SOIL PROFILE

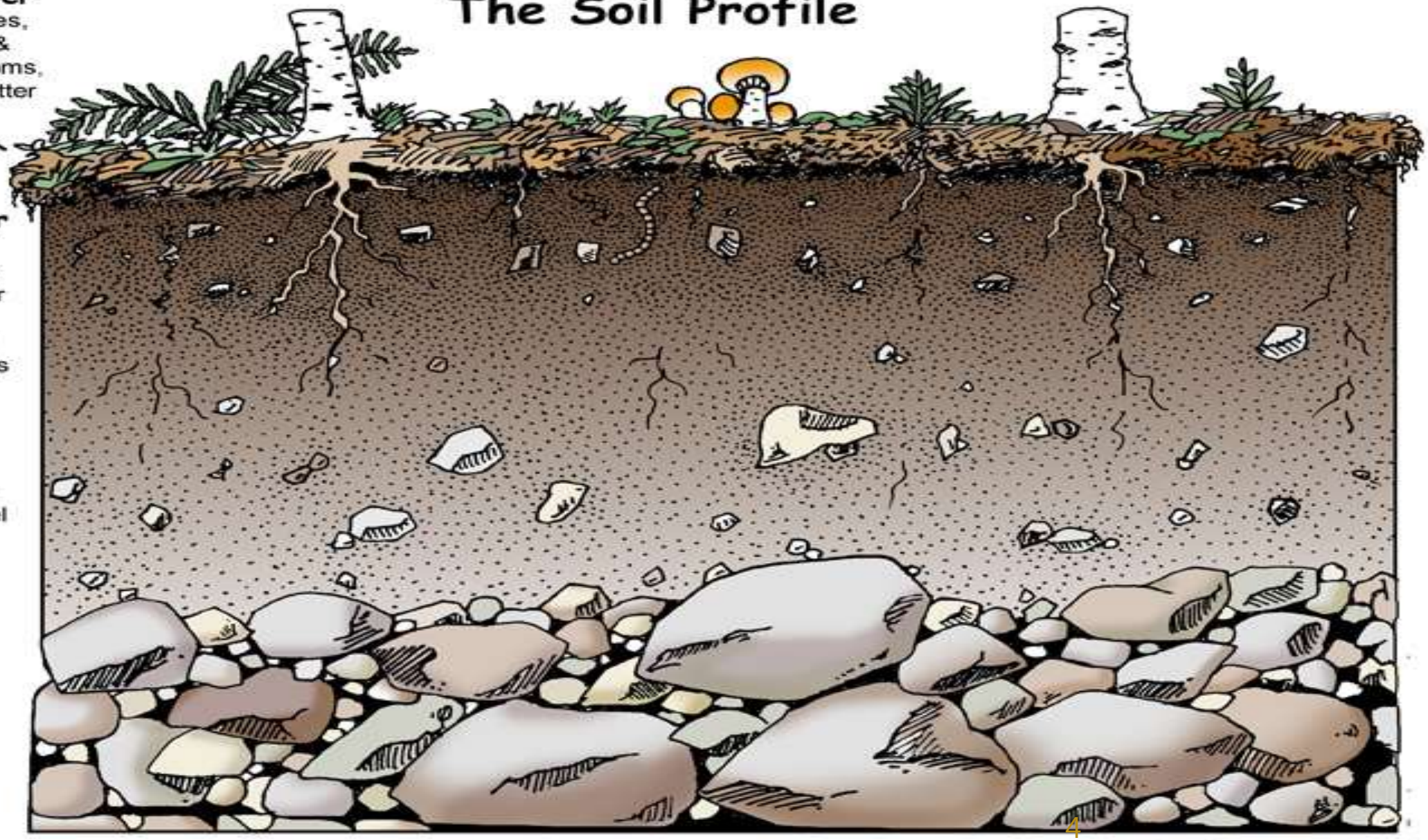
Soil

- Major part of the natural environment,
- Vital to the existence of life on the planet.
- Soil is the result of the process of the gradual breakdown of rock, such as weathering and erosion
- Soil is made up from four constituents:
  - mineral material,
  - organic material,
  - air and
  - water.

Soil Profile

- The soil profile is one of the most important concepts in soil science.
- Soil profile is the term used for the vertical section of mature soil generally up to the depth of 2 meter or up to the parent material to show the different layers or horizons of soil for study of soil in its undisturbed state.
- It is made up of a succession of horizontal layer or Horizons.
- Each of which varies in
  - Thickness
  - Structure
  - Consistency
  - Porosity
  - Acidity
  - composition

The Soil Profile

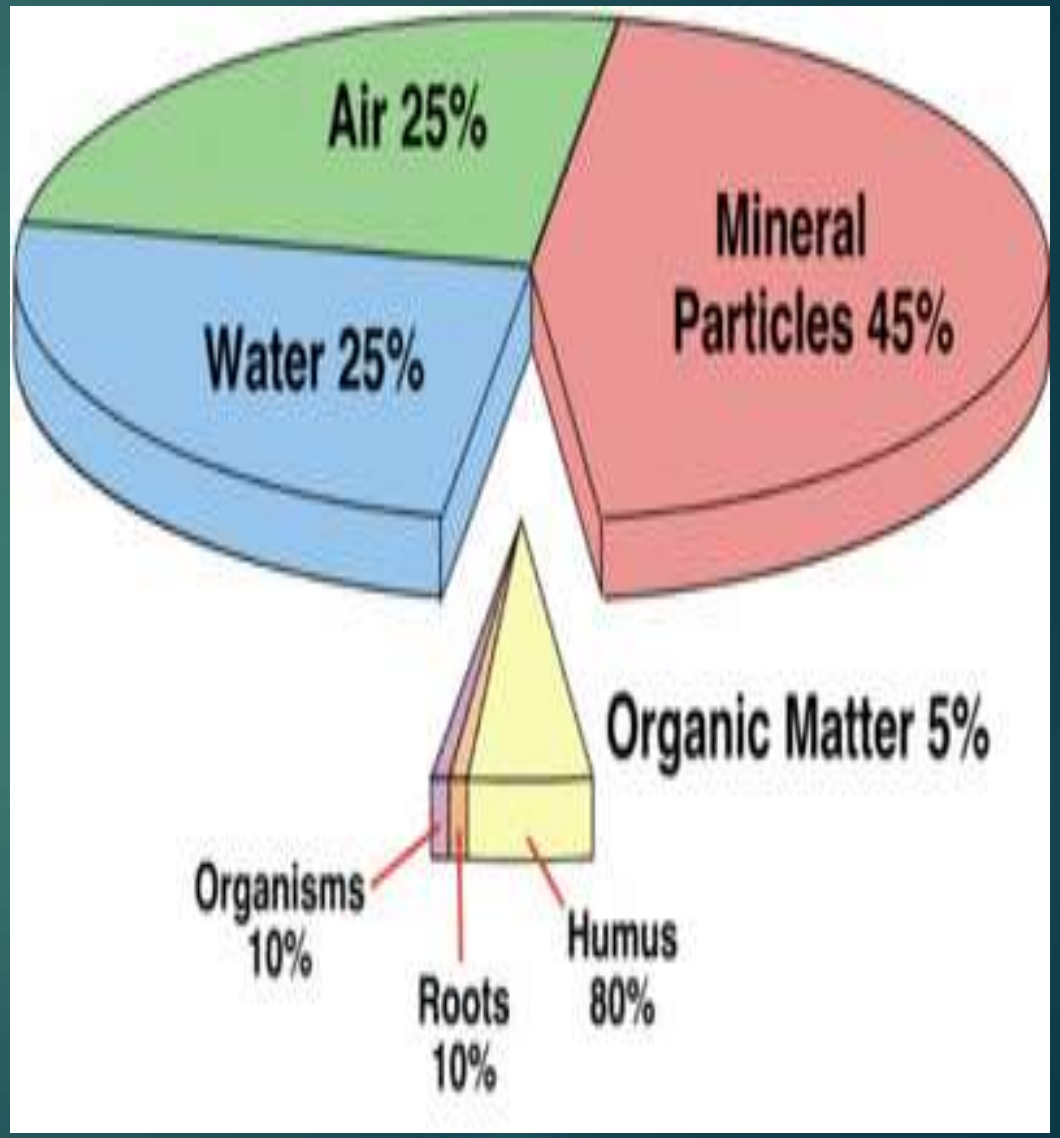


Soil Structure

- Combination or arrangement of primary soil particles.
- Soil particles are:
- Sand
- Silt
- Clay

Soil Composition

- Soil composition is an important aspect of nutrient management.
- The basic components of soil are:
  - Minerals/Nutrients 45%,
  - Organic matter 5%,
  - Water 25% and
  - Air 25%.



Organisms

Topography

Time

Climate

Parent Material

Soil Colour

- Two types of soil on the basis of colour
  1) Dark Colour Soil
  2) Light Colour Soil

1.Dark Colour Soil:

- Rich with a lot of organic matters.

2. Light Colour Soil:

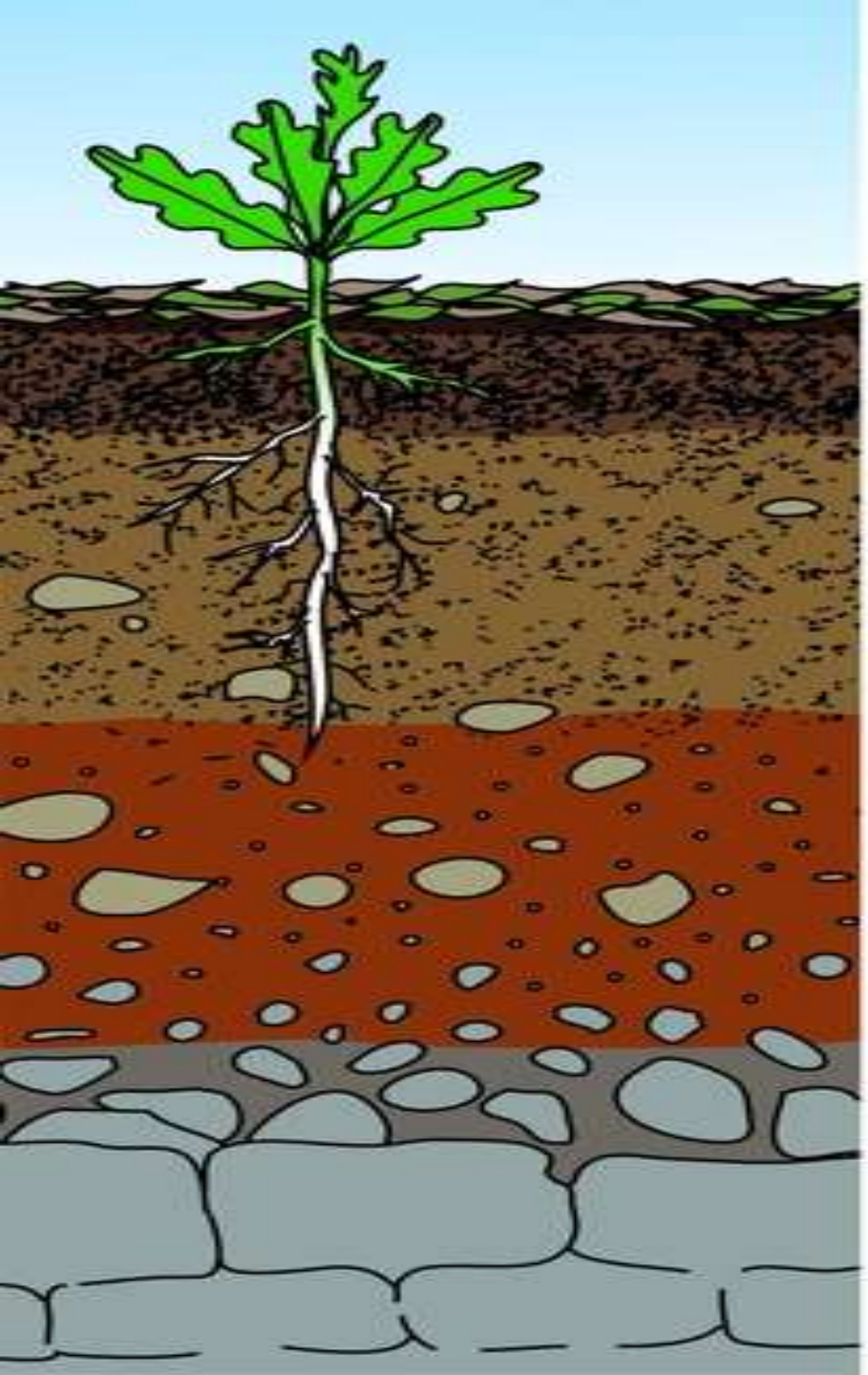
- Not so rich with organic matters

Components of the Soil Profile

- A soil horizon makes up a distinct layer of soil.
- The soil profile extends from the soil surface to the parent rock material.
- The regolith includes all of the weathered material within the profile. The regolith has two components:
  - Solum
  - Saprolite / regolith

- Solum
  - The solum includes the upper horizons with the most weathered portion of the profile.
  - Surface and subsoil layers.
  - O, A and B Horizons.

- Saprolite
  - The saprolite is the least weathered portion that lies directly above the solid, parental bedrock
  - C Horizon



Humus

Topsoil

Subsoil

Solum

Weathered
rock fragmentsnts

Saprolite

Bedrock

Master Horizons

- Horizons based on color, roots, structure, rock fragments.
- Master Soil Horizons are depicted by a capital letter in the order (from top to down):
- The master horizons are represented by the letters:
  - O Horizon
  - A Horizon
  - E Horizon
  - B Horizon
  - C Horizon
  - R Horizon

O Horizon

- Surface horizon that is comprised of organic material at various stages of decomposition.
- Surface-layer, at depths of 0-5 cm.
- Dark in color, soft in texture.
- Leaf litter – leaves, needles, twigs, moss, lichens that are not decomposing.
- Humus - rich organic material of plant and animal origin in a stage of decomposition

A Horizon

- "Topsoil" or "Biomantle" Horizon.
- largely consists of minerals (sand, silt, and clay)
- Topmost layer of mineral soil, at depths of 5-10 cm.
- Some humus present, darker in color than layers below.
- Biomantle - most biological productive layer; earthworms, fungi, and bacteria live this layer.
- Smallest and finest soil particles.

E Horizon

- The "Leaching Layer" Horizon
- Small layer between A & B horizons
- At depths of 10-15 cm
- Light in color, mainly sand & silt
- Poor mineral and clay content due to leaching – the loss of water-retaining plant nutrients to the water table
- Soil particles larger than in A horizon but smaller than in B horizon.
- Also known as Zone of "eluviation"

B Horizon

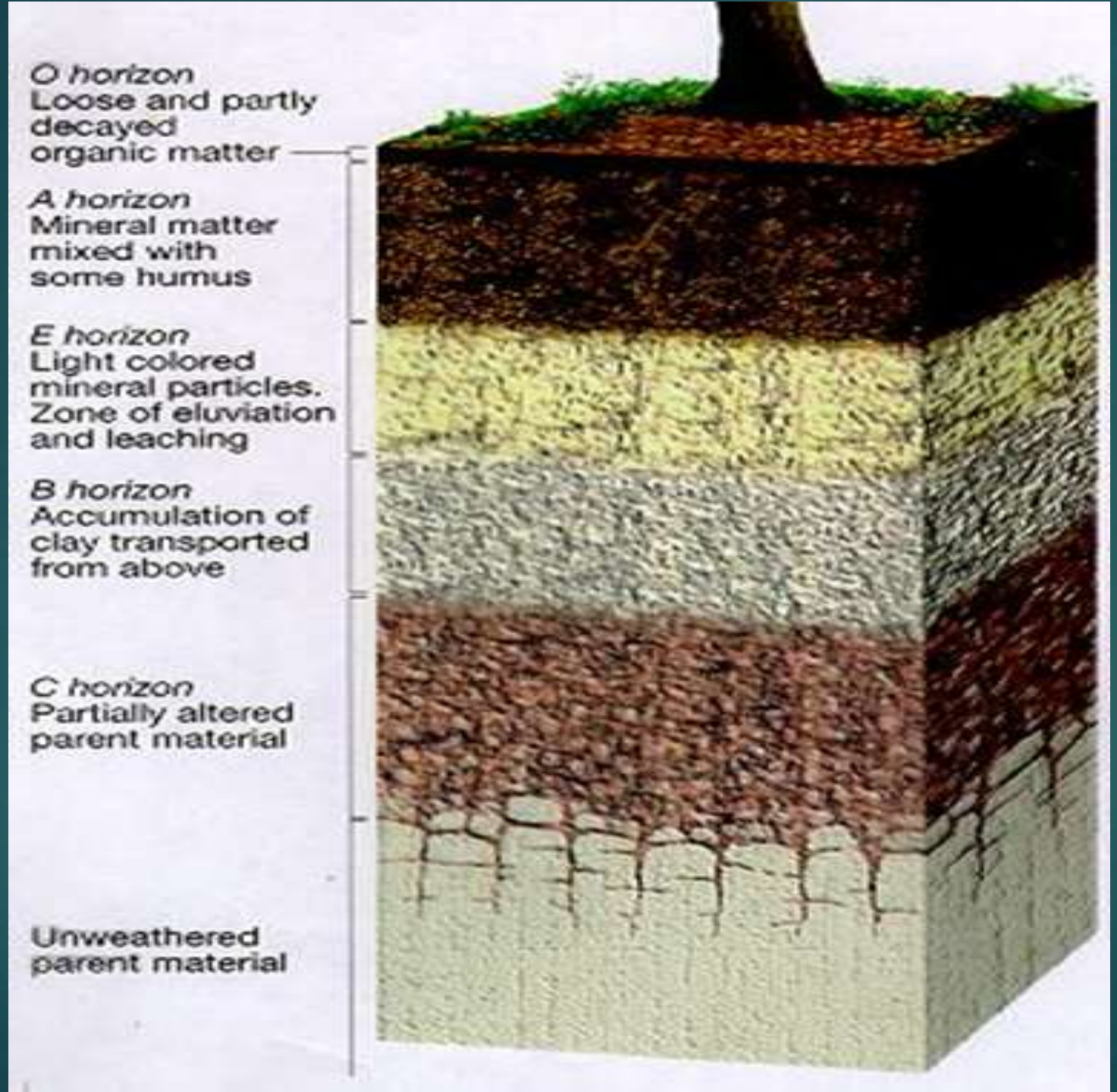
- The "Subsoil" Horizon.
- At depths of 10-30 cm.
- Rich in clay and minerals like Fe & Al.
- Some organic material may reach here through leaching.
- Plant roots can extend into this layer
- Red/brown in color due to oxides of Fe & clay.
- Also known as Zone of "illuviation"

C Horizon

- The "Saprolite" Horizon or regolith.
- At depths of 30-48 cm.
- Made up of large rocks or lumps of partially broken bedrock.
- Least affected by weathering and have changed the least since their origin.
- Devoid of organic matter due to it being so far down in the soil profile.

R Horizon

- The "Bedrock" Horizon.
- At depths of 48+ cm.
- Deepest soil horizon in the soil profile.
- Continuous mass of bedrock.
- Colors are those of the original rock of the area.


O horizon
Loose and partly decayed organic matter
A horizon
Mineral matter mixed with some humus
E horizon
Light colored mineral particles. Zone of eluviation and leaching
B horizon
Accumulation of clay transported from above
C horizon
Partially altered parent material
Unweathered parent material