


Soil Water Movement and Retention

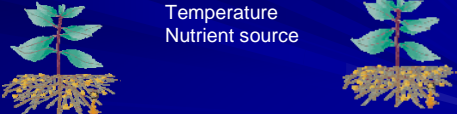
Functions of Soil

- Medium for plant growth
- Regulator of water supplies
- Recycler of raw materials
- Habitat for soil organisms
- Engineering medium



Functions of Soil

- Medium for plant growth
- Physical Support
- Gas exchange
- Water
- Temperature
- Nutrient source



Functions of Soil

Regulator of water supplies

- Infiltration
- Run-off
- Storage/Movement
- Distribution
- Purification

Integral to hydrologic cycle



Total Earth Water

■ Oceans	97%
■ Ice and Glaciers	2.0%
■ Aquifer/Groundwater	0.6%
■ Atmosphere	0.2%
■ Lakes	0.012%
■ Soil	0.001%
■ Rivers	0.0002%

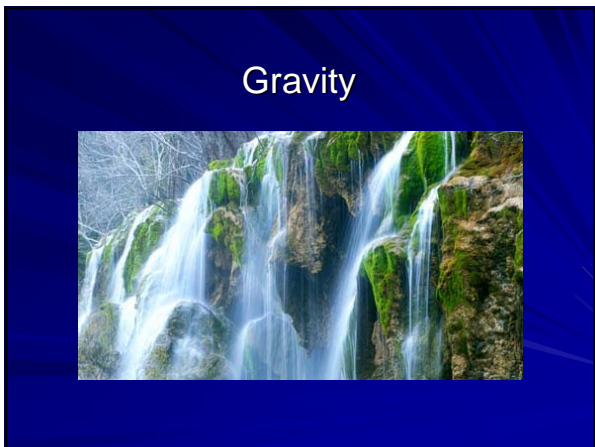
Water Movement



Two Forces Responsible for
Water Movement in Soils

Gravity

Capillarity



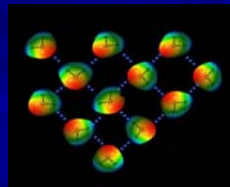
Capillarity

Spontaneous movement of water into and through pore spaces in soil without the aid of gravity.

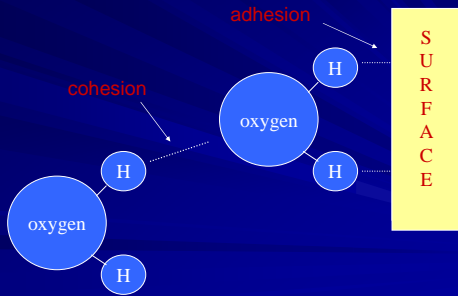
Adhesion and Cohesion



Cohesion

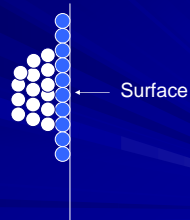


Adhesion and Cohesion



Adhesion and Cohesion

- adhesion
- Cohesion (H-bonding)



Adhesion and Cohesion



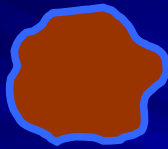
Weak Adhesion



BEAD MAX CREATES A SMOOTH, WATER REPELLANT FINISH.



Adhesion to Soil Particles

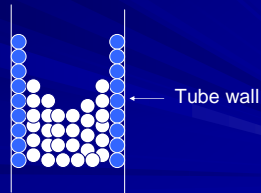


Strong Adhesive Forces

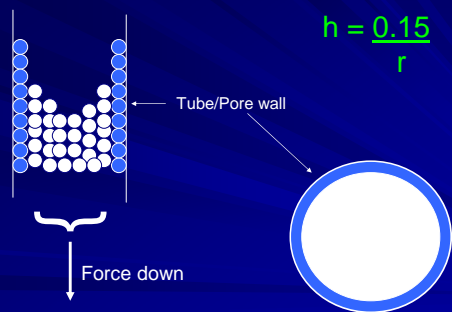
Soil Pores

Adhesion and Cohesion

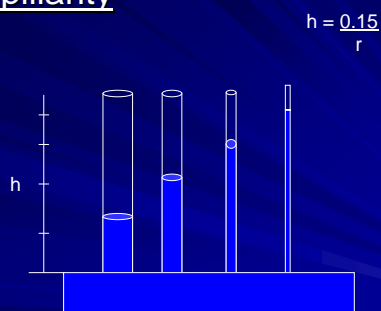
Adhesion to the tube or pore wall
Cohesion between water molecules

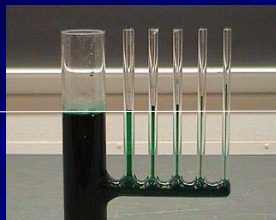


Capillarity



Capillarity





Soil Pores and Pore Size Distribution

Texture
Density
Structure

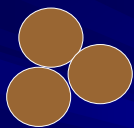
Define.

Texture



Particle Size	Large/coarse	Medium	Fine/Small
	Sand Loamy Sand Sandy Loam Silt	Sandy clay Loam Silty clay Loam Silt Loam Loam	Clay Loam Sandy Clay Silty Clay Clay
Pore Size	Large/Macro	Meso/Medium	Micro/Small
Capillarity	Weak	Moderate	Strong

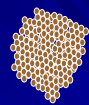
Soil Pores



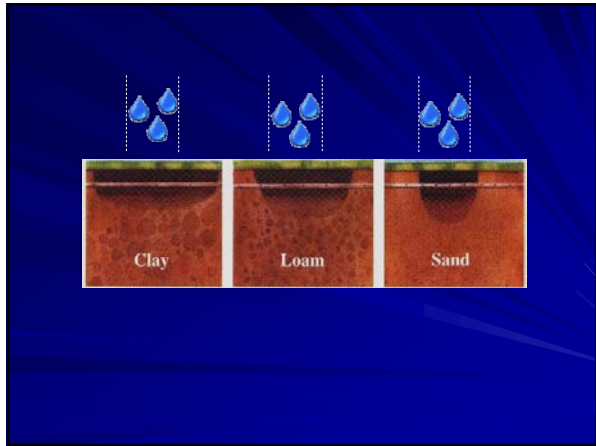
Sandy



Silty



Clayey

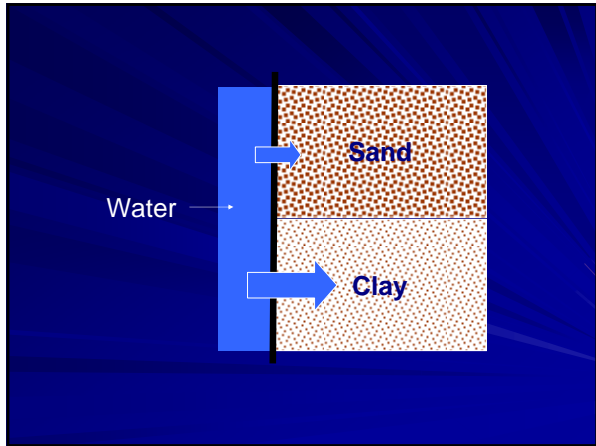


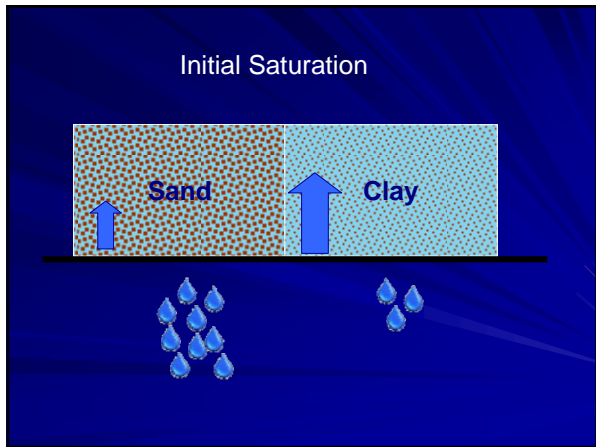
Density

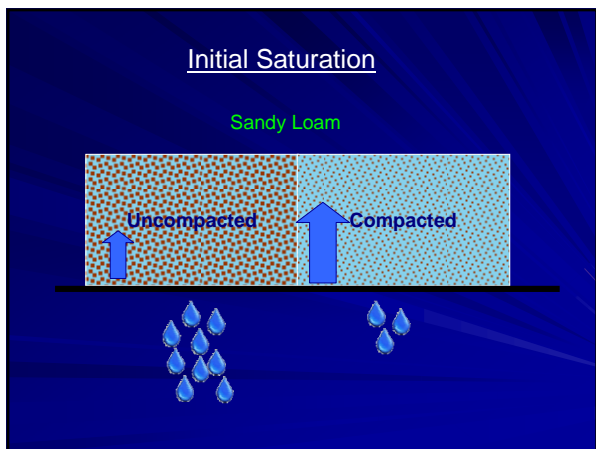
- Compaction
- Organic Matter
- Arrangement of Particles
- Depth in Profile

Structure

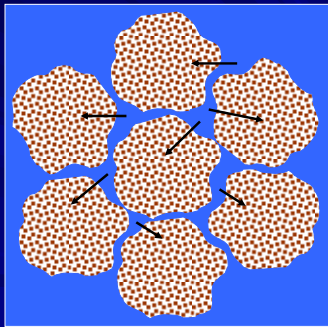
The photograph shows a soil profile with two distinct textures. The upper part, labeled (a), shows 'Loamy aggregates' which are clumpy and irregular. The lower part, labeled (b), shows 'Coarse sand grains' which are more uniform and granular. To the left of the photograph are two arrows: a yellow arrow with a dotted pattern pointing to the loamy aggregates, and a solid yellow arrow pointing to the coarse sand grains.



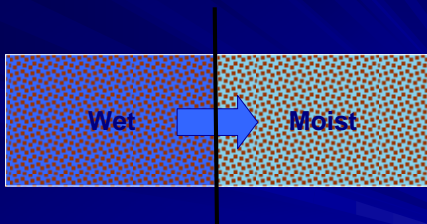




Aggregates



Same Texture and Density



Relevance

