What is Soil?

- Dynamic natural body composed of mineral and organic solids, gases, liquids and living organisms which serve as a medium for plant growth.
- Unconsolidated, weathered, thick (cm’s to m’s thick), variable zone of mineral and organic material, biologically active, that covers most of the Earth’s land surfaces.
- Intensely weathered geologic material.

\[
\text{Soil} = f(\text{Climate} + \text{Organism} + \text{Relief} + \text{Parent Material} + \text{Time})
\]

**Idealized ‘A’ Horizon** (top Soil)

- **Air**: 25%
- **Mineral**: 45%
- **Water**: 25%
- **Organic Matter**: 5%

**Soil Texture**

**Fine Earth Fraction**

- % Sand
- % Silt: \(< 2\text{mm}\)
- % Clay

**Soil Horizons** (all possibilities)

- **O**: Organic – typical of deciduous forests
- **A**: Mineral – dark color due to organic matter
- **E**: Mineral – white horizon = minerals lost
- **B**: Mineral – strong soil structure
- **C**: Transitional from rock to soil
- **R**: Bedrock
SOIL STRUCTURE
Displayed with water drops to indicated water infiltration (into) and permeability (within)

https://ohioline.osu.edu/factsheet/aex-742

SOIL COLOR
3 main influences on soil color:

1. Organic matter
   a. OM tends to be black
2. Water content
   a. Moist soils are generally darker than dry soils
   b. Influences oxygen levels → determines oxidative states (#3)
3. Presence and oxidation states of iron and manganese oxides
   a. Red or brown in well-drained soils → presence of oxidized iron
   b. Gray and blue in poorly-drained soils (gleyed colors) → presence of reduced iron

OTHER PHYSICAL FACTORS THAT INFLUENCE SOIL

Landscape position

- hill tops have thinner soils and are less wet than valley bottoms with thicker, wetter soils
- degree of slope will determine depth of soils → gradual slopes > steep slopes for soil development

Parent material → imagine the different time required to weather single-grained materials like sand (beach terrace) vs. glacially deposited till (large to small loose particles) vs. granite (Canadian shield)
Soil Texture by Feel Method

Start by placing two teaspoons in your palm. Add a few drops of water (more if needed) and knead to break aggregates. Soil is at the proper consistency when it feels plastic and moldable, like moist putty.

Does the soil remain in a ball?  
Y  Is it too dry?  
N  Is it too wet?  
N  SAND

Gently squeeze the ball of soil with thumb and forefinger upward into a ribbon of uniform width and thickness. Allow the ribbon to emerge and extend over forefinger, and break from its own weight. Does it form a ribbon?

Y  Does the soil feel very gritty?  
N  SILT

Does the soil make a weak ribbon < 1” long before it breaks?  
Y  Does the soil make a medium ribbon 1-2” long before it breaks?  
N  Does the soil make a strong ribbon >2” long before it breaks?

Y  Make a ball, push a dimple, and wet soil. Rub the dimple with your forefinger.

Y  Does the soil feel very gritty?  
Y  SANDY LOAM  
N  SANDY CLAY

Y  Neither gritty nor smooth?  
Y  LOAM  
N  CLAY

Y  Does the soil feel very smooth?  
Y  SILT LOAM  
N  SILTY CLAY

Y  Neither gritty nor smooth?  
Y  CLAY LOAM  
N  SILTY CLAY

Y  Does the soil feel very smooth?  
Y  Silt  
N  Clay

Scharenbroch - UWSP