastes and household wastewater are piped so that wastes can be broken down by bacteria and water can be cleaned |
| _____ 4. failure | d. water under the ground's surface |
| _____ 5. coliform bacteria | e. an impurity |