



Ground Water Contamination

What is ground water contamination?

Objective: Learn about ground water contaminants and their sources

Grades: 3-6

Materials:

- Ground water contamination animation
- Large beaker
- Gravel
- Paper Cup
- Syringe & Tubing
- Red food coloring

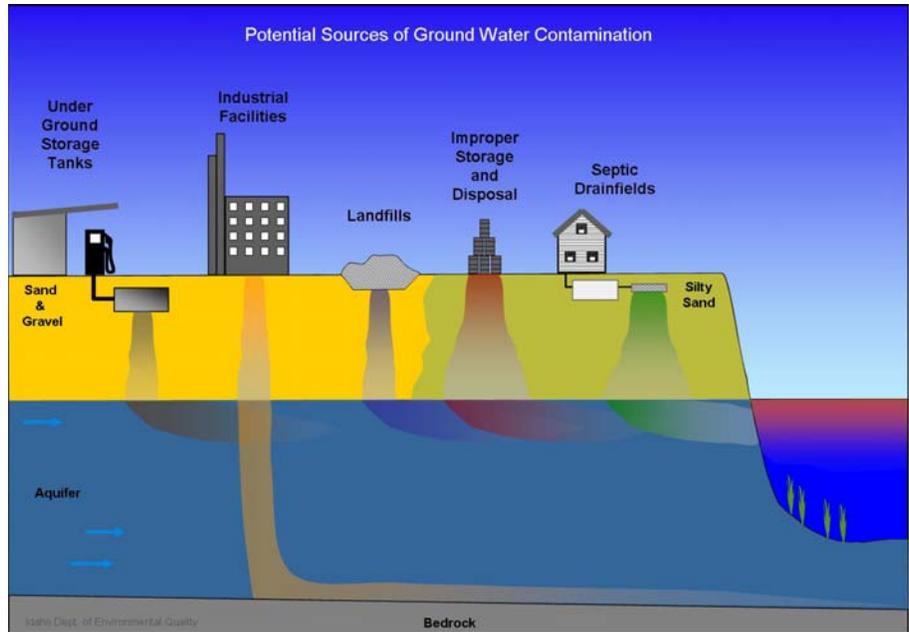
Ground Water Contamination:

Naturally occurring ground water commonly has certain types of minerals dissolved in it. The minerals give the water some flavor and make it safe to drink. If ground water has chemicals from human activity, it is said to be **contaminated**. If there is too much of one kind of chemical, the water may not be safe to drink.

Where do these chemicals come from? Humans use many different materials that contain chemicals. These materials are often stored in large tanks if they are liquids. Chemicals in solid form are often mixed with water. Some sources of ground water contamination from chemicals include:

- underground storage tanks
- industrial facilities
- landfills
- improper storage or disposal of chemicals
- septic drainfields

If liquids or solids that contain chemicals are not used or stored



properly, the chemicals can leak into the soil and eventually into ground water. Some contaminants float on top of the water table and slowly mix with the ground water. Some contaminants sink to the bottom of the aquifer and slowly mix with the aquifer.

Underground storage tanks are commonly used to hold thousands of gallons of gasoline at gas stations. Old tanks may

start to rust and corrode and eventually contain holes. Gasoline leaking from underground storage tanks can contaminate the ground water.

Industrial facilities or companies often use large quantities of chemicals. Sometimes there are accidental spills of chemicals. It used to be common to dispose of used chemicals into nearby rivers and streams which could eventually seep into ground water.



Leaking underground storage tank



Industrial Discharge

Ground Water Contamination

What is ground water contamination?

Landfills are places where household wastes go. Some household wastes contain chemicals that could be dangerous. If the household waste is allowed to sit outside, chemicals may seep into the ground underneath. Most landfills have a layer underneath of low permeability (see ground water lesson plan) to keep chemicals from seeping into the ground water. Often after the waste is dumped, a layer of soil with low permeability will be placed on top to keep rain water from seeping into the waste and carrying chemicals into the soil. Some cities have special hazardous waste drop-off locations for residents to bring hazardous chemicals instead of throwing them into the garbage, where they end up in the landfills.



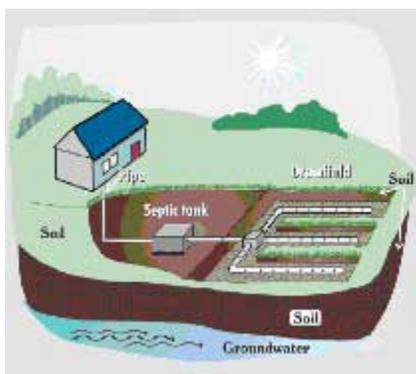
Landfill

Improper storage and disposal of chemicals may allow them to seep or leak into the soil and contaminate the ground water. Chemicals should always be stored in sturdy, closed containers and the containers kept inside on floors that will hold any spills or leaks if they occur.

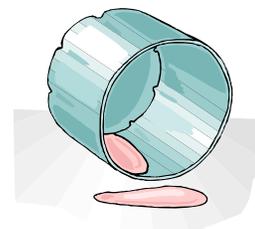


Rusty and Leaking Drums

Septic drainfields are used to dispose of wastewater from houses into the ground. If built and maintained properly, the septic system will keep most contaminants out of the ground water. If a septic system fails or is not built properly, then it may introduce contaminants like bacteria or viruses into the ground water. When homeowners pour chemicals down the drain rather than taking them to hazardous waste drop-off locations, the chemicals will go to the drainfield and seep into the ground water. If there is a water well nearby, the bacteria, viruses or chemicals coming from the drainfield may end up in someone's drinking



Septic System



Exercises:

1. Download the drinking water animation at <http://www.deq.idaho.gov/rathdrumprairieaquifer>.
2. On page 3, fill in all the blanks describing the potential sources of contamination. Name other sources of contamination.
3. Find out where your local hazardous waste drop-off locations are. What types of household materials are considered hazardous wastes?
4. Go to <http://www.epa.gov/epahome/commsearch.htm> and type in your zip code. Find out what facilities in your area handle and store hazardous materials. What types of hazardous materials do they use?

Ground Water Contamination

What is Ground Water Contamination?

5. Construct an aquifer by ;

1. Place the one tube into the beaker so the bottom of the tube is near the bottom of the beaker
2. Place about 2-inches of gravel in the large beaker, and another one-inch of sand on top of the gravel. This is your aquifer.
3. Gently pour enough water into the beaker so that the water has filled the gravel.
5. Connect a syringe to the ends of the tube. This is a water well.

Start pulling water out of the gravel with the syringe.

What color is the water?

Now punch some holes in the bottom of a paper cup and place it on top of the sand. Fill the cup with a mixture of water and food coloring.

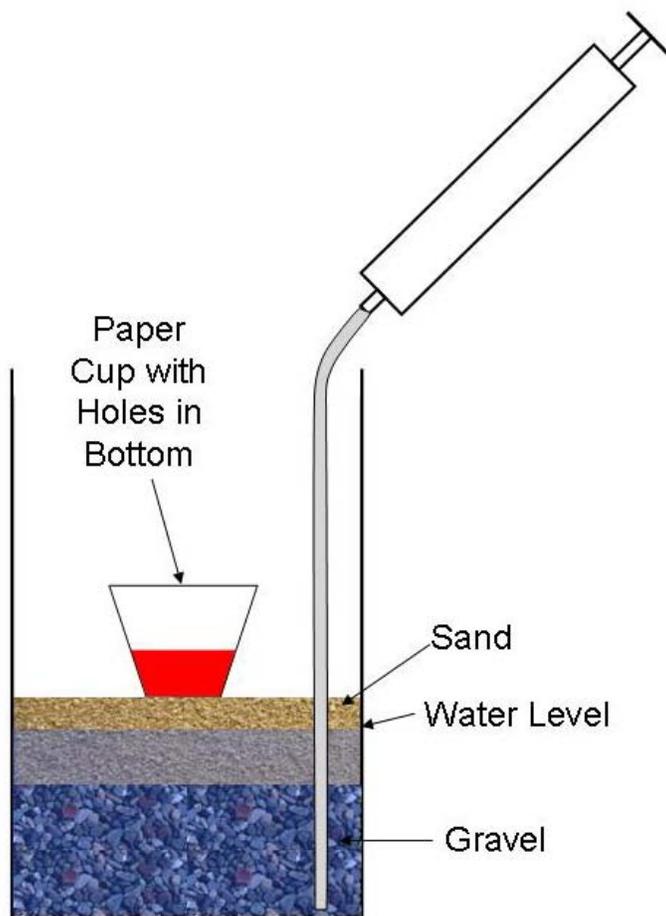
What happens to the colored water in the cup?

What kind of contamination source might this be?

After 20 or 30 minutes pull another water sample using the syringe.

What color is the water?

What controls how the contaminant might travel to the aquifer?



DRAFT

CERTIFICATE OF COMPLETION AQUIFER EDUCATION

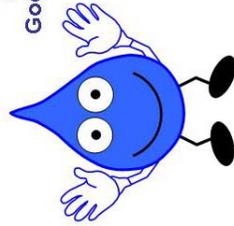


THIS CERTIFICATE IS AWARDED TO

SCHOOL

IN RECOGNITION OF COMPLETING LESSON 4

Congratulations
and
Good Job!



Teacher

Date