

What is soil?

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Soil is much more than dirt. Soil is a complex, mixture of mineral matter, organic, and living material that support plant life. Dirt is not necessarily soil by this definition because dirt may lack essential life sustaining elements.

It is important to acknowledge the important role that soil plays in our lives and in our landscapes. We, as humans, affect the quality of our soil by our activities. In our suburban landscapes the quality of the soil is proportionate to how it has been handled by man. Home building 60 to 100 years ago in inner ring suburbs such as Cleveland Heights and Shaker Heights, did not have as much of an impact on the surrounding environment, so the natural soil layers remained in tact. In new(er) home development, or outer ring suburbs, developers strip top soil and organic material from the site and then grade out subsoils across the landscape after excavating. The disruption of soil layers, or the soil horizon, creates landscape management problems that show up after the landscapes are installed. Proper preparation before installing the landscape will minimize

the impact caused by new home building methods, although natural soil horizons cannot be recreated. Often builders and owners do not set aside enough of their budget to rebuild soil in their landscape, ultimately leading to disappointment in the quality of the landscape.

Living organisms in our soil are important to overall plant and landscape health. Both plants and animals help to create a soil. As they die, organic matter incorporates with the mineral matter and becomes part of the soil. Living animals and organisms such as moles, earthworms, fungi, bacteria, and nematodes are all busy moving through or digesting food found in the soil. All of these actions mix and enrich the soil. Sterile soil lacks these organisms and is often too deficient in organic matter to be successful at supporting good plant life.

Altering your soil

Thought should be given to any new soil you may be adding to your land-

scape and how it will affect your current environment. Soil additives can help promote increased diversity in soil organisms, creating a healthier soil for your landscape. On a larger scale, adding high-quality products that are the building blocks for good soil can seem expensive, but they are well worth the investment over the long term.

Soil in Cuyahoga County is primarily mineral soil, consisting of sand, silt and clay. The proportion of these minerals relative to one another can be measured quite easily. Once we determine the type of soil we have in our landscapes, we can plan a management program and new installations appropriately. We cannot readily change the composition of our soil. We are better off accepting and working with the type of soil we have. What we can do is make existing soil healthier by adding organic matter on a regular basis. Creating a healthier soil that attracts and sustains earthworms, bacteria, fungi and other living organisms is ideal.

A typical cultivated soil will have 50 to 60% mineral particles, 1 to 5% organic matter, and 40% pore spaces between the particles, which will have varying amounts of air and water in them.

The distribution of the particles determines the structure of the soil and how porous it is. It is important to maintain a good structure. Compaction reduces the porosity, the addition of grit and organic matter increases it. Wetting and drying, freezing and thawing, root growth, soil organisms and cultivation are all actions that change the structure.



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A Simple Test

We can measure the proportions of the mineral particles in our soil by conducting an unsophisticated Jar Test. By comparing the results of our test with the soil pyramid (see chart), the type of soil is defined. This information helps when determining what plants to select for certain locations. Most growers and suppliers provide information about the ideal soil conditions for the plant. For desired plants that won't readily grow in the type of soil present, creating raised beds or amending soil in smaller areas may allow us to keep and grow them, but there will always be limitations. The best way to determine the limits is through experimentation or consulting with a professional.

A much simpler, but less accurate method to gauge soil composition is to take a small amount of slightly moist soil in your hand. Rubbing the small sample between finger and thumb will give a rough guide to the texture of soil. Sands have little cohesion and don't bind; sandy loam has a gritty feel; loam can be formed into a ball and does not have a dominant



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feel of grittiness, silkiness or stickiness; loamy sand can be rolled into a "worm"; silty loam has a silky feel; clay loam binds together strongly, does not readily deform and takes a polish if rubbed; clay readily binds and takes a polish if rubbed. The amount of organic matter and calcium in the soil can change the feel. Chalk can give a silky or gritty feel and organic matter makes it stickier.

There is much to consider when evaluating soil, though it need not be complicated. Generally speaking, we are

working with clay soils that are best amended using organic matter in sufficient quantity and with proper regularity to create and maintain healthy soil in our landscapes. We need to maintain the air space or pores in the soil by avoiding soil compaction as much as possible. Realize that clay soils have a small particle size, and therefore have small pore spaces between them. Clay soils will compact easily, which results in poor drainage that can lead to other problems with our landscapes.

The addition of humus and organic matter bind the particles together, forming small clumps or crumbs - but clay particles are the main stabilizers in a good loam. Changing or adjusting the ratio of soil types in your landscape can be expensive, and often not very effective unless entire areas are excavated, removed from the site and new soil brought in. This is generally not practical. Completely removing and changing the soil composition may also remove some of the beneficial organisms that are integral to maintaining healthy soil. ●

A Simple Jar Test:

- 1) Take a jar with a lid and fill it half full with soil from the area you wish to test.
- 2) Fill the rest of the jar with water and a drop of dish soap.
- 3) Shake the jar up vigorously to suspend the soil particles in solution.
- 4) Let the jar sit. Monitor the jar in the following intervals.
- 5) One minute: Sand, the largest and most coarse particle, will settle out first. Mark the sand line on the jar.
- 6) Six hours: Silt is less coarse and takes longer to settle out of solution. Mark the silt line on the jar.
- 7) 24 hours: Clay particles are smallest and take up to 24 hours to settle out. Mark the clay line on the jar.
- 8) Measure the total height for all three particles in the jar.
- 9) Measure each of the three particles and determine their percentage of the whole sample.
- 10) Follow the soil pyramid, plotting the percentage of each of the particles to determine the type of soil.

