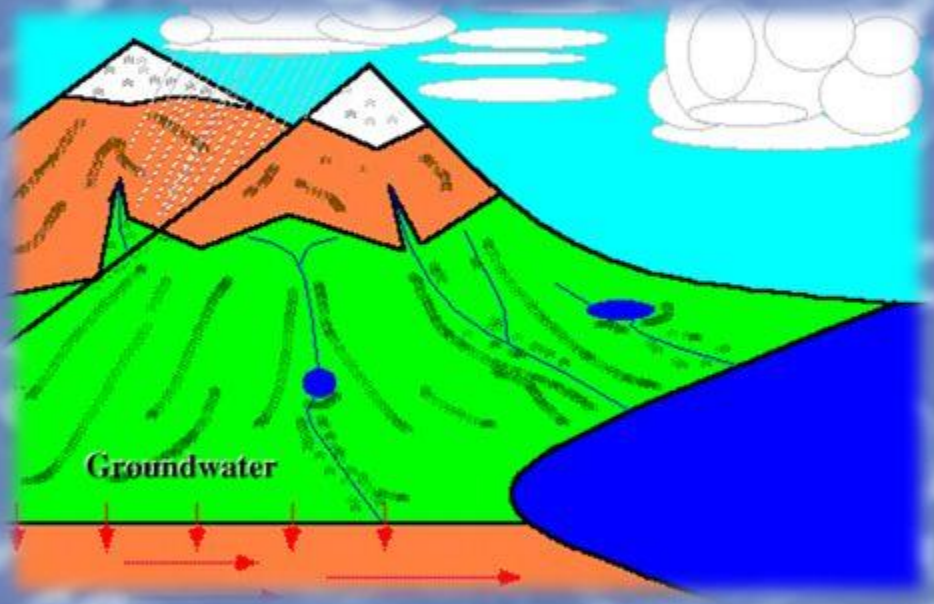
Groundwater

Parent note:

Students will have to give the simple definition for ground water. See their notes on the PowerPoint presentation.

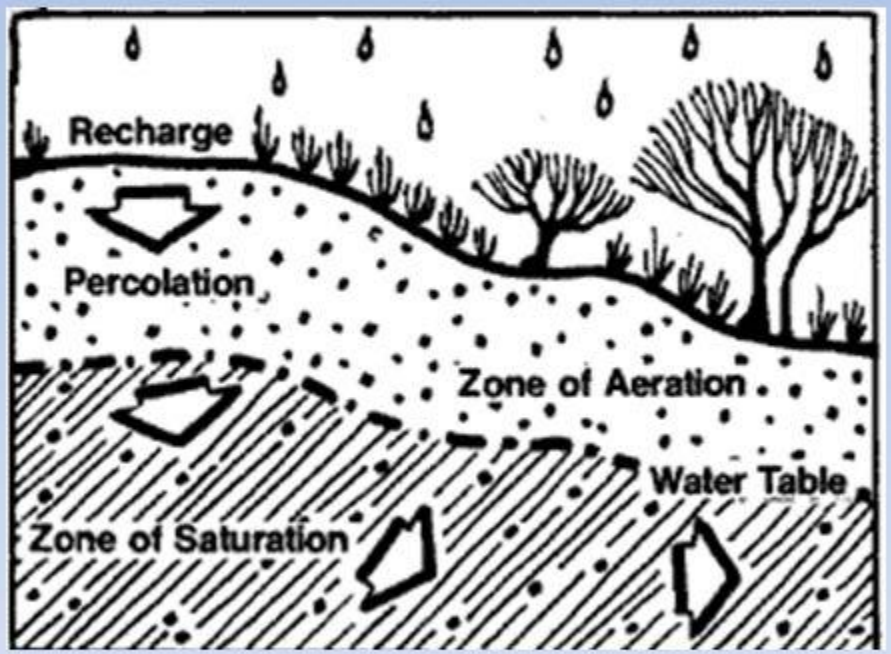
Groundwater is water that exists in the pore spaces and fractures in rock and sediment beneath the Earth's surface. It originates as rainfall or snow, and then moves through the soil into the groundwater system, where it eventually makes its way back to surface streams, lakes, or oceans.



Water that is underground, but is not as deep as the water table.

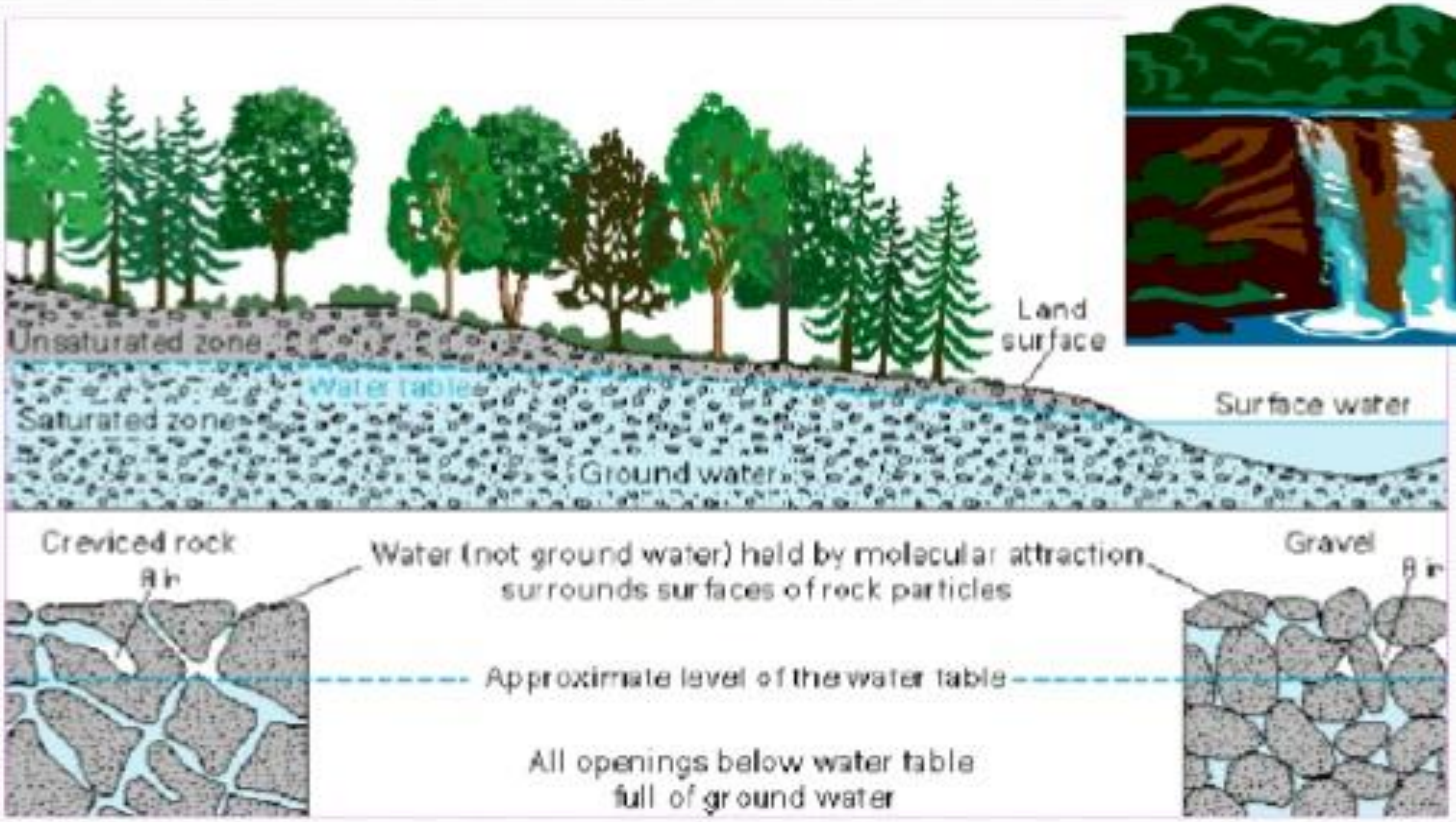
Groundwater Zones

- There are two zones
  - The zone of aeration has water and air filling pore spaces between rock and soil particle.
  - The zone of saturation has only water filling pore spaces between rock and soil particles.
- The top of the zone of saturation is called the water table.
- An aquifer is an underground layer of rock or soil that contains water



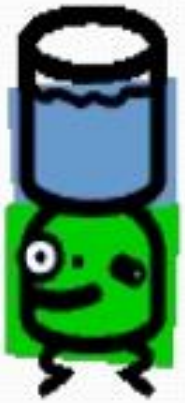
WATER TABLE & ITS SCOPE

Water table is said to be water which is saturated under ground from rain/rivers...
This leads to extraction of ground water to consume more water by humans..



REASONS FOR DEPELITION OF WATER TABLE

- Deforestation & Scanty Rainfall
- Excessive consumption by increasing population
- Decrease in SEEPAGE area
- Excessive usage by agricultural activities
- Increase in industries & Searching of minerals and metallic elements



Solutions: Groundwater Depletion, Prevention and Control

Solutions

Groundwater Depletion

Prevention

Waste less water

Subsidize water conservation

Limit number of wells

Do not grow water-intensive crops in dry areas

Control

Raise price of water to discourage waste

Tax water pumped from wells near surface waters

Set and enforce minimum stream flow levels

Divert surface water in wet years to recharge aquifers

Fig. 13-12, p. 327

What is a sinkhole?

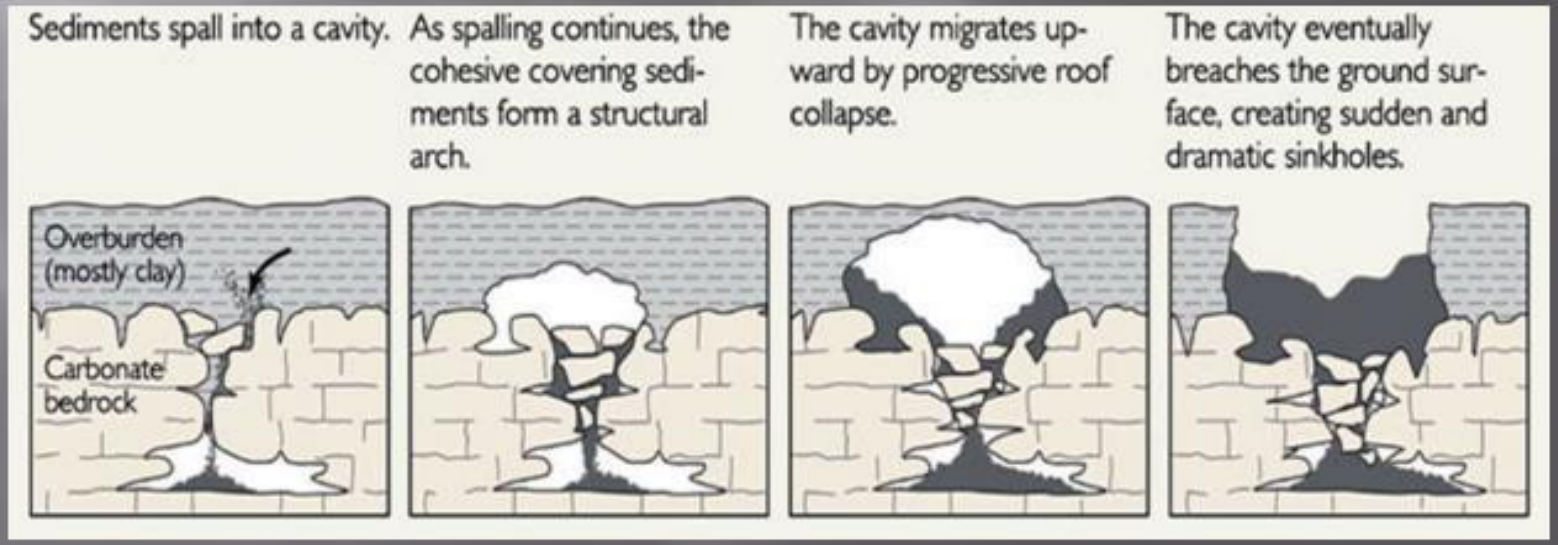
- A **sinkhole** is a hole in the ground that forms when water dissolves surface rock.
- Sinkholes are formed when a landscape, where carbonate rock sits underneath the soil, is exposed to water.
- Water collects in the cracks called joints and into the carbonate rock.
- As this happens the carbonate rock is dissolved and is carried away, the joints widen until the ground above them becomes unstable and collapses.

Causes of sinkholes

- Underneath soil/rock is dissolved by groundwater flowing through the material.
- Human involvement

Types of Sinkholes

- Cover-collapse sinkhole
  - Water erodes rock away underneath overburden
  - Overburden soil loses stability
  - Rapid and sudden collapse
  - Can take weeks or years to reach point of collapse

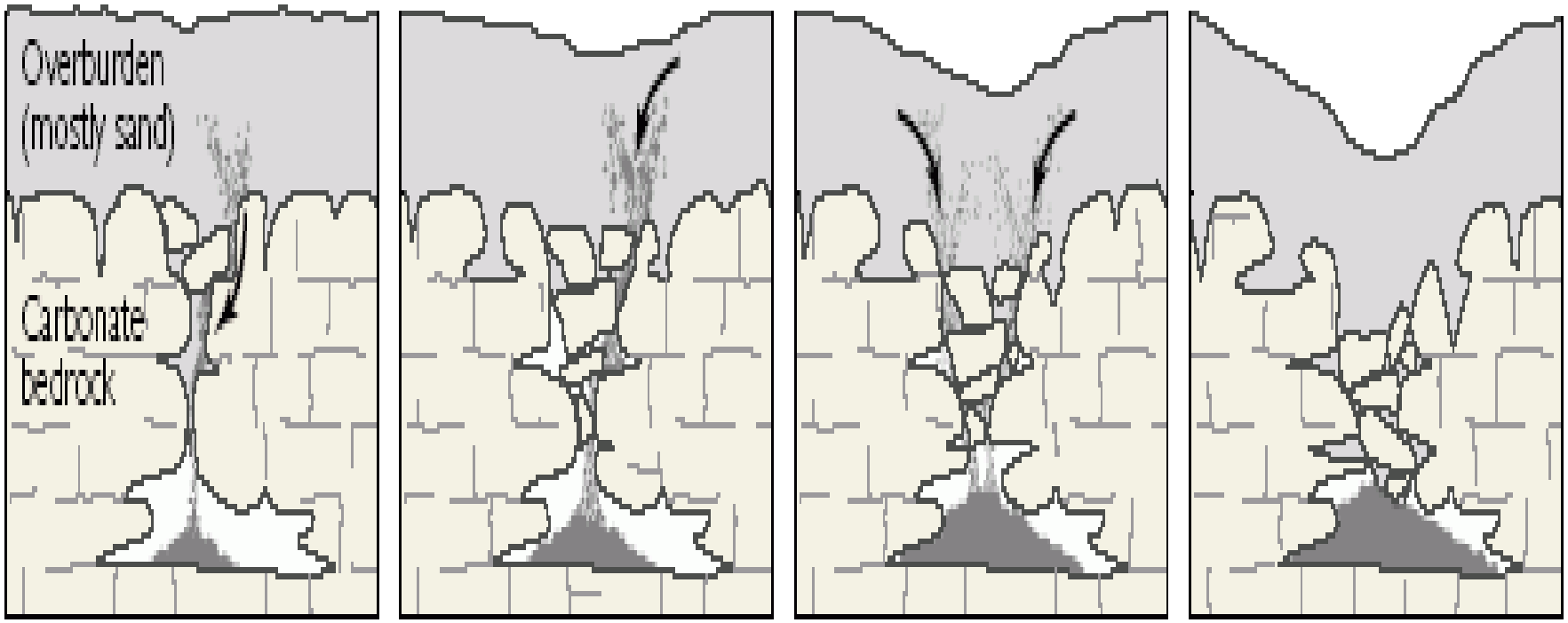


Granular sediments spall into secondary openings in the underlying carbonate rocks.

A column of overlying sediments settles into the vacated spaces (a process termed "piping").

Dissolution and infilling continue, forming a noticable depression in the land surface.

The slow downward erosion eventually forms small surface depressions 1 inch to several feet in depth and diameter.



Problems with Sinkholes

- Sinkholes can range in size and severity.
- Contaminate water sources
- Costly to people and government
- Example : State of Florida
  - Florida Senate Committee on Banking and insurance reported **24,671** claims of sinkhole damage between **2006-2010 costing totaled 1.4 billion dollars**.