SOIL (CH 10, SECTION 3)

"Each soil has had its own history. Like a river, a mountain, a forest, or any natural thing, its present condition is due to the influences of many things and events of the past." ***--- Charles Kellogg, <u>The Soils That Support Us</u>, 1956***

- Franklin D. Roosevelt once said: “The nation that destroys its soil destroys itself.”
- What do you think this quote means?

FDR: 32nd President of the United States (1933–1945)

Soil is a MIXTURE of

- weathered rock/mineral pieces
- organic material (decayed plants and animals—*thanks to fungus, lichen & bacteria*)

  (called HUMUS)
- water and air

- *soil is NONrenewable because it takes thousands of years to make*

How is soil formed???

- **1. weathering** of rocks/minerals
- and
- 2. decomposing organic materials (leaves, grass, animals, etc.)---called **HUMUS**

Why is soil so important?

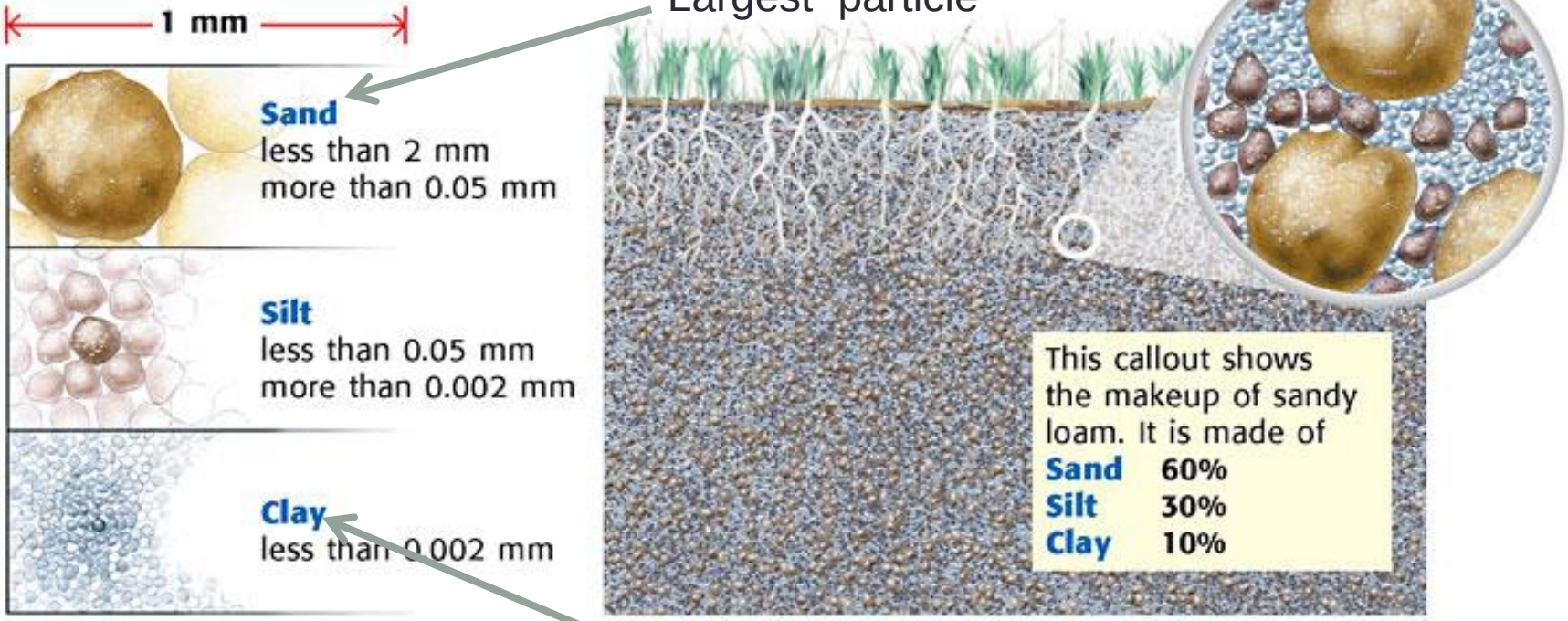
- **1. <u>Nutrients</u>** --Soil provides minerals and other nutrients for plants. All animals get their energy from plants.
- **2. <u>Housing</u>** --Soil provides a place for animals to live.
- **3. <u>Water</u> Storage** Without soil to hold water, plants would not get the moisture or the nutrients they need.


Layers of Soil

SOIL Texture

- the <u>size</u> of the sediment particles

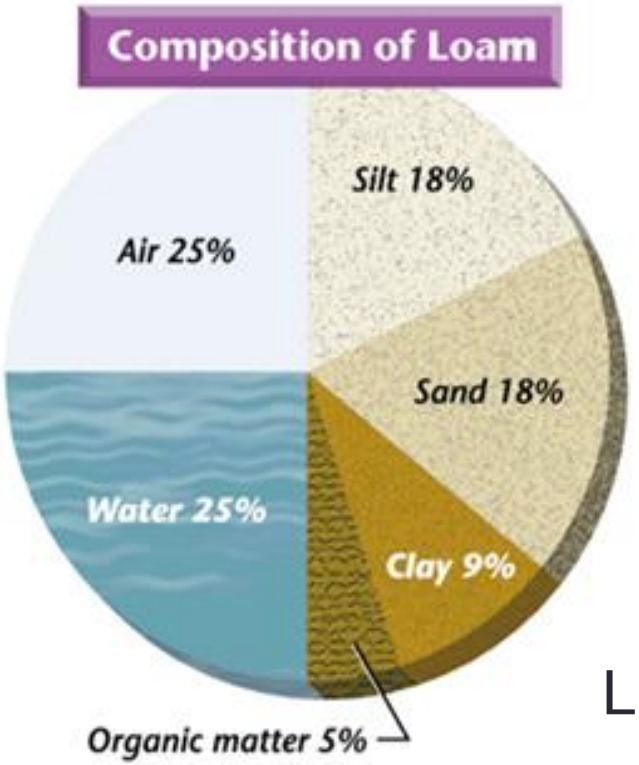
The proportion of these different-sized particles in soil determine the soil's texture.

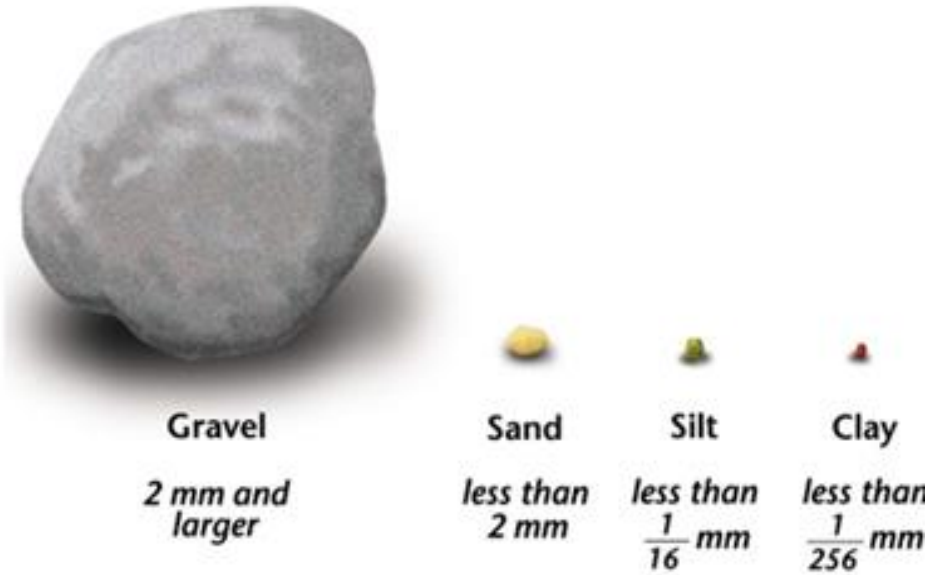


Largest particle

Smallest particle

Loam (best soil)



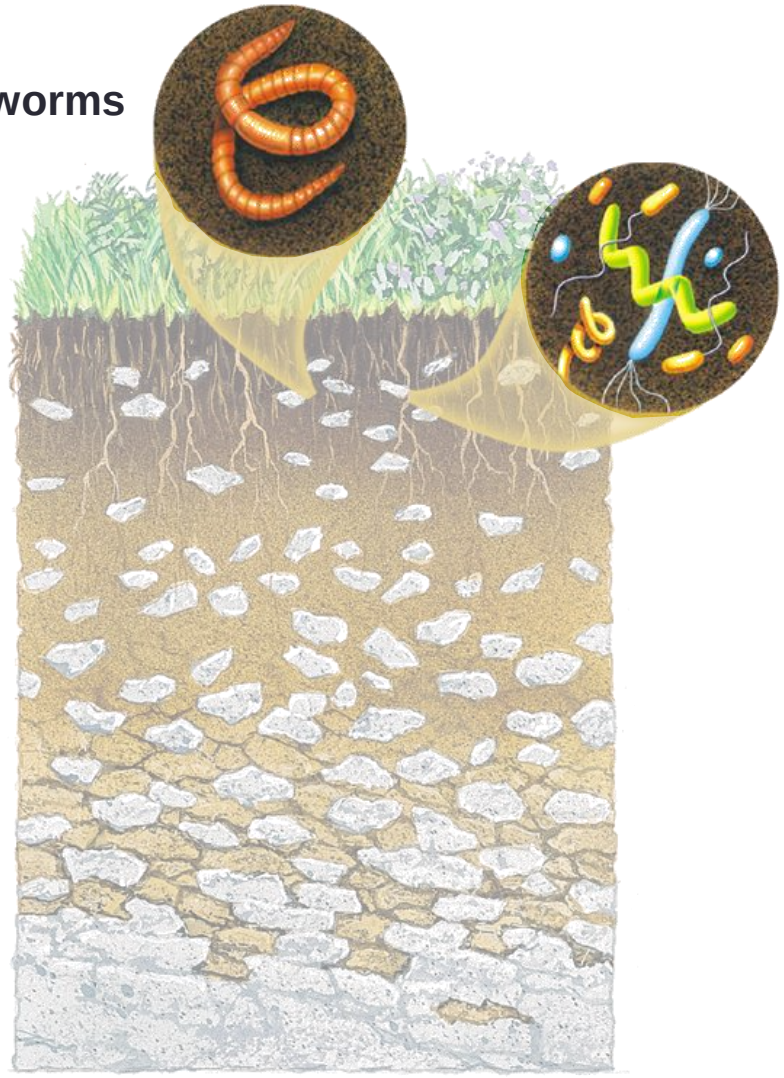


LOAM—if you mix of all types of sediment ---- for best growth

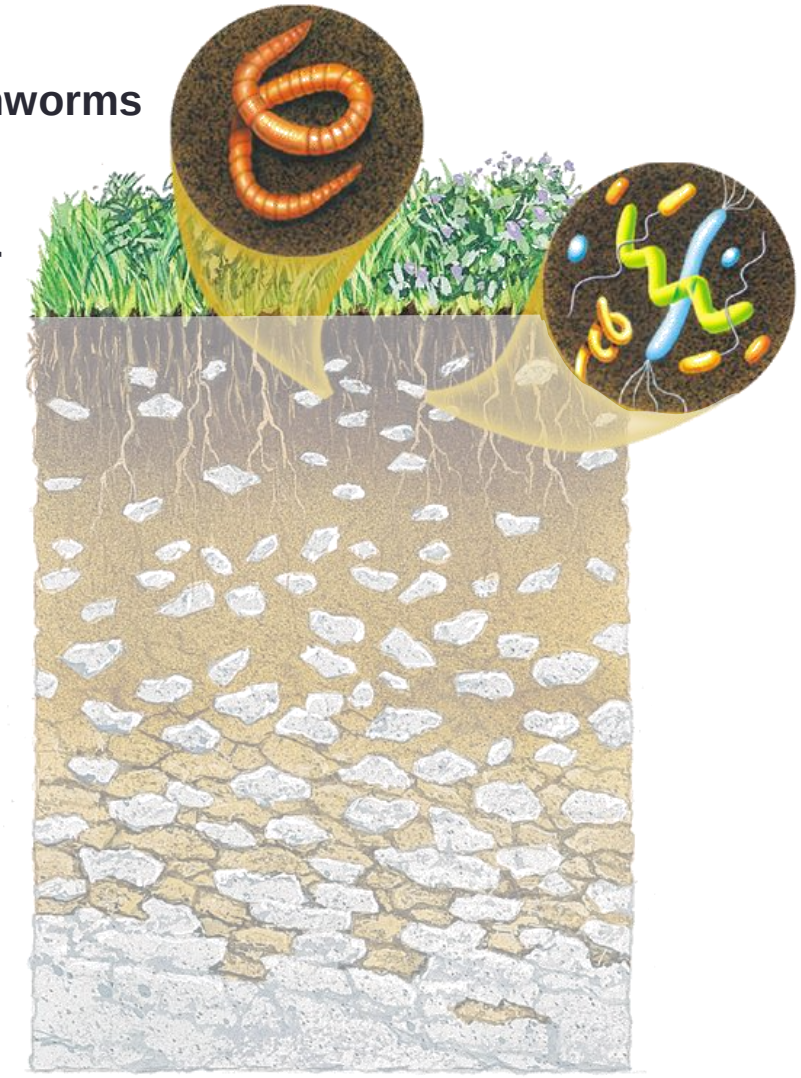
Questions

- Soil is made up of
  - A. only weathered rock.
  - B. only organic matter (humus).
  - C. weathered rock and organic matter.
  - D. only animals and plants.

Soil layers



Soil



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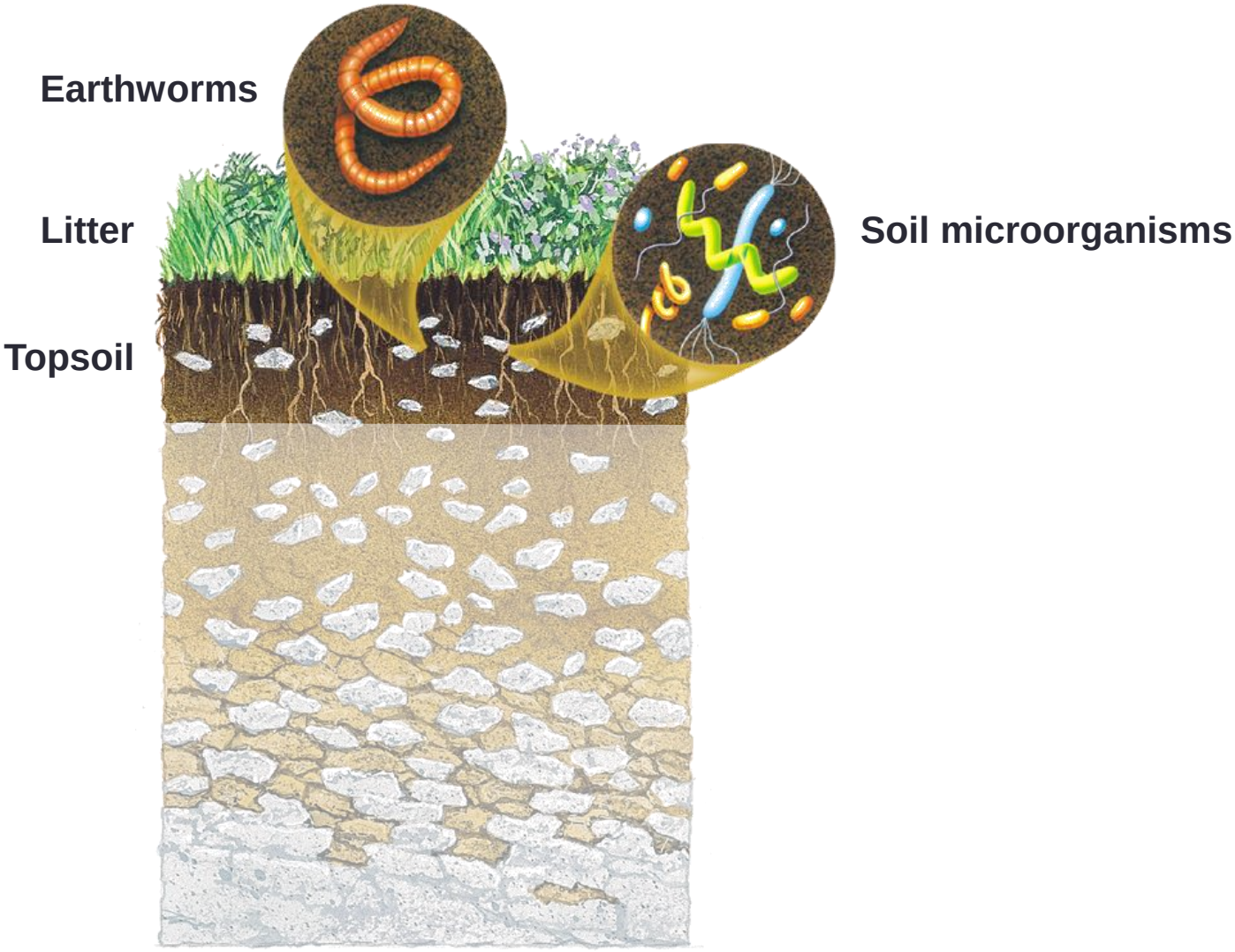
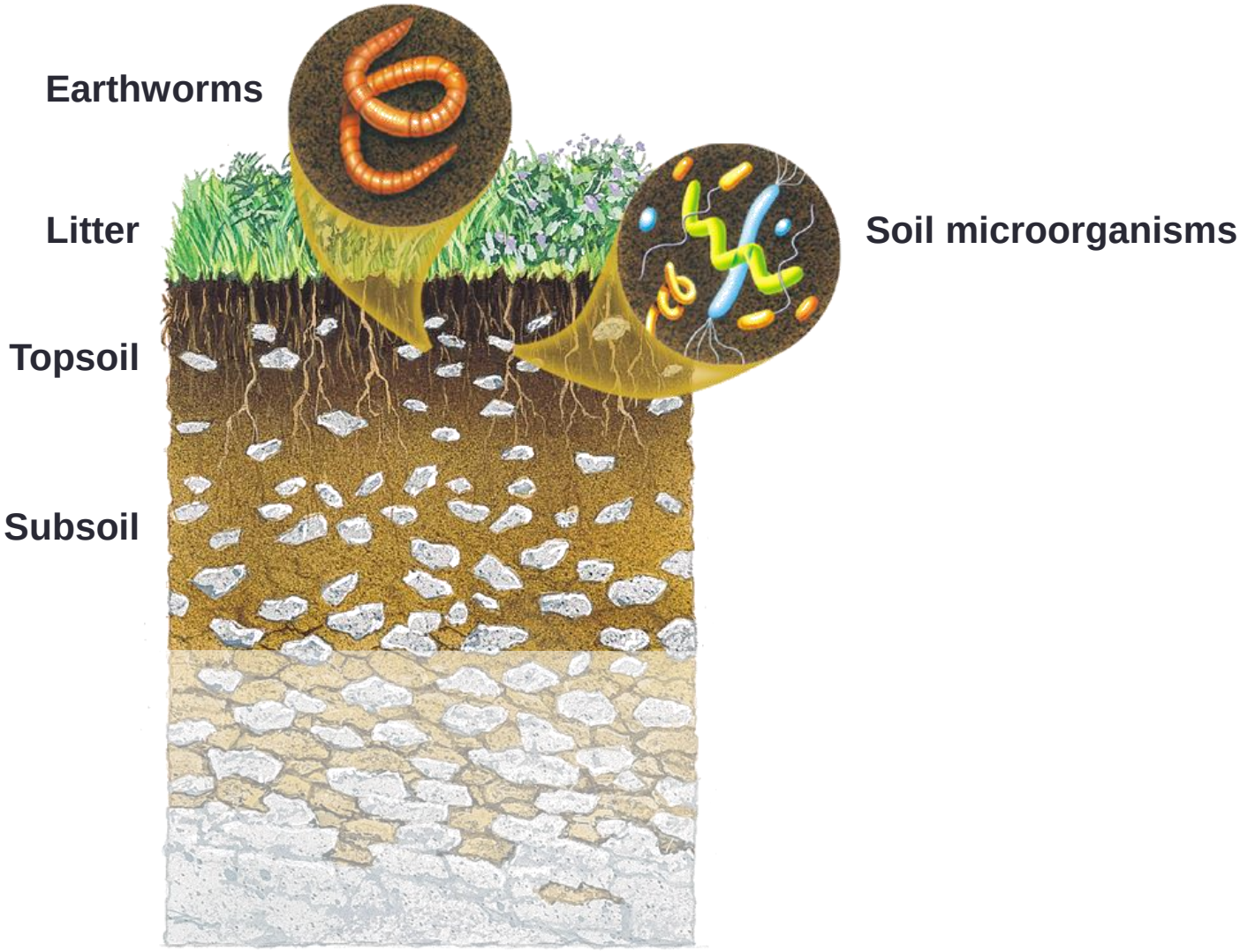


Soil

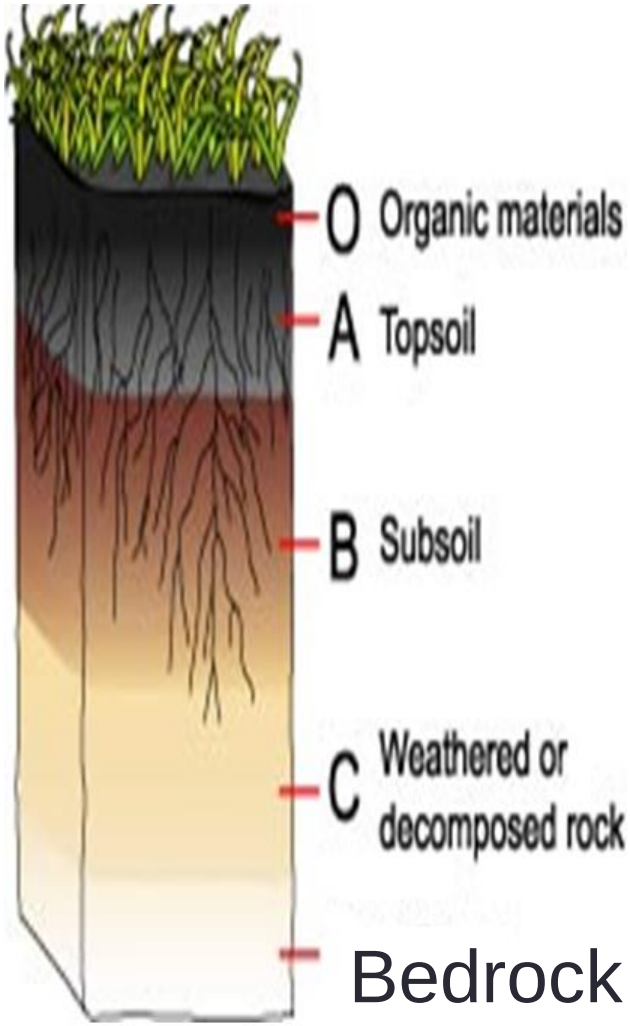


Soil Layers


Earthworms
Litter
Topsoil
Subsoil
Bedrock
Soil microorganisms

Soil profile (soil horizons)

- topsoil contains humus (rich in nutrients because it contains decayed organic material)
- solid rock under all the soil is called "bedrock," or "unweathered parent rock"



- From top to bottom, what are the horizons of soil?
- **>>>topsoil, subsoil, weathered parent rock, bedrock/unweathered parent rock (or horizon A, B, C, bedrock)**
- Which of the following contains organic materials?
  - A. unweathered rock
  - B. grass
  - C. water
  - D. air

Last question…

- The component of soil that is made up of decayed organic material is called ___.
- **>>humus**

(enrich) Let’s try some soil math…

- Suppose it takes 500 years to form 2 cm of new soil without erosion. If a farmer needs at least 35 cm of soil to plant a particular crop, how many years will the farmer need to wait before planting his or her crop?
- **8,750 years!!!**

Soil Conservation

(chapter 10, section 4)

- mature soil takes THOUSANDS of years to form (so it's **nonrenewable**), so it needs to be protected (conserved)

Human Activity that increase EROSION

- 1. logging
- 2. mining
- 3. construction
- 4. farming

1--Logging

- Trees cut down to build homes and furniture, and to make paper
- clear-cutting (all trees cut down in an area)—roots decay and there's nothing to hold the soil, so it washes away

2--Mining

- to get natural resources like minerals
- erosion of soil speeds up
- mining companies must "***reclaim***" the area when done

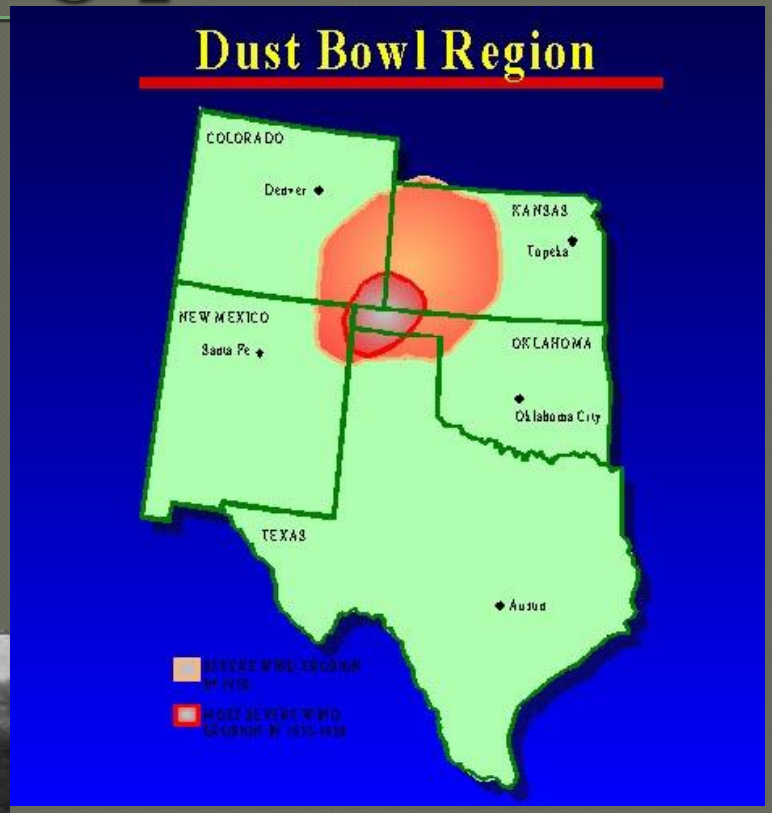
3--Construction

- building roads, buildings, and communities
- plants removed, so erosion speeds up

4--Over Farming

(enrich) Poor farming practices…

- Dust Bowl
- 1930-1937
- Colorado, Kansas, Oklahoma, New Mexico, and Texas
- began as a severe drought and poor farming



Review

- Weathering
- …breaks down the rocks into smaller pieces (helps to make the soil)

- Erosion
- …**moves** the sediment/soil

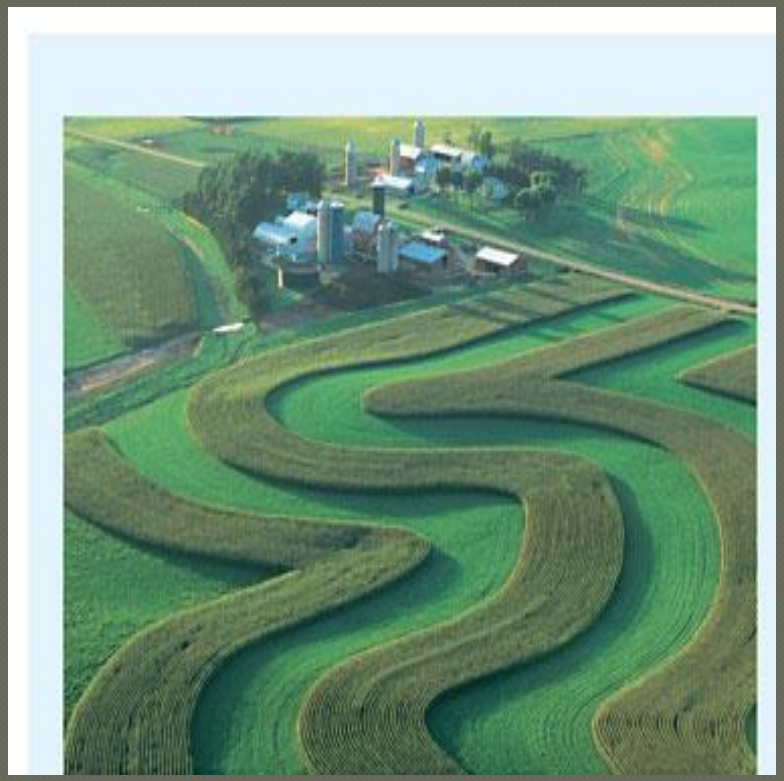
- We don't want the soil to move, so what do we do?????

reduce soil erosion by…

- 1. more **plants** (wind breakers)-- slows down wind/water erosion and hold in soil
- 2. contour plowing
- 3. terracing
- 4. no-till farming
- 5. cover crop
- 6. crop rotation

(1) Wind Breakers— slows down the wind

(2) Contour Plowing– slows down water erosion (for gentle hills)

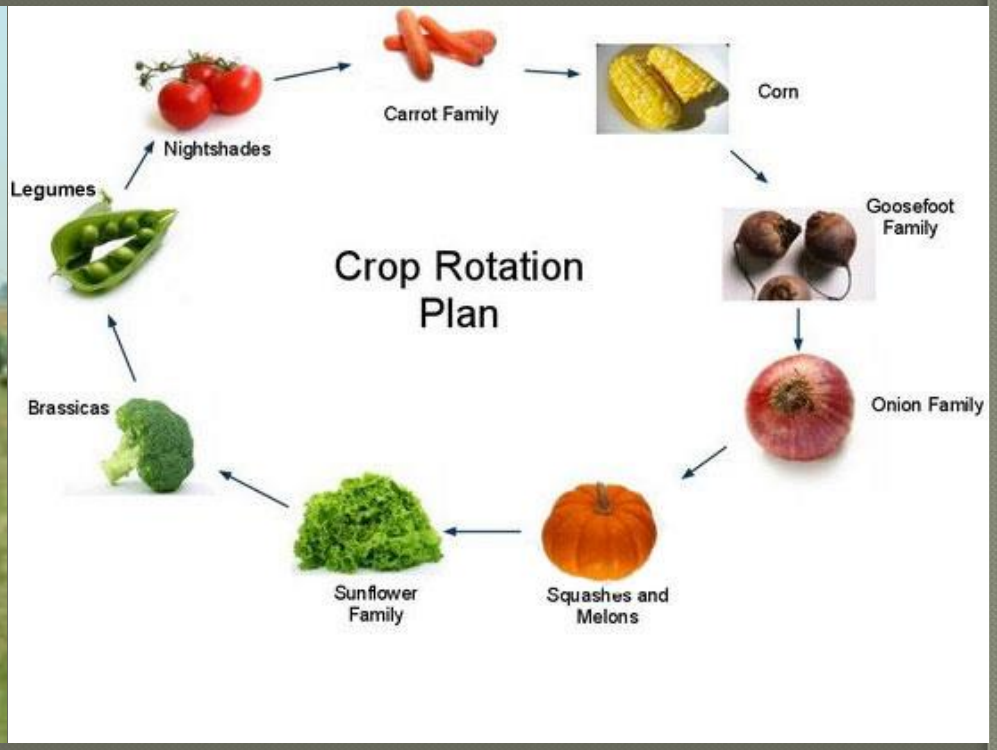


(3) Terracing– for **steep** hills (makes STEPS to slow down the water)

(4) No-till Farming – leave old stalks/roots to slow down runoff (don't plow between harvest and replanting time)

(5) Crop Cover– planted between harvests to restore nutrients and prevent wind/water erosion

(6) Crop Rotation– plant different crops each year (helps replenish nutrients to soil)



- Which human activity can help **prevent** soil erosion?
  - A. planting cover crops and employing contour plowing methods
  - B. strip mining and deforestation
  - C. building cities and highways
  - D. growing crops and burning fossil fuels