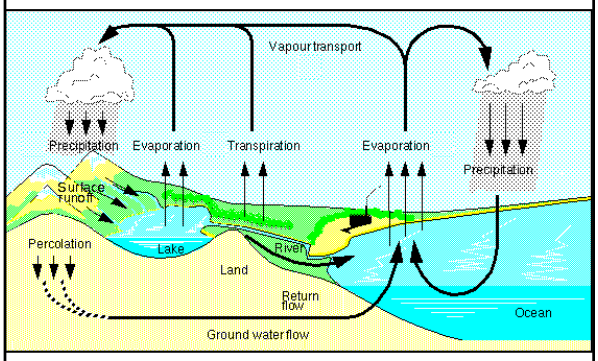
Water Resources
Chapter 11-1

The Water Cycle

- Water molecules travel between the Earth's surface and the atmosphere.
  - Evaporation: Liquid to gas as water moves up in the atmosphere
  - Factors that impact evaporation rate…
  - Transpiration: evaporation from leaves
  - Condensation: Gas to liquid as water cools and forms cloud droplets (clouds)
  - Precipitation: condensed water falls back to the atmosphere as rain/snow etc.



Courtesy Erich Roeckner, Max Planck Institute for Meteorology

The Earth's Water

- Surface Area
- 71% covered by water
- 97% is salt water
- 3% fresh water
- Of all fresh water, 77% is frozen in ice caps
- Small % is liquid fresh water we can use

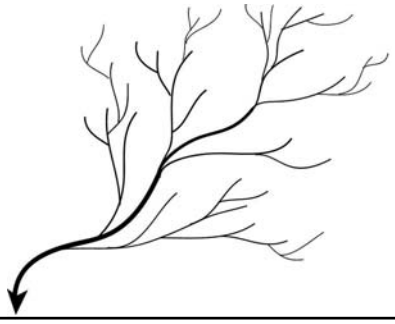
What is Surface Water?

- Surface water - fresh water on the Earth's surface.
  - Found in lakes, rivers, streams, wetlands
- plays an important role in the development of societies.
  - People build towns and farms near water.
  - Large cities still depend on rivers for their water supply.
  - Rivers are used for boating, fishing and power.

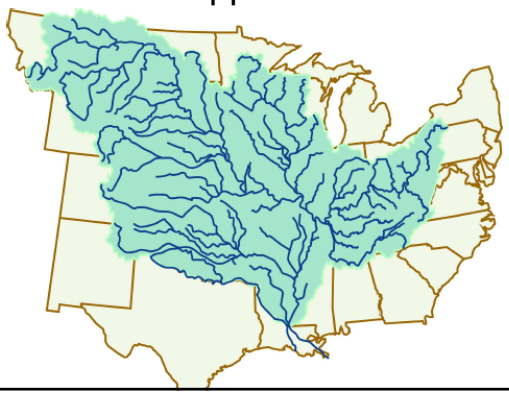
Surface Water

- River Systems - formed as rivers move across land.
  - Rivers are formed from streams combining. How are streams formed?
  - More streams = bigger rivers
  - Examples of large river systems
    - the Mississippi
    - the Amazon (largest in the world).
- Watersheds - land that is drained by a river.
  - Pollution in a watershed can pollute a river.

Watershed Dendritic Drainage Pattern



Mississippi Watershed

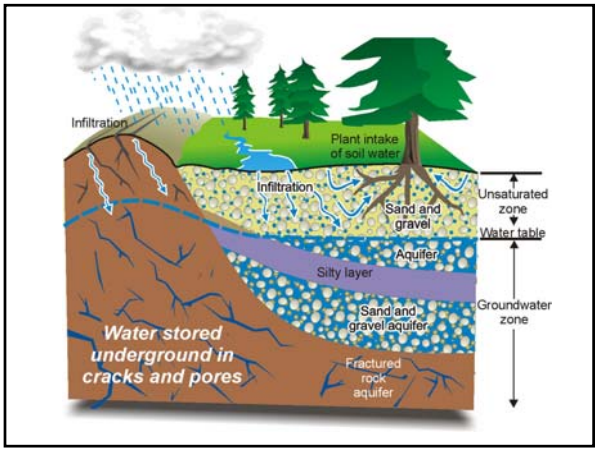


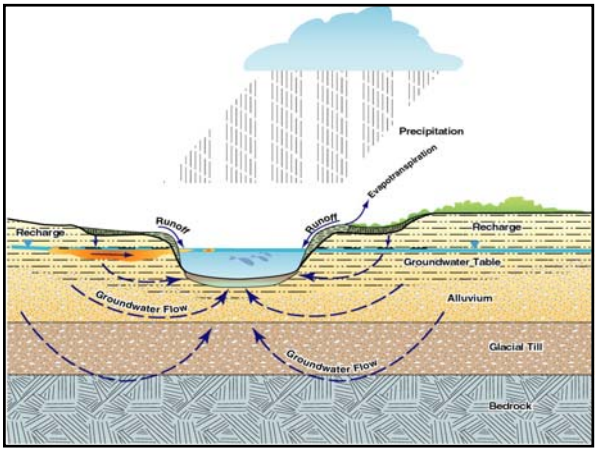
What is Groundwater?

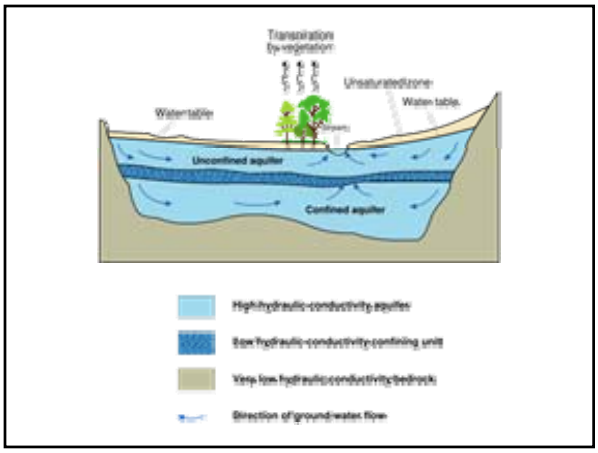
- Groundwater - water stored beneath Earth's surface in sediment and rock formations.
  - Water table - the level where the rocks and soil beneath the surface are saturated with water.
  - The water table depth varies depending on the region it is in.
    - Ex.?

Groundwater

- Aquifers - underground formations that contain groundwater. (holds it like a sponge)
  - The water table forms the upper boundary of the aquifer.
  - Most aquifers consist of rock, sand and gravel (places where water can accumulate).
  - Groundwater can dissolve stone in aquifers forming caves filled with water.
  - Aquifers are a source of water for many cities and for agriculture.

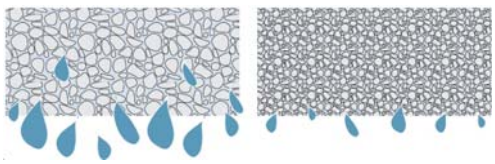






Groundwater

- Porosity
  - The amount of space between the particles that make up a rock
  - The more porous a rock is, the more water it can hold.
- Permeability
  - The ability of rock or soil to allow water to flow through it.
  - Gravel is permeable. Clay or granite are impermeable.



Groundwater

- The Recharge Zone -the area of the Earth's surface where water percolates down into the aquifer.
  - They are environmentally sensitive because pollution in the recharge zone can affect the aquifer.
- Wells are holes that are dug or drilled to reach groundwater.
  - Reliable source of fresh water
  - Soil filters pollutants from water