

Lesson # 3:

AQUIFER AND GROUNDWATER POLLUTION

Through the activities below, students will learn how water is stored underground, and how it can become contaminated by common land use activities.

Activity #1—Build Your Own Aquifer

See attached handout, or go to:

<http://www.epa.gov/adopt/patch/html/aquifer.html>.

Also, see the following video for detailed activity instructions:

http://www.epa.gov/safewater/kids/flash/flash_aquifer.html

Teacher Preparation: This activity is “hands-on” learning and requires teacher planning and preparing materials. Please review the attached handout closely and watch the video in preparing for the activity. A group or team of students building an aquifer might be one way to complete this activity. Students will learn how water is stored in an aquifer, how groundwater can become contaminated and how this contamination ends up in a drinking water well. This is achieved by layering various “aquifer materials” to illustrate soils and geologic layers, and pumping water through the aquifer with a well.

Student Discussion Questions:

1. What is permeability and how does it relate to groundwater traveling through soils? What is porosity and how does it relate to the amount of groundwater storage in the aquifer?
2. What is infiltration? How do contaminants begin at the land surface and travel to the groundwater aquifer?
3. What is a confining layer? How does a confining layer help prevent movement of contaminants from the land surface? Was the aquifer in the experiment a confined or an unconfined aquifer? Explain why.
4. What would need to be changed in the experiment to make the aquifer used as a confined aquifer? (Answer: Extend the clay completely across the bottom and not allow surface water and contaminants to enter the aquifer below.)

5. As the experiment shows, aquifers directly connected to surface water or land surface are extremely vulnerable to contamination. How might confined aquifers be contaminated? (Answer: old unsealed wells. Need to seal wells that are no longer in use.)
6. Think about the difference between confined and unconfined aquifers. Which would you prefer as your source of drinking water? Why?

Activity #2:

See attached handout, or download the word find puzzle at:
http://www.groundwater.org/kc/docs/groundwater_word_search.pdf

This activity will encourage the students to use the groundwater related terms discussed in previous activities to complete the word-find puzzle.

Key terms:

Aquifer - A geologic formation that is water bearing. Aquifers are associated with being able to supply enough water for consumption.

Confining layer - A layer of impermeable material (clay, for example) over an aquifer that prevents substances (water or contaminants) from passing through.

Infiltration – Water that soaks into the ground. Contaminants can soak into the ground with surface water and contaminate ground water.

Permeability - A measure of the ability of a material (such as soils or rocks that make up an aquifer) to transmit fluids such as water or contaminants.

Porosity – The percentage of pore space in a volume of soil. Porosity influences how much water can be stored in aquifers.

Precipitation – Rain, snow, sleet, hail.

Surface runoff - The flow of water, from rain, snowmelt, or other sources, over the land and is a major component of the water cycle.

Well – A drilled, driven or bored shaft or dug hole constructed for the purposes of withdrawing water from an underground aquifer.