**Ground Water**

1. Ground water represents infiltration of about 15% of the precipitation falling to the earth, accounts for .61% of the world's water, and is second only to glaciers as a source of freshwater.  
  
2. **Porosity** is the percentage of a rock's volume comprised of openings and it measures the rock's ability to hold water. Most rocks hold some water in either pores or joints, but porosity is highly variable. **Permeability** measures the capacity of a rock to transmit fluids such as water. The permeability rate is the speed at which fluids will flow through a material.  Larger the particles - the faster the permeability rate.  Many porous rocks are permeable, but shale has high porosity and low permeability.  Porosity determined by shape, packing and sorting of loose materials --- NOT SIZE.  Greater Porosity:  well rounded particles, loosely packed particles, and sorted particles.

3. Water infiltrates down under the influence of gravity.  Earth’s surface is divided into 2 zones:  **zone of aeration** (pores are partly filled with air and water) and **zone of saturation** (pores are filled with water).  The interface between is called the **water table.**The depth of the water table varies with the amount of infiltration.  Water is drawn by **capillary action** from the saturated zone into the unsaturated zone.  Capillary action causes water to move up against gravity.  The smaller the pores - the higher the capillary action.  The subsurface water below the water table is called **ground water.**

4.  Aquifers are porous and permeable rock bodies through which ground water moves easily.   Springs form where the water table intersects the surface.  Hot springs have ground water warmer than the human body. Heating of the water is by either proximity to a magma chamber, or through the geothermal gradient. Geysers erupt periodically because of constrictions in conduits to the surface allow the temperature of the ground water to rise to vapor, which then condenses as the eruption proceeds. Geothermal energy is derived from hot ground water through the production of electricity from natural steam.

5. Rain can leach surface contaminants and move them into ground water. Human activity produces potential pollution from pesticides, herbicides, fertilizers, heavy metals and toxic compounds, bacteria, viruses and parasites from animal, plant and human waste, acid mine drainage, and radioactive waste (both low level and high level). Gasoline may float on the water table. Some pollutants are naturally occurring. Some filtration and purification can be expected through ground water flow, if it is slow. Heavily pumped wells near coasts can be contaminated by saltwater intrusion.

6. Dropping water tables create problems with supply and subsidence, through compaction. Artificial recharge may offset these problems.

7. Natural ground water is slightly acidic because of dissolved carbon dioxide from the atmosphere or soil gases. Its contact with calcite in limestone causes solution forming caves, sinkholes and karst topography. Calcium and bicarbonate in solution can be precipitated as calcite in the form of stalactites and stalagmites.