



THE USUAL SUSPECTS: GROUNDWATER CONTAMINATION

Objectives:

The student will be able to:

- ◆ Understand how water wells can become contaminated
- ◆ Apply principles of well placement

Suggested Grade Level:
6-8

Subjects:

Science, Social Studies,
Health, Language Arts, Math

Time:

Approximately 30 minutes

Materials:

- well model (NOTE: Use the model constructed in the activity “Wells: A Deep Subject” to demonstrate the concepts in this activity.)
- yellow food coloring
- teacher key (included)

BACKGROUND INFORMATION

The biggest problem facing well water is contamination. Sources of groundwater pollution are leaking underground storage tanks, leaking septic tanks, landfill seepage, animal waste, fertilizer, pesticides, industrial waste, road salt, and some natural contaminants. When a groundwater source is contaminated, it is very difficult and expensive to correct. The best way to protect well water is to prevent contamination from occurring. Wells should be properly located in order to avoid contact with contaminants.

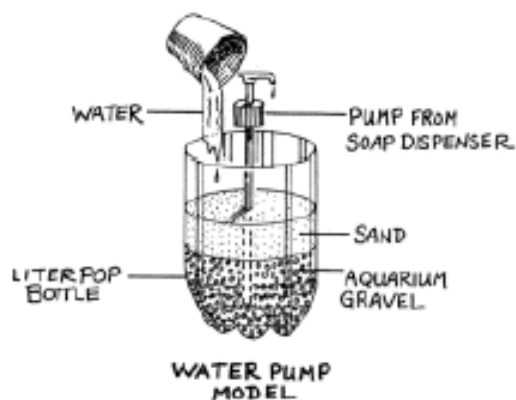
ADVANCE PREPARATION

A. Make copies of student sheets “Well, Well, Well,” and “Well, Well, Well Map” (one of each per student).

B. Prepare a model for a well demonstration or use model already constructed from “Wells: A Deep Subject” activity. If model has not been previously constructed, then:

1. Cut the top off a 2-liter soda bottle.
2. Fill the bottom with 3-4 inches of gravel and sand. Gravel can be purchased in the pet section of many department stores. Pour in 2 to 3 inches (5 to 7.5 cm) of water colored blue with food coloring.
3. Locate a pump from the top of a soap dispenser. Place the pump into the gravel with the tube extending into the water.

(See illustration below)



PROCEDURE

I. Setting the stage

A. Explain what is really important about wells today. About half of the U.S. population gets its drinking water from wells. While most wells are safe, the potential exists for their contamination or pollution.

II. Activity

1. Place the demonstration material and model where all students can observe. The model should be filled with blue water. Explain that you are about to demonstrate how a well can become contaminated.

A. Explain that just as the rainwater or snowmelt can soak down into the groundwater, so can harmful contaminants like agricultural waste, sewage, road salt, and other chemicals.

1. Pour water colored with yellow food coloring into the container.
2. Ask them what happened to the water. (*It changed color when the yellow reached it.*)

B. Explain that while many contaminants can be seen, others cannot. Ask the students to determine how we can tell if well water is contaminated even if we can't see the pollutants. (*by testing the water*)

1. Explain to the students that contaminants are not always of human origin; some are naturally occurring. For example, radioactive radon is found in many areas of the United States. Radon can get into groundwater, making it unsafe to drink. There are tests to determine levels of radon.

2. Distribute copies of "Well, Well, Well" and the accompanying map.

A. Tell the students that one way to keep a well free of contaminants is to select a good site before it is drilled. (NOTE: This lesson does not require that the students consider the direction of groundwater flow, which would be a major consideration in a real case. For age appropriateness, we will only use distance in this exercise.)

B. Instruct the students to read the instructions and guidelines to the handout and select a place to drill the well. Students may draw a symbol to illustrate the well.

C. Check the student responses with the teacher key. (NOTE: The key may be used as a transparency to better illustrate the correct procedures for well placement.)



III. Follow-Up

A. Have the students list at least four possible sources of groundwater contamination.

IV. Extensions

A. Have students contact their local health department for guidelines on digging new wells.

R E S O U R C E S

Banks, M., British Calendar Customs, Volume 1, William Glaiser, Ltd., London, 1937.

“Groundwater Pollution Control,” American Ground Water Trust, Dublin, Ohio, 1990.

Korab, H., Land and Water: Conserving Natural Resources in Illinois, University of Illinois at Urbana-Champaign, Champaign, Illinois, 1989.

Thank you to the Environmental Protection Agency *Water Sourcebook* for this activity!

http://water.epa.gov/learn/kids/drinkingwater/wsb_index.cfm

Student Sheet

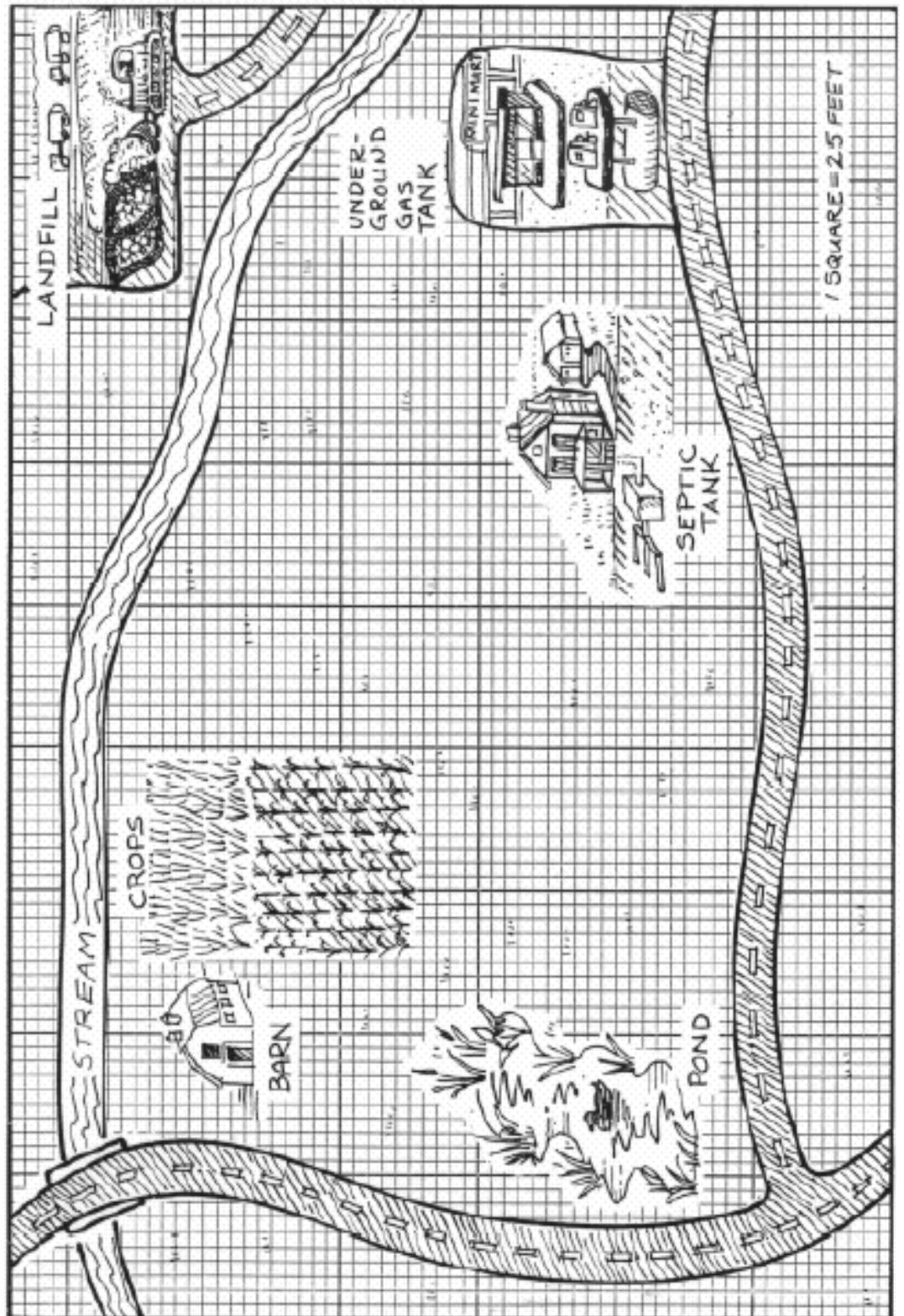
WELL CONTAMINATION

Object: You must find a place to drill a water well where it is least likely to be contaminated.

Guidelines:

1. Each block equals 50 feet.
2. The following are things you will find on the map and the distance the well must be away to avoid possible contamination.
 - a. a house with a septic tank and lines (50 feet)
 - b. an underground gas tank (200 feet)
 - c. a pond and a stream (200 feet)
 - d. a barn used to store animal feed, manure, fertilizer, and chemicals for farming (200 feet)
 - e. crop fields which are sprayed with fertilizer and pesticides (200 feet)
 - f. roads that produce runoff and road salts are used (200 feet)
 - g. a landfill (200 feet)
3. If you are unsure about the distances, play it safe and go to the long side of your measurement.
4. Mark the place on your map where you think the well should be dug. You may even want to draw a picture to illustrate your site, like a windmill, bucket well, or a gush of water.

Student Sheet



Answer Key

