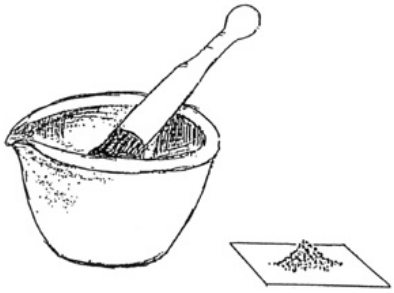
Lesson 7 - What is soil?



Purpose - Understand the role of soil as part of a natural system.

Warm up - What do you know about soil?

Ideas - What is it made of, used for, or where does it come from?

1. Soil sample - What is soil made of?
    a. Each table can take one sample.
    b. Use the mortar and pestle to grind up your sample - about 2 spoonfuls of soil.
    c. Put your soil sample to fill HALF of the tube.
    d. Add water so the tube is mostly full. Clean up after yourselves.
    e. Shake the sample for at least a minute.
    f. Leave it undisturbed at your table.

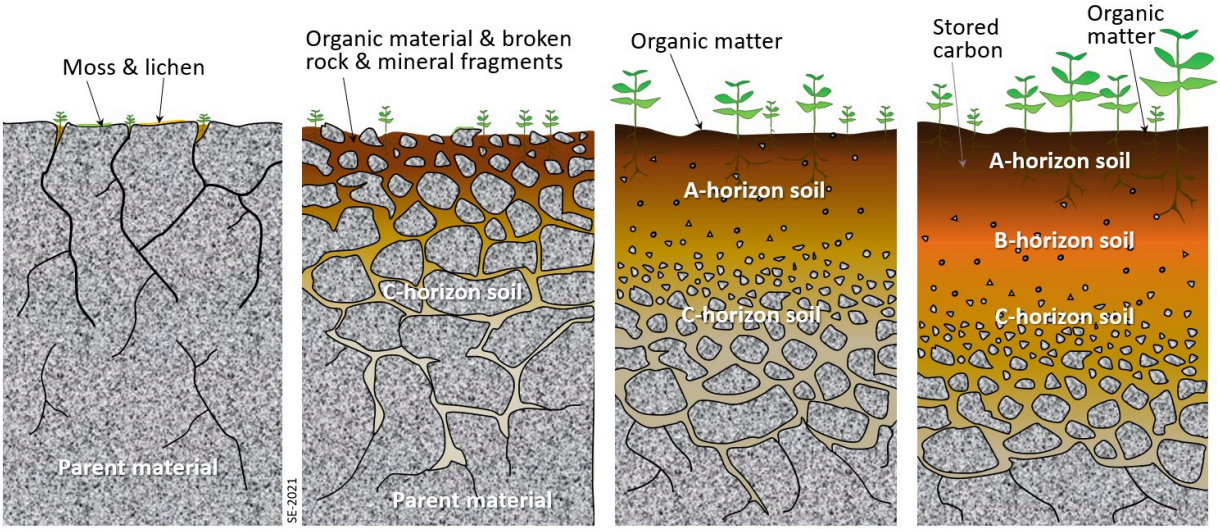
2. Read - Be sure to bring in the biological importance of soil.

What is soil?

Soil is the loose upper layer of the Earth's surface where plants grow. Soil consists of a mix of organic material (decayed plants and animals) and broken bits of rocks and minerals.

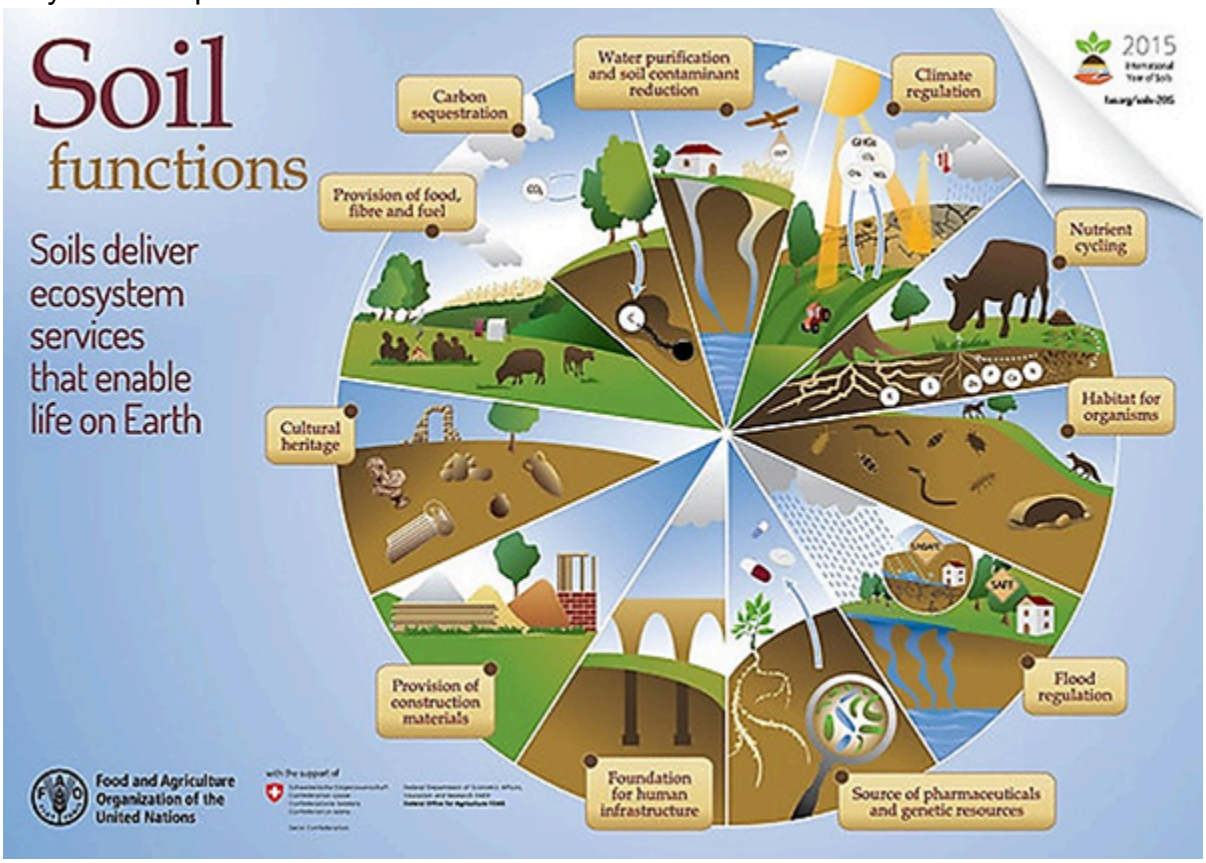
How is soil formed?

Soil is formed over a long period of time by a number of factors. It can take up to 1000 years for just an inch of soil to form.



Besides time, other factors that help soil to form include:
Living organisms - This includes organisms such as plants, fungi, animals, and bacteria.
Topography - This is the relief or slope of the surface of land where the soil is forming.
Climate - The overall climate and weather where the soil is forming.
Parent material - The parent material is the minerals and rocks that are slowly disintegrating to form the soil.

Why is soil important?



At first you may think of soil as just dirt. Something you want to get rid of. However, soil plays a very important role in supporting life on Earth.

Plants - Many plants need soil to grow. Plants use soil not only for nutrients, but also as a way to anchor themselves into the ground using their roots.

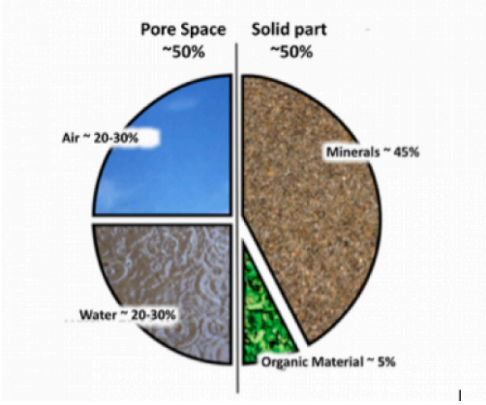
Atmosphere - Soil impacts our atmosphere releasing gasses such as carbon dioxide into the air.

Living organisms - Many animals, fungi, and bacteria rely on soil as a place to live.

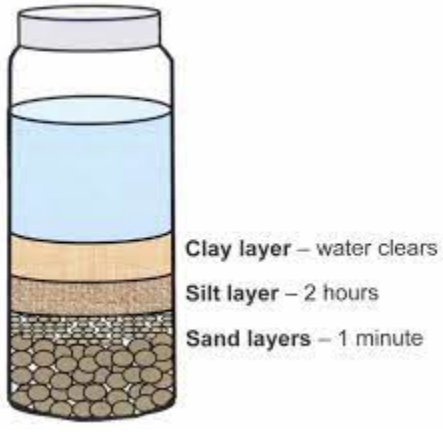
Nutrient cycles - Soil plays an important role in cycling nutrients including the carbon and nitrogen cycles.

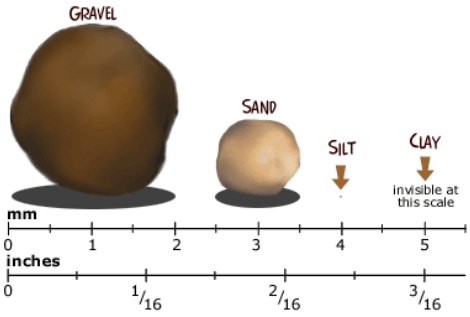
Water - The soil helps to filter and clean our water. Soil can also work as water storage. Water can filter into soil and stay there in aquifers or as groundwater.

Properties of Soil
Soil is often described using several characteristics including texture, structure, density, temperature, color, consistency, and porosity.
One of the most important properties of soil is the texture. Texture is a measure of whether the soil is more like sand, silt, or clay. The more like sand a soil is the less water it can hold. On the other hand, the more like clay a soil is, the more water it can hold.



Types of soil - soil texture parts
Why does the soil separate into different layers?





3. Copy and answer the questions **in your notebook** using the reading above.
    a. What does soil contain that plants need to survive?

    b. How is soil formed?

    c. What is the role of soil in the water cycle?

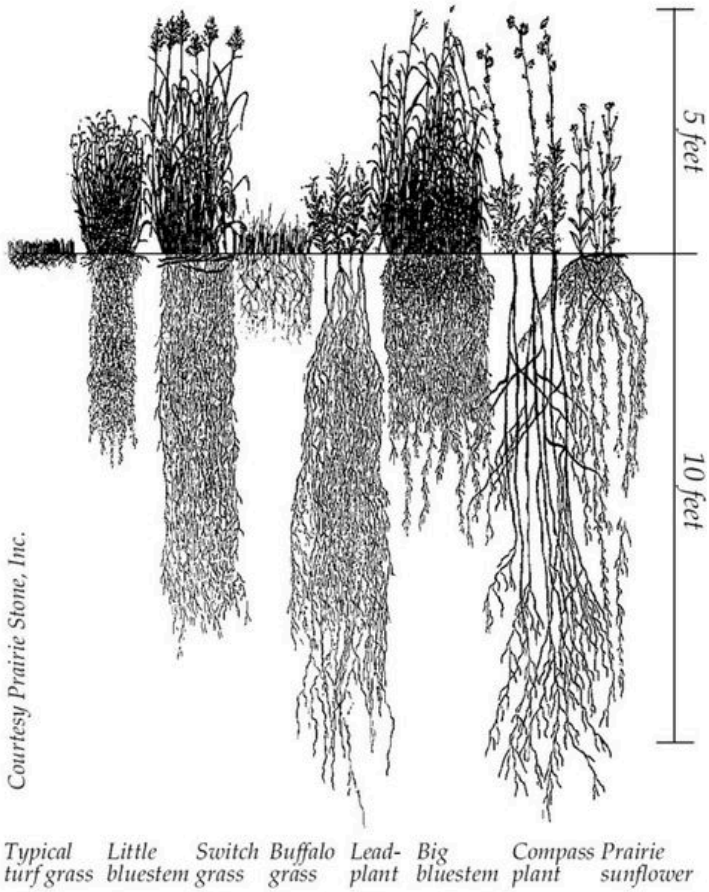
4. Watch - The importance of soil (6:40 min)
    a. What are some of the natural roles of soil?
    b. How do humans use and impact natural soils and soil systems?

5. Diagram Analysis

Big picture connections -

a. How have humans changed soils in the central United States?
b. How does this lead to things like the dust bowl OR changes in the water cycle?
c. Diagram analysis -
    i. What is the purpose of this plant diagram?
    ii. What information does it show?
    iii. How does this information make connections to human impacts on a natural soil system? root systems (more detailed picture)

Dust Bowl Pictures



6. Analyze your soil sample
    a. Draw a picture of your soil sample.
    b. Label each layer
    c. Measure each layer
    d. Write - What do you think is the main type of particle in your soil?

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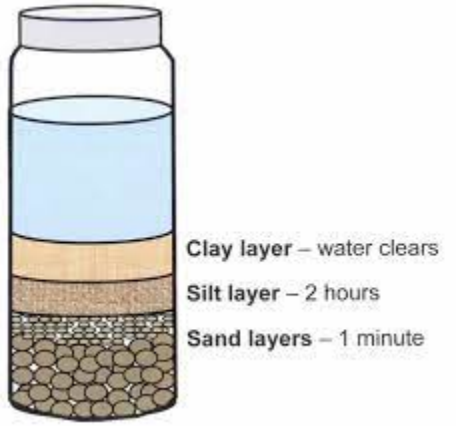

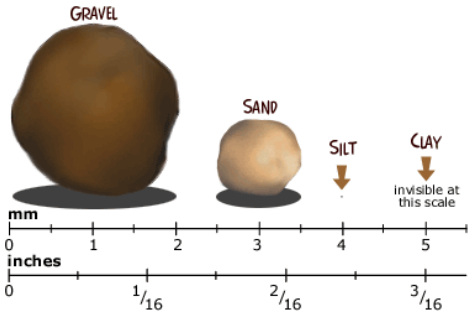

If time - Do any work corrections. Go over previous grades.

OR - Review the Soils of Fire Kit handbook.

- Briefly look through the kit for all of the equipment.

- Start to read the Soils of Fire (see Bio folder or download to rotate view) guidebook (read carefully) and notebook setup together.
    a. Write all answers in your **notebook**.

b. Read p. 3-6
c. Write - What happens to the forest's carbon during different intensities of wildfires? (p. 6)

Just for reference - Colorado Science Standard

4. How do organisms interact with the living and nonliving components of the environment to obtain matter and energy?

Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.