

CASE

*Curriculum for Agricultural
Science Education*

Principles of Agricultural Science – Plant

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Water Behavior

Unit 2 – Mineral Soils

Lesson 2.1 Understanding Soil Properties

Relationships of Soil & Water



Two principles define soil and water relationships:

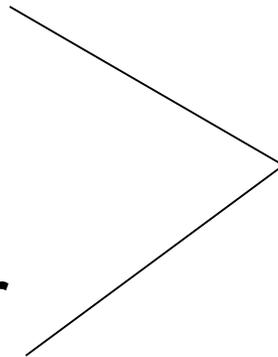
- 💧 Permeability rate – how quickly water moves through soil
- 💧 Water holding capacity – how much water is retained by soil particles

Permeability



Depends upon:

- Texture
- Structure
- Organic Matter

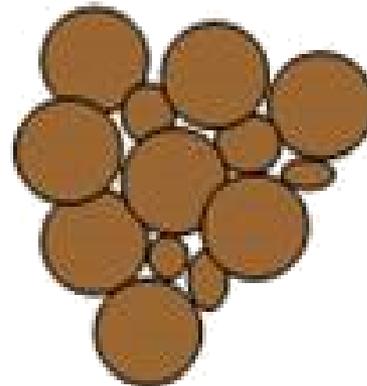


Porosity

Porosity

Pores in the soil are created by:

- Roots and other organic matter (i.e., decaying substances)
- Animals, such as worms and rodents
- Soil particle size and “fit”



Permeability Rate

Rapid



Slow

Texture: Sands and silts

Texture: Clays

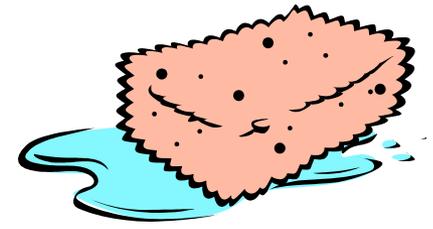
Structure: Strong to any

Structure: Weak and Massive

Porosity: Porous

Porosity: Not porous

Water Holding Capacity



High



Low

Texture: Silts, loams,
and Clays

Texture: Sands

Organic Matter:
Present

Organic Matter:
Absent

Types of Soil Water



Plants can't use all soil water.

- 💧 **Available water** is free to plants for use.
- 💧 **Unavailable water** is held too tightly by clay particles and surface tension.
- 💧 **Saturated** soils have excess water that will run off increasing erosion concerns.

References



Huddleston, J. H., & Kling, G. F. (1996). *Manual for judging Oregon soils*. Corvallis, OR: Oregon State University.

Parker, R. (2010). *Plant and soil science: Fundamentals and applications*. Clifton Park, NY: Delmar.