Soils and Soil Science

Soil

- Definition
  - A naturally occurring body of variably thick horizons of mineral and/or organic material that differs from the parent material in physical, biological and morphological properties.

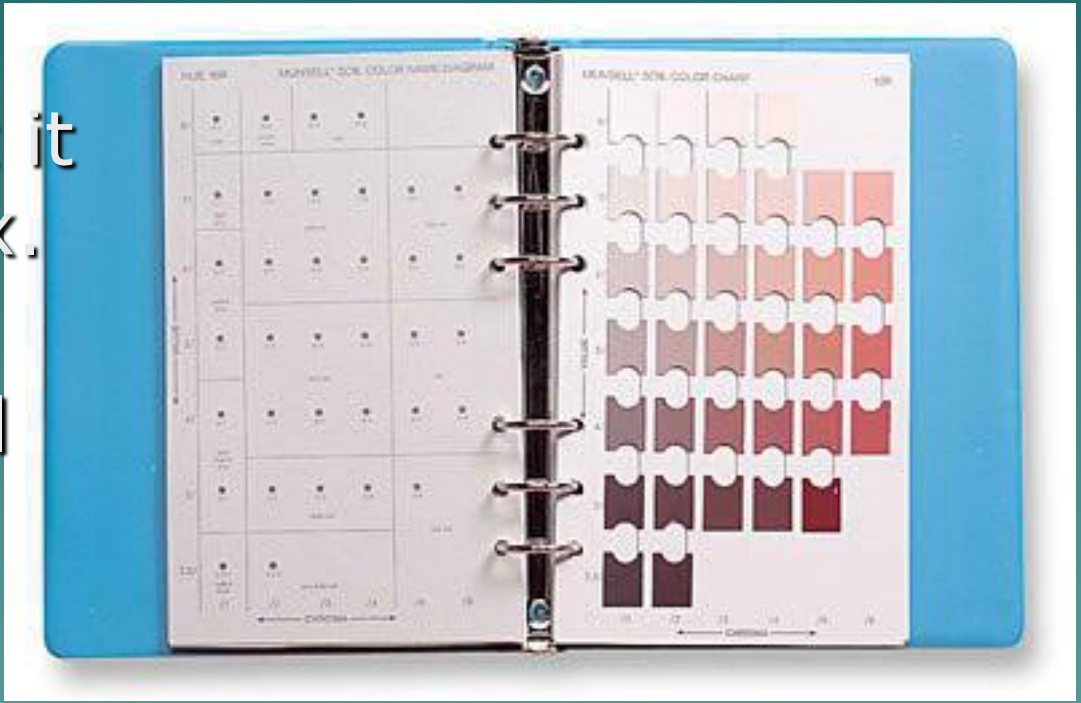
(the way it is made)

The 5 Soil Forming Factors

- Climate – the amount of rain and other biological factors
- Parent Material – the type of rock the soil is made of
- Organics – vegetation and animals (both decaying and root action)
- Slope – amount of water runoff
- Time – how long it has been there (age)

Soil Color

- Soil color can tell you much about how a soil was created and what it is made from. (ex. darker – organic)
- The color of a soil is determined by using a Munsell Color Chart.
- Munsell colors consist of a hue, value and chroma.



Soil Color

- Hue
  - The relation of the color to red, yellow, green, blue or purple.
  - Located in the upper right hand corner of the Munsell Chart.
  - **R** = Red, **Y** = yellow and **YR** = yellow red (orange)

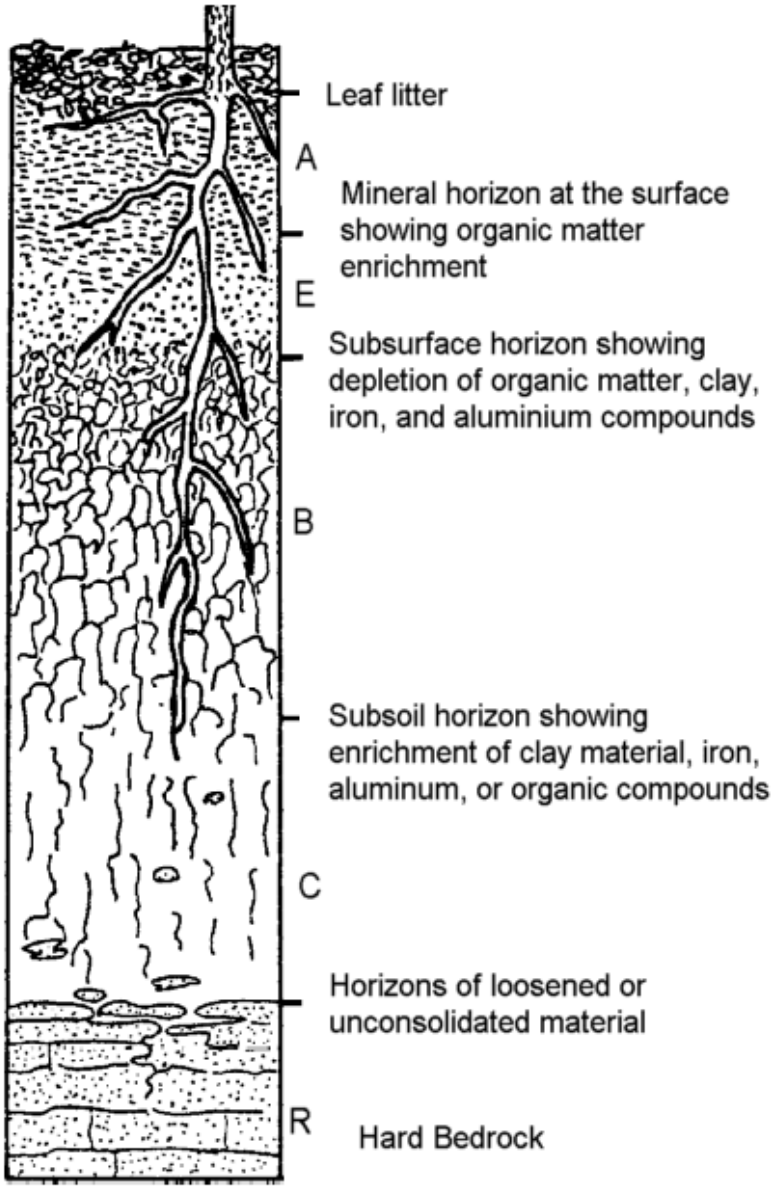
Soil Color

- Value
  - The lightness or darkness of the color.
  - Located along the left edge of the Munsell Chart.

Soil Color

- Chroma
  - Rates the strength or depth of color.
  - Located along the bottom of the Munsell Color Chart.
  - Names are written hue, value, chroma
    - Ex. 5YR5/6

Soil Profile



Weathering versus Erosion

- Weathering
  - The breaking down of a rock over time
    - Types
      - Mechanical
        - Frost Action
        - Shrink / Swell
        - Root Action
      - Chemical
        - Acid Rain

Weathering versus Erosion

- Erosion
  - The breaking down and transport of a rock
    - Caused by:
      - Wind
      - Water
      - Ice (glaciers)

Parent Materials

- Residual Parent Materials
  - Parent material made from the remains of a rock that was weathered
  - *in Situ*

Parent Materials

- Transported Parent Material

  Glacial

  - parent material moved by a glacier or glacial outwash

  Fluvial

  - parent material moved by a stream (flood)

Glacial

Fluvial

Parent Materials

- Transported Parent Material

  Colluvium

  - parent material that has been moved by gravity (mountains)

  Eolian

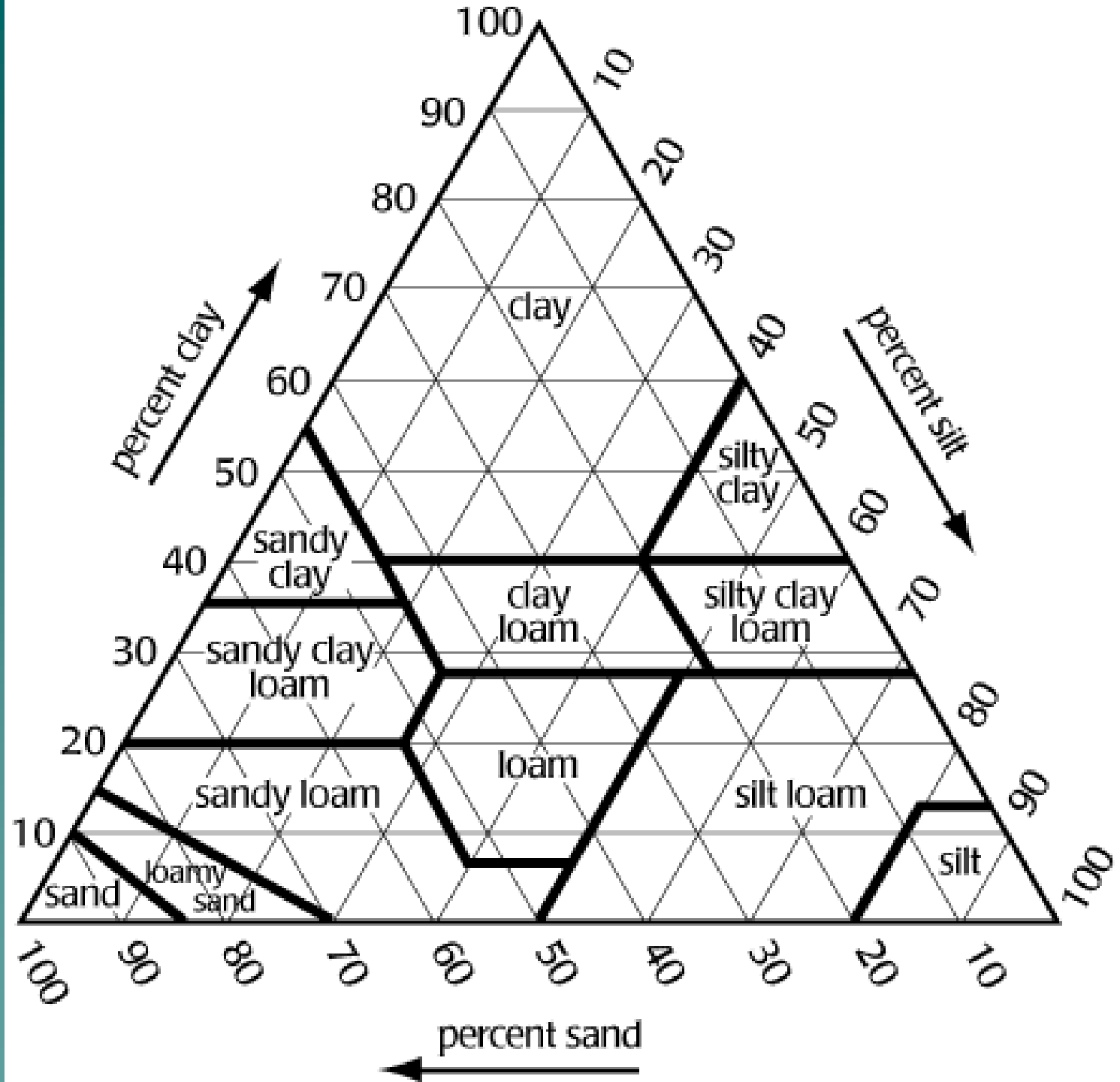
  - parent material moved by wind
  - generally found in deserts

Colluvium

Eolian

Particle or Grain Size

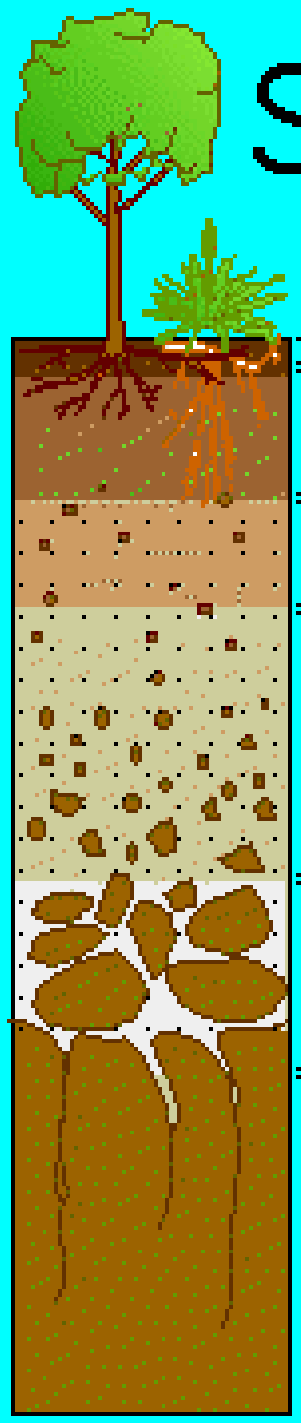
Coarse Fraction	Boulders	> 600 mm
	Stones	250-600 mm
	Cobbles	75-200 mm
	Gravels	2-75 mm
Soil Seperates	Sand	2-.05 mm
	Silt	.05-.02 mm
	Clay	< .02 mm


100
90
80
70
60
50
40
30
20
10
percent clay
percent silt
percent sand
clay
silty clay
sandy clay
clay loam
silty clay loam
sandy clay loam
loam
sandy loam
silt loam
silt
sand
loamy sand

Master Horizons

- O_{HZ} – made of organic material in various states of decomposition
- A_{HZ} – accumulation of decomposed organic material (topsoil – very dark)
- E_{HZ} – made as silt and clay are eroded from the soil by water (sandy layer)
- B_{HZ} – made of silt and clay from the E horizon
- C_{HZ} – weathered rock
- R_{HZ} - bedrock

Soil Layers



O Horizon (humus)

A Horizon (topsoil)

E Horizon (eluviation layer)

B Horizon (subsoil)

C Horizon (regolith)

R Horizon (bedrock)