Soil Basics



Score Four: Students, Schools, Streams, and the Bay

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Soil: The Foundation For a Plant's Success



- Soil gives plants:
 - Food (nutrients & minerals)
 - Water
 - Oxygen
 - A place to grow!



It's Not Just Dirt

Soil is made of:

- Tiny particles called minerals.
- Spaces between the minerals, known as pores.
- Dead plants, animal matter, and worm droppings, called organic matter.
- Living organisms, such as worms, insects, bacteria, and fungi.





Soil: It's a Mix of Minerals

Three types of minerals make up soil:

- Sand
- Silt
- Clay





Pores – Where the Action Takes Place

- Pores are spaces between soil particles.
- Pores also are made by roots, insects, and worms.
- Pores hold water and oxygen.
- Pores provide habitat homes for organisms.





Organisms Live in Healthy Soil

Microscopic organisms we can't see with our eyes







Bacteria

Nematodes

Fungus

Some organisms we can see:



Worms



Springtails



Part 2: Soil Texture



More about Sand, Silt, and Clay Minerals

- A grain of sand is rounded and big enough to see.
- Silt is flat and can be seen with a microscope.
- Clay is flat. It is so tiny, a special microscope is needed to see it.



The feel of soil gives clues to what is in it.

- The minerals in soil affect how it feels to the touch.
- Some soils are mostly sand; some have lots of clay. Each feels different to the touch.
 - Have you noticed this?
- The feel of a soil is called **soil texture**.



Soil Texture Lab

- You will observe how different minerals feel.
- You will use this information to guess what minerals are in your school soil.



Definitions for teachers

Source (unless otherwise noted): Soil Health and Glossary, National Resources Conservation Service <u>https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/?cid=nrcs142p</u> <u>2 053848</u>

- Bacteria: Microscopic, single-celled organisms. They include the photosynthetic cyanobacteria (formerly called blue-green algae), and actinomycetes (filamentous bacteria that give healthy soil its characteristic smell).
- **Fungi**: Multi-celled, non-photosynthetic organisms that are neither plants nor animals. Fungal cells form long chains called hyphae and may form fruiting bodies such as mold or mushrooms to disperse spores. Some fungi such as yeast are single-celled.
- **Mineral:** A mineral is an element or chemical compound that is normally crystalline and that has been formed as a result of geological processes" (Source: Nickel, E. H., **1995**). "Minerals are naturally-occurring inorganic substances with a definite and predictable chemical composition and physical properties." (Source: O' Donoghue, **1990**).
- **Organic matter:** any material that is part of or originated from living organisms. Includes soil organic matter, plant residue, mulch, compost, and other materials
- Silt: a granular material of a size between sand and clay, whose mineral origin is quartz and feldspar. Silt may occur as a soil (often mixed with sand or clay) or as sediment mixed in suspension with water (also known as a suspended load) in a body of water such as a river. (source: Wikipedia)



Resources for Teachers

- Flow diagram for Texture by Feel. Commonly used in the field. Provided by the USDA Natural Conservation Resources Service. (Click <u>here</u> for a highresolution version of the graphic.)
- <u>Soil Science Society of America</u> provides an excellent bank of soils lessons for multiple grades covering texture, biology, chemistry, forensics, and more. <u>http://www.soils4teachers.org/lessons-and-activities#General9</u>
- Basic Hydrologic Science Course Runoff Processes Section Four: Soil Properties. In depth explanations with public domain graphics. <u>http://wegc203116.uni-graz.at/meted/hydro/basic/Runoff/print_version/04-soilproperties.htm?vm=r#12</u>
- <u>Soil Biology Primer</u>, Natural Resources Conservation Service, USDA. <u>https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/biology/</u>

