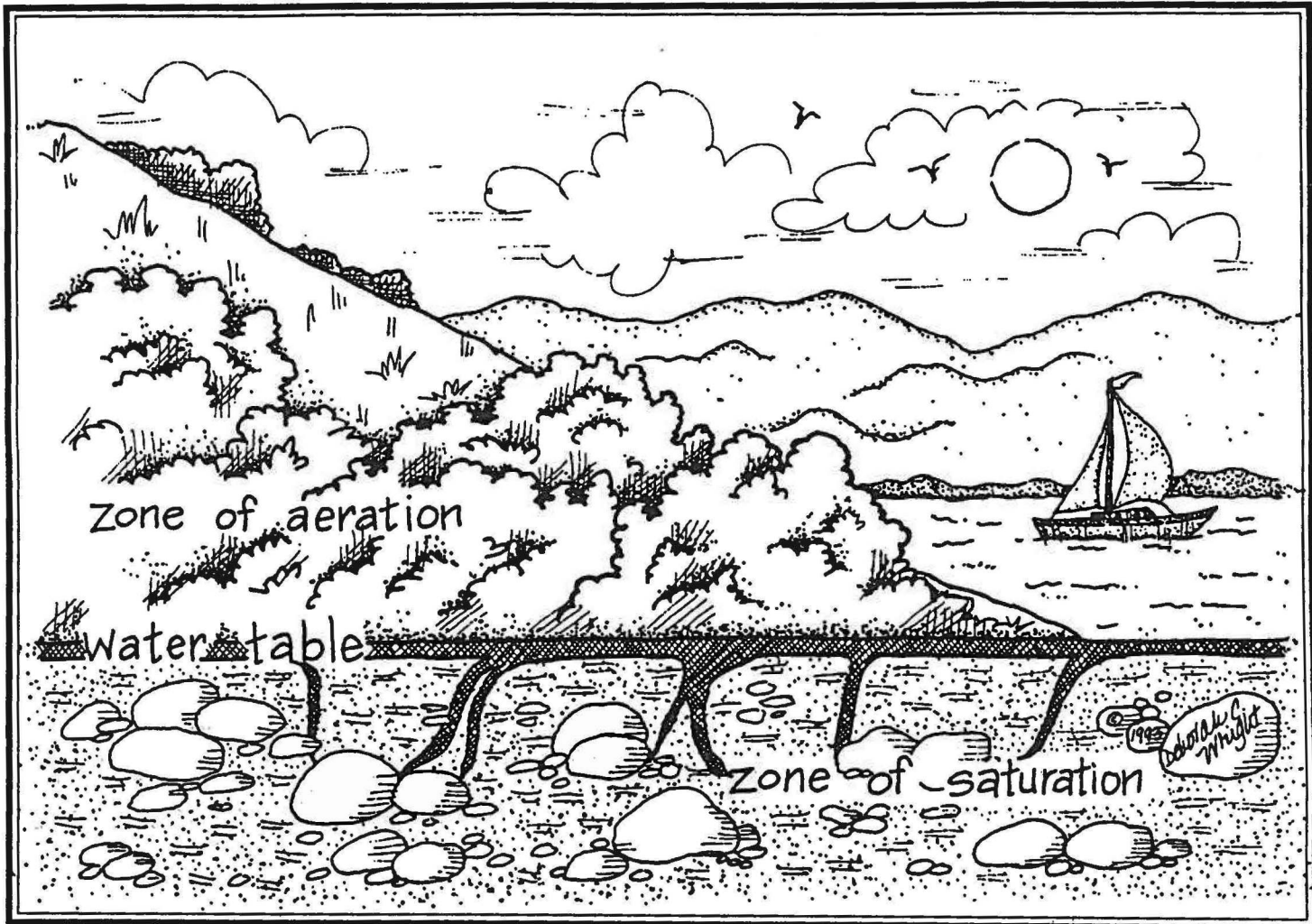


# #3 - Subterranean Waters



## Focus Question:

What is a water table?

## Objective:

The students will simulate a water table.

## Suggested Grade Level:

Grades 5-8

## Materials Needed:

- bricks
- rectangular kitchen sponges about 3/4"-1" thick
- straws
- large baking pan
- aluminum foil
- a supply of gravel/sand

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## Overview:

One of the unique resources of our planet is water. Water is a link to all life. Created during the turbulent first billion years of our planet's life this unique combination of oxygen and hydrogen is vital to life on earth. The water that exists now is all that we will ever have! Understanding its characteristics and studying its movement is the science of hydrology. The constant exchange of water in its various forms is the water cycle. Rising as water vapor and condensing as different forms of precipitation, water has cycled endlessly for trillions and trillions of years. The same water we use today was part of some ancient sea millions upon millions of years ago. There is some water under the earth's crust almost everywhere. Hydrologists can find water in the most humid and arid areas of the planet. To locate water the scientist studies the rocks. He or she studies a geologic map that shows where different rocks come to the surface and how they are arranged beneath the surface. Ground water will percolate downwards until it can no longer fill pores and gaps in subsurface rock. The water then saturates a layer. It is into this layer that wells are dug. The water table is the top of this saturated layer of rock. Below the water table all the openings — crevices, crannies and pores—are completely full of water.

## Procedure:

- 1) Place a bed of gravel or sand about 1" deep in a large baking pan.
- 2) Lay bricks across the baking pan.
- 3) Cut several pieces of aluminum foil to lay over the surface of the bricks.
- 4) Cut the kitchen sponges and cover the surface of the aluminum foil.
- 5) Place another layer of bricks on top of sponges.
- 6) Pour water over bricks and observe.
- 7) The sponges will absorb water.
- 8) Water that is not absorbed by the sponges will seek a path through the aluminum foil and trickle down to the gravel/sand layer.
- 9) Insert a straw into the sponge layer simulating a well.

## Conclusion:

This simulation represents the physical characteristics of the water table. It is very hard to picture underground water. Often we think of vast dark subterranean rivers or dark cold lakes beneath our feet. In most cases this is erroneous. There are lakes and streams that do course through caverns and caves, however, the majority of all ground water on earth is held in the saturated zones of rock known as water tables. Porosity and permeability decrease as depths increase. Generally, wells are not drilled deeper than 2000 feet. Below that depth the pores and cracks in the rocks have been closed by the weight of overlying rock. When rain falls, water enters the ground and the water table rises. In times of drought, the water table declines. Ground water creating the water tables generally moves horizontally or downhill, however, in some cases it can move uphill if the water is confined between layers of very dense rock. Artesian wells are unique in that they are the result of a "puncture" in a water table squeezed between layers of impermeable rock. The release of pressure will cause the water to rise above the layer of the aquifer.

## Further Investigations:

- 1) Students should contact their local soil scientist to discuss the various characteristics of ground water found in their neighborhoods.
- 2) Students may research well drilling companies and ask permission to do a site investigation. Lists of specific equipment unique to well drilling operations might prove valuable to the class.
- 3) Students might design a brochure outlining the safety tips for playing in "well country." Seek assistance from local sanitation authorities or health department.