SOIL BASICS

What's going on under our feet

And in our gardens.

Score Four Program, Interstate Commission on the Potomac River Basin, July 2015.

SOIL: THE FOUNDATION FOR *A* PLANT'S SUCCESS

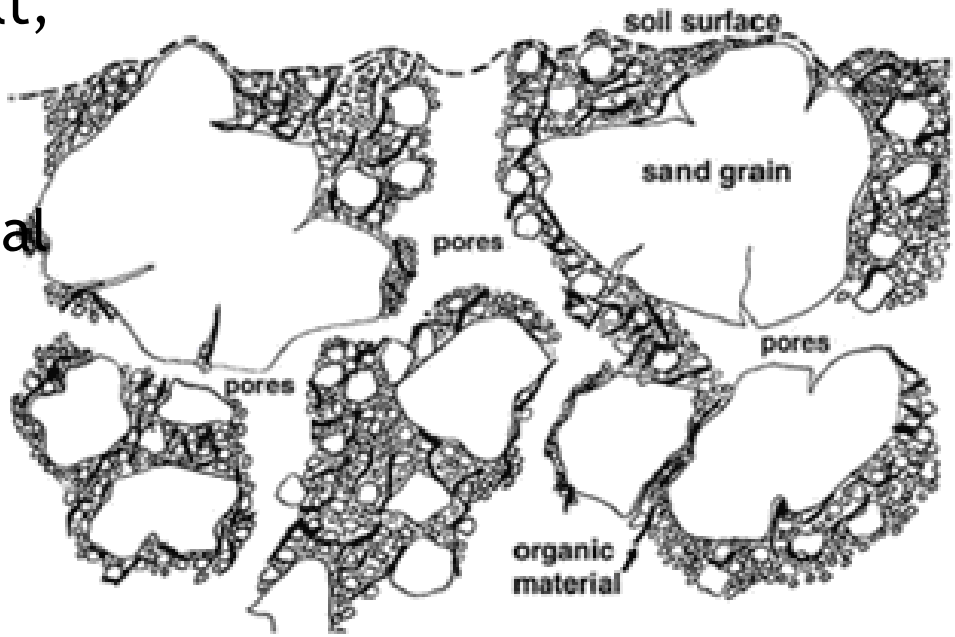
Soil provides plants with --

- Nutrients
- Minerals
- Water
- Oxygen

IT'S NOT JUST DIRT

Soil consists of:

- Mineral particles – sand silt, or clay
- Organic matter – decomposing plants, animal matter and droppings
- Small organisms – worms and insects and microorganisms, such as bacteria and fungi
- The space between mineral particles (pore space)

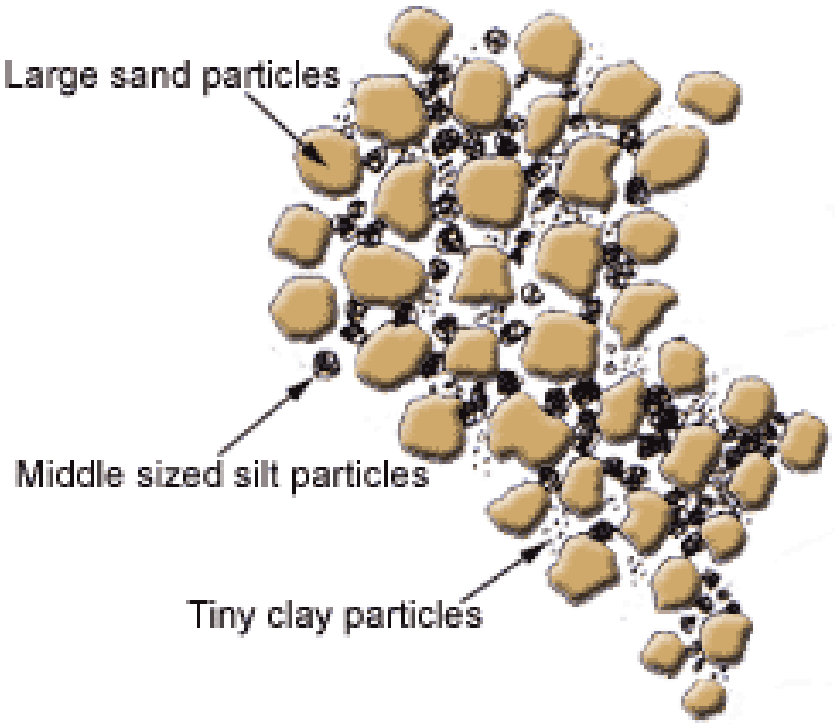


Graphic: MEA Learning Center, http://mea.com.au/soil-plants-climate/soil-moisture-monitoring/learning-centre/what-is-soil-structure?vm=r

SOIL: IT'S A MIX

Three minerals comprise soil:

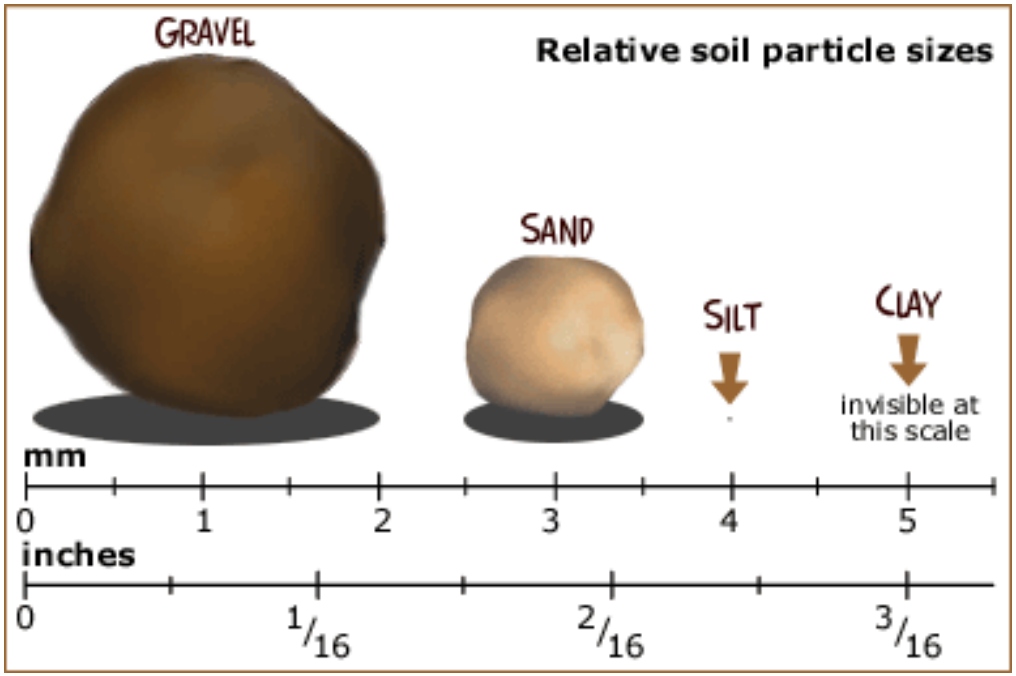
- Sand
- Silt
- Clay



More On Minerals

These minerals are classified by size.
You can see –

- Sand with your eye or magnifying glass
- Silt with microscopes
- Clay with electron microscopes



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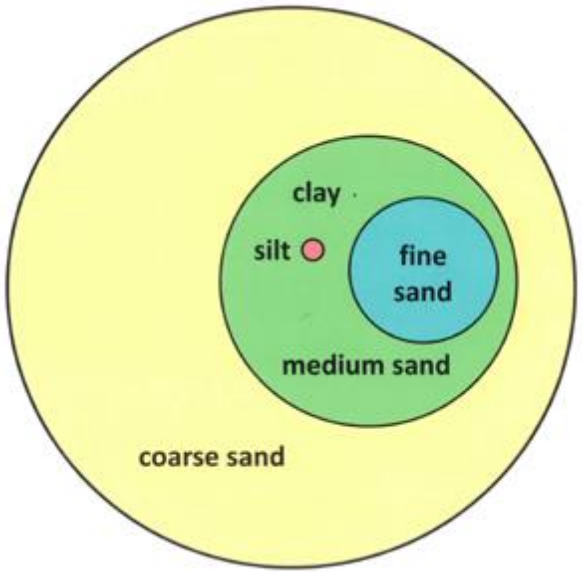
TEXTURE -- THE FEEL OF SOIL

Particle size influences soil texture.

The particles **feel differently**, due to their sizes and structure.

The minerals in a soil define its **texture.**

We can tell the general composition of soil from its texture.



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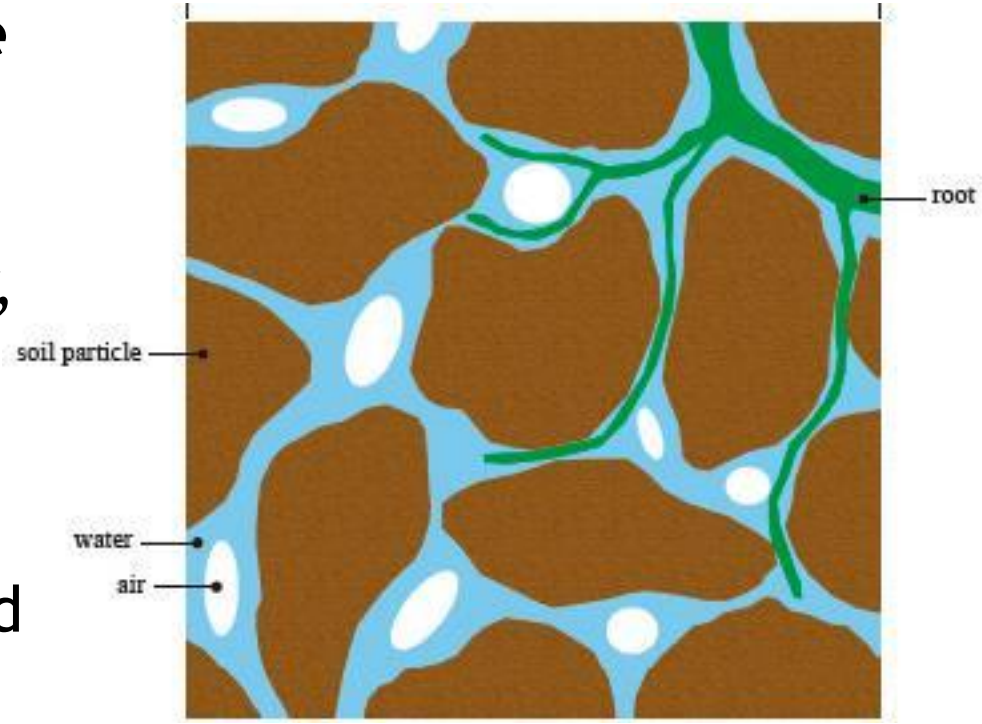
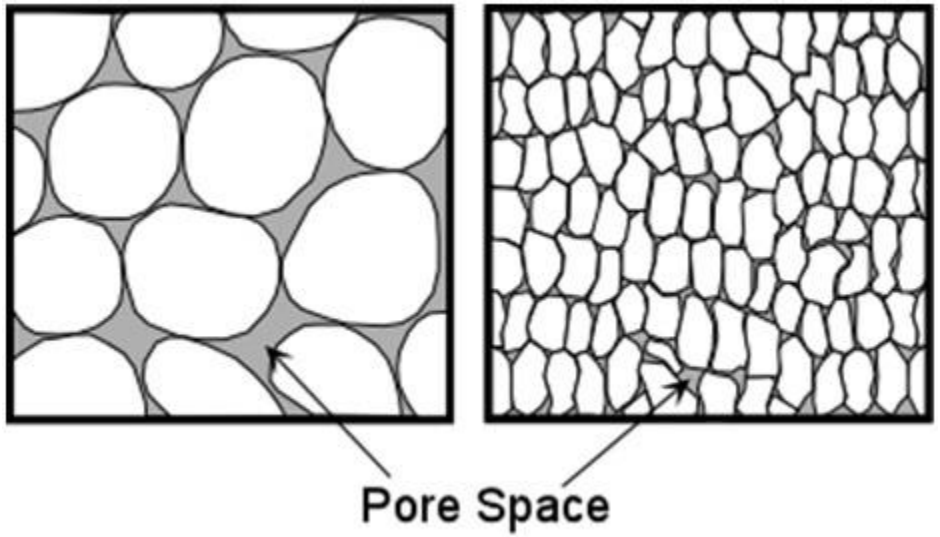
WHAT?? SPACE IN SOIL?

- The spaces between soil particles are called **pore spaces**.
- Pore spaces house water, oxygen, and microorganisms.
- Plant roots grow into and make pore spaces.



MORE ON PORE SPACE

Different types of minerals have different sized pore spaces.

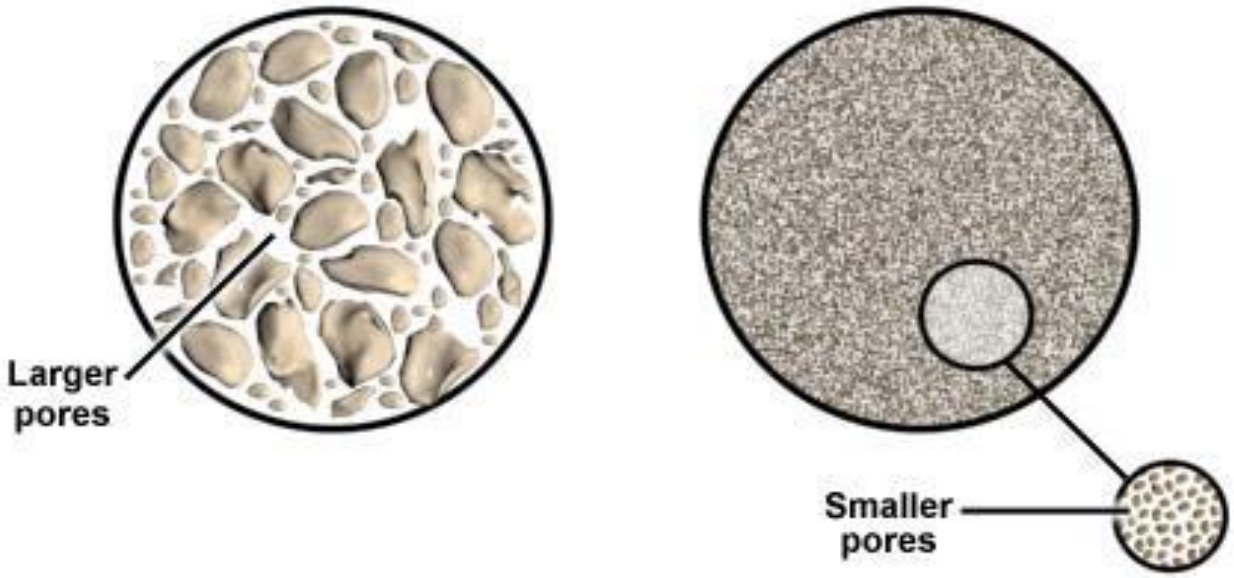


Graphic: Earth Science Australia

THINKING-CAP TIME

Which type of mineral has the largest pore spaces?

- Sand?
- Silt?
- Clay?

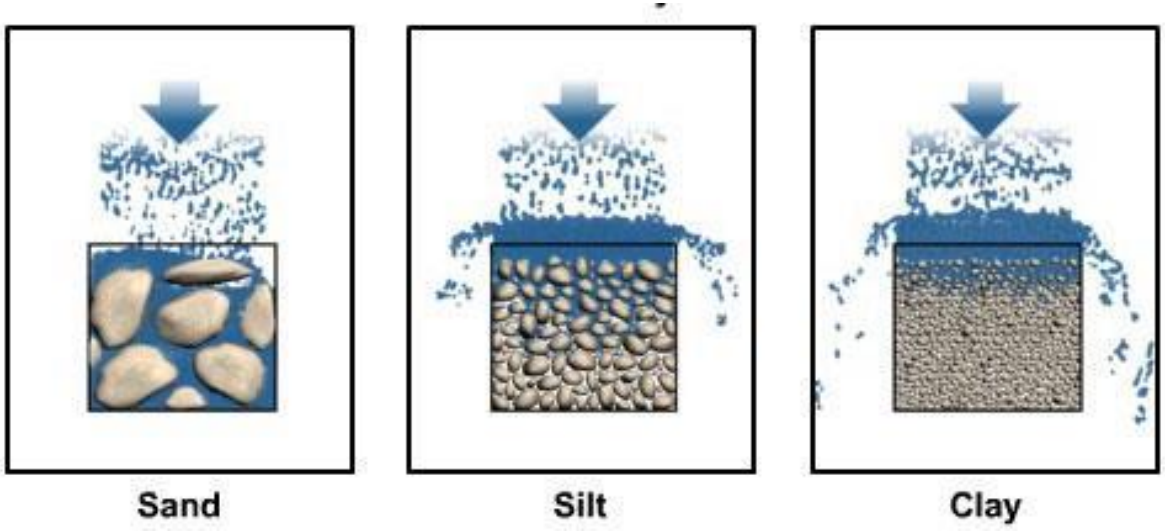


INFILTRATION AND POROSITY

Infiltration: water passing into the soil.

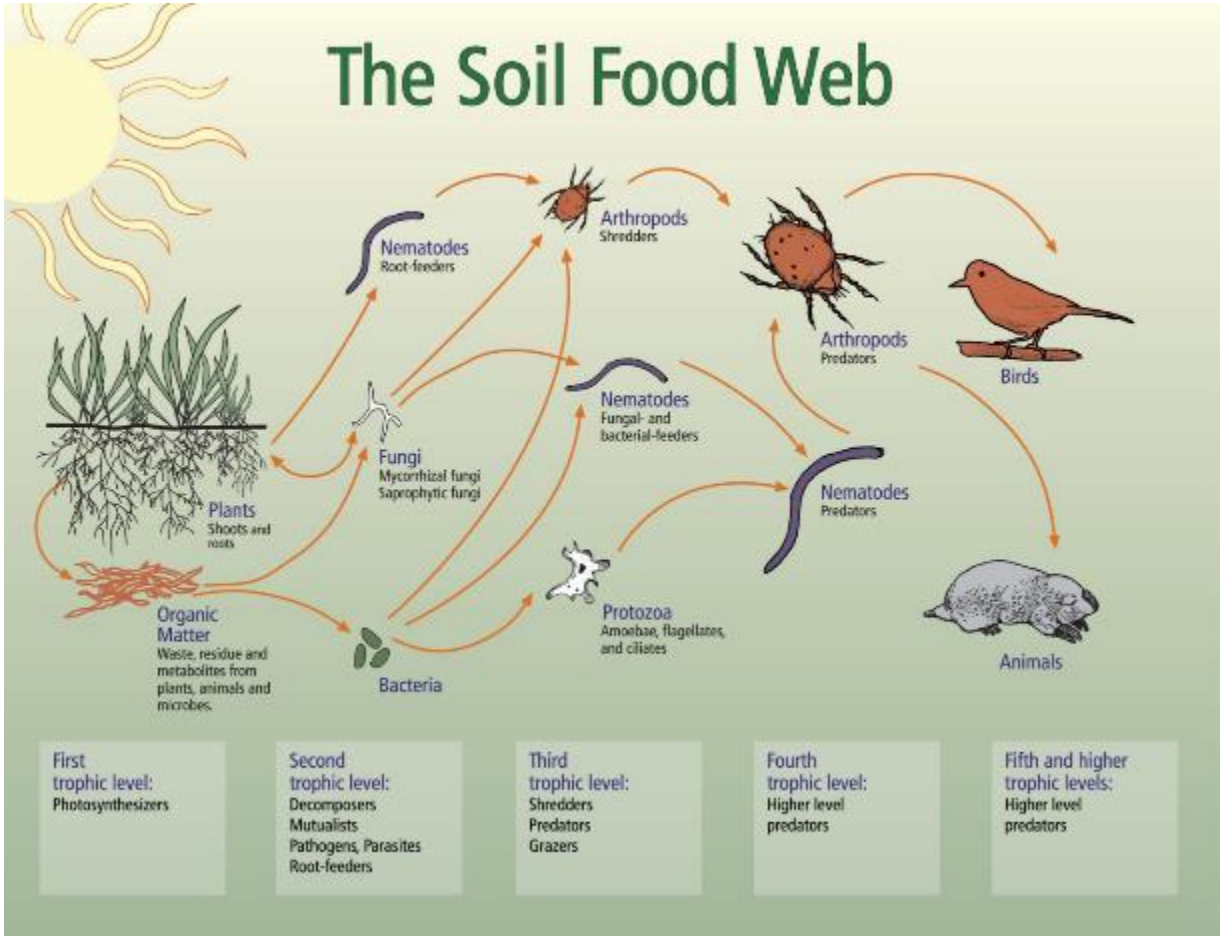
Porosity: the amount of pores in soil.

- Which soils are the most porous?
- Which soil would rain infiltrate into the fastest?



ORGANISMS LIVING IN SOIL

- Bacteria and protozoa
- Algae and fungi
- Microscopic nematodes and arthropods
- Worms, insects, animals
- Plants
  - Interestingly, these organisms cleanse our water and air



Graphic: Soil and Water Conservation Society (SWCS). 2000. Soil Biology Primer. Rev. ed. Ankeny, IA: Soil and Water Conservation Society

BACK TO THINKING-CAP TIME

- What are some factors that cause pore spaces in soil?
- Which would retain water the best – a sandy soil or a clayey soil?
- What types of organisms do you think you will find in your school soil?

QUESTION TO THINK ABOUT

- Plants need nutrients, oxygen, and water from the soil.
- Rain gardens are meant to let large amounts of storm water percolate slowly through the soil.
- **Which mix of soils would work best in a rain garden?**

Think about this question during your soils experiments.

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RESOURCES

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