NACD Stewardship – Water Is Life
National Association of Conservation Districts (NACD)

Words and definitions to use with the Where's the Groundwater?
Activity on page 13

of the NACD Educators Guide Water Is Life.

To download the guide click here

http://www.nacdnet.org/stewardship/2008/

Additional materials such as student booklets, watershed map and more can be purchased
At http://www.nacdstore.org/

You may print off the words and definitions to use as part of the activity.

Card stock paper works well.
You can print the word on one side and the definition on the other.
Or print them on separate pieces of paper.
Use like flashcards for presentations and or place around room or give to student to read to group.

Word and definition list:
aquifers
surface water
groundwater
saturation zone
water table
recharged
infiltrates

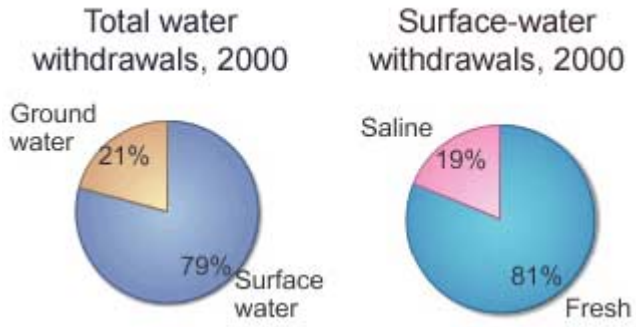
aquifers

One of our most valuable resources is the water beneath our feet - something you can't see and may not even know is there!
When a water-bearing rock readily transmits water to wells and springs, it is called an **aquifer**.
Aquifers consist of layers of sand, gravel and rock.

Precipitation eventually adds water (recharge) into the porous rock of the aquifer. The rate of recharge is not the same for all aquifers, though, and that must be considered when pumping water from a well. Pumping too much water too fast draws down the water in the aquifer and eventually causes a well to yield less and less water and even run dry. In fact, pumping your well too fast can even cause your neighbor's well to run dry if you both are pumping from the same aquifer.

Source: http://ga.water.usgs.gov/edu/earthgwaquifer.html

surface water



Water that is located above ground, like rivers and lakes, is called **surface water.**

The water in the nation's rivers, streams, creeks, lakes, and reservoirs are vitally important to our everyday life. The main uses of surface water include drinking-water and other public uses, irrigation uses, and for use by the thermoelectric-power industry to cool electicity-generating equipment. The majority of water used for thermoelectric power, public supply, irrigation, mining, and industrial purposes came from surface-water sources. Of all the water used in the United States in 2000 (about 408 billion gallons per day (Bgal/d), fresh and saline), over 79 percent (387 Bgal/d) came from surface-water sources. Water from ground-water sources accounted for the remaining 21 percent. Over 80 percent of all water used in 2000 was freshwater, although saline water was heavily used in the thermoelectric-power industry, and, to a lesser extent, for industrial and mining purposes.

Source: http://ga.water.usgs.gov/edu/wusw.html

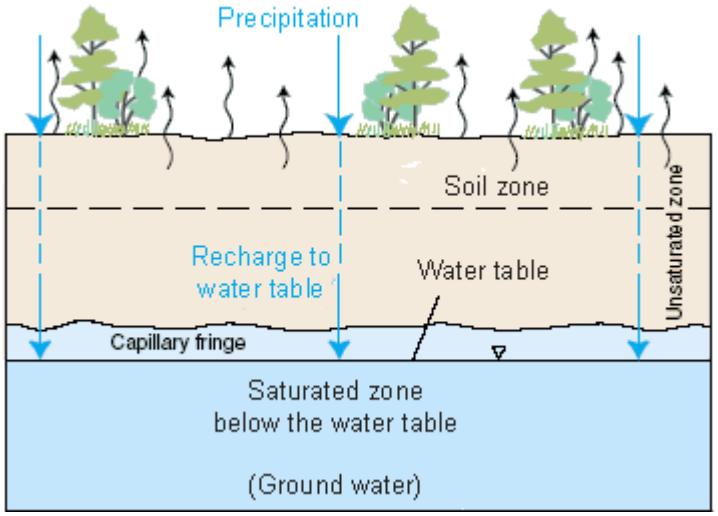
groundwater

Water below the ground's surface is called **groundwater**.

Ground water is the part of precipitation that seeps down through the soil until it reaches rock material that is saturated with water. Water in the ground is stored in the spaces between rock particles (no, there are no underground rivers or lakes). Ground water slowly moves underground, generally at a downward angle (because of gravity), and may eventually seep into streams, lakes, and oceans.

Source: http://ga.water.usgs.gov/edu/earthgw.html

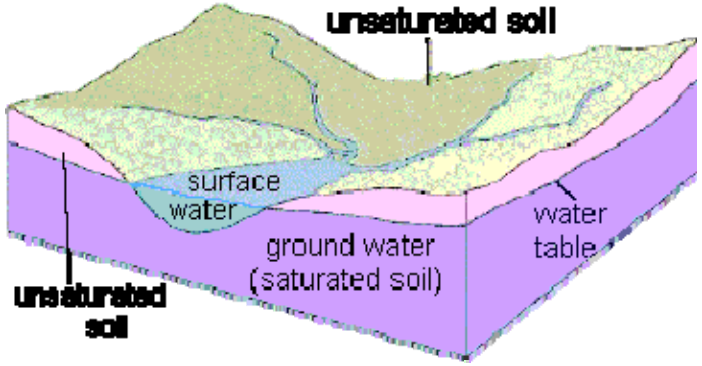
saturation zone



As precipitation infiltrates into the subsurface soil, it generally forms an unsaturated zone and a **saturated zone**. In the unsaturated zone, the voids—that is, the spaces between grains of gravel, sand, silt, clay, and cracks within rocks—contain both air and water. Although a lot of water can be present in the unsaturated zone, this water cannot be pumped by wells because it is held too tightly by capillary forces. The upper part of the unsaturated zone is the soil-water zone. The soil zone is crisscrossed by roots, openings left by decayed roots, and animal and worm burrows, which allow the precipitation to infiltrate into the soil zone. Water in the soil is used by plants in life functions and leaf transpiration, but it also can evaporate directly to the atmosphere. Below the unsaturated zone is a saturated zone where water completely fills the voids between rock and soil particles.

Source: http://ga.water.usgs.gov/edu/watercycleinfiltration.html

water table



From USGS – Water Science for Schools

Here is a simplified diagram showing how the ground is saturated below the water table (the purple area). The ground above the **water table** (the pink area) may be wet to a certain degree, but it does not stay saturated. The dirt and rock in this unsaturated zone contain air and some water and support the vegetation on the Earth. The saturated zone below the water table has water that fills the tiny spaces (pores) between rock particles and the cracks (fractures) of the rocks.

recharged

Natural refilling of deep aquifers is a slow process because ground water moves slowly through the unsaturated zone and the aquifer. The rate of **recharge** is also an important consideration. It has been estimated, for example, that if the aquifer that underlies the High Plains of Texas and New Mexico—an area of slight precipitation—was emptied, it would take centuries to refill the aquifer at the present small rate of replenishment. In contrast, a shallow aquifer in an area of substantial precipitation such as those in the coastal plain in south Georgia, USA, may be replenished almost immediately.

People all over the world make great use of the water in underground aquifers all over the world. In fact, in some places, they pump water out of the aquifer faster than nature replenishes it. In these cases, the water table, below which the soil is saturated and possibly able to yield enough water that can be pumped to the surface, can be lowered by the excessive pumping. Wells can "go dry" and become useless.

In places where the water table is close to the land surface and where water can move through the aquifer at a high rate, aquifers can be replenished artificially. For example, large volumes of ground water used for air conditioning are returned to aquifers through recharge wells on Long Island, New York. Aquifers may be artificially recharged in two main ways:

- **Rapid-infiltration pits:** One way is to spread water over the land in pits, furrows, or ditches, or to erect small dams in stream channels to detain and deflect surface runoff, thereby allowing it to infiltrate to the aquifer
- **Ground-water injection:** The other way is to construct recharge wells and inject water directly into an aquifer

Source: http://ga.water.usgs.gov/edu/watercycleinfiltration.html

infiltrates

Anywhere in the world, a portion of the water that falls as rain and snow **infiltrates** into the subsurface soil and rock. How much infiltrates depends greatly on a number of factors. Infiltration of precipitation falling on the ice cap of Greenland might be very small, whereas, a stream disappearing into a cave in southern Georgia, USA can act as a direct funnel right into ground water!

Some water that infiltrates will remain in the shallow soil layer, where it will gradually move vertically and horizontally through the soil and subsurface material. Eventually, it might enter a stream by seepage into the stream bank. Some of the water may infiltrate deeper, recharging ground-water aquifers. If the aquifers are porous enough to allow water to move freely through it, people can drill wells into the aquifer and use the water for their purposes. Water may travel long distances or remain in ground-water storage for long periods before returning to the surface or seeping into other water bodies, such as streams and the oceans.

Source: http://ga.water.usgs.gov/edu/watercycleinfiltration.html