

Unit 3: What's in the Groundwater?

Now you know where groundwater is and how it moves from place to place.

All the moving around that groundwater does means that other substances can move through the ground, too.

THIS PART'S IMPORTANT: As groundwater moves through the earth, it takes with it all sorts of things.

Some of the groundwater's traveling companions, such as bacteria and viruses, may make us sick. Some, such as minerals, may make the water taste good or awful. And some, like industrial pollutants, may be long-term health hazards.

Good grief! How do all these things get into OUR groundwater?

They come from all over the place. Some occur naturally, but there are lots of man-made sources, too: faulty septic tanks or sewer systems; overly enthusiastic fertilizing of farms, lawns and gardens; runoff from roofs, streets and parking lots; animal manures; chemicals dumped by industries; leaking oil and gasoline tanks; landfills and garbage dumps; mining processes. . . .

First, the sources that occur without the help of mankind: groundwater picks up some substances just by filtering through the ground. Water dissolves calcium, iron, sodium, fluorine, manganese, magnesium, sulfur -- among other elements -- out of the rocks it flows through.

Demonstration 3: groundwater acidity

PURPOSE: To observe how the decay of vegetation affects the acidity of groundwater.

MATERIALS: • stream table or box with garbage bag liner • water • sand • food
• watering can or plant mister • pH paper

PROCEDURE: If you don't have access to a stream table, line a sturdy cardboard box with a plastic garbage bag. Punch a hole in one corner of the box and liner for water to drain through.

Fill the box with sand. Place some food in the sand (you could use something from a fast food place or from the school cafeteria). Stir the food and sand so that half of the food is under the sand and half is above "ground."

Tilt the box slightly so that the drainhole is the lowest point. (Prop up the highest corner.) Water the food and sand daily. Collect the water draining out of the box and test it with pH paper each day. Continue until the food is mostly gone.

Record pH level for every day.

CONCLUSION: As the food decomposes, the acid

level rises. Water percolating through the decomposing food picks up acids and leaches them into the water you collected for testing.

DISCUSSION: Decaying plant matter in the soil undergoes the same process. The change in the water's acidity changes the water's ability to dissolve some rocks and minerals (like limestone) underground.

QUESTIONS:

1. What does the decaying food represent in a natural (earth) system?
2. What connection was there between the decaying of the food and the change in the pH level of the water that had rained through the box?
3. Could changes in seasons cause differences in the level of groundwater acidity?
4. Collect some water samples from various sources (well water, water from a municipal water system, water from a creek, water from a mud puddle, rainwater). Test the pH level of each. Why do they have different levels?