

Soil science basics

A healthy and productive vegetable garden starts at ground level.

Because soil is a living system, it needs as much care and attention as the plants that grow in it. A good understanding of your soil will help you decide how best to care for it.

What is soil?

Soil is a mixture of solids, spaces, and living organisms.

About 97% of the solid part of soil is mineral, mainly made of rock that has been broken down into tiny particles. The type of rock (also known as parent material) has a big influence on the type of soil that develops. For example, sandstone weathers into sandy soil while shale produces a more clayey soil.

The remaining 3% or so of the solid part of soil is organic matter. Organic matter is a mix of dead plant and animal materials in various states of decomposition plus living organisms and plant parts that reside in the soil.

Depending on texture, 30-60% of soil is space.

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Figure 1. The mixture of parts in a typical soil.
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Soil texture

The mineral part of soil is a mix of rocks, gravel and soil particles (pieces 2mm or less in diameter).

Depending on their size, soil particles can be classified from largest to smallest, as sand, silt,

Billions of microorganisms decompose dead plant and animal material, releasing nutrients and organic matter. Animals and living plants do their part by adding organic matter and mixing and loosening the soil.

Soils with lots of sand aren't very good at holding water or nutrients. Clayey soils can have drainage problems and plant roots may have trouble growing through these tight packed sticky soils. Of course, most soils are a mix of particle sizes. The ideal gardening soil is a loam; 40% sand, 40% silt, and 20% clay. Knowing the texture of your soil will help predict how it will respond to cultivation and what plants will grow well.

Soil structure

Soil structure refers to the way in which soil particles

It's the soil life that allows soil to function as a base for growing plants. It ties together the soil physical and chemical properties. For example, fungi and bacteria get their energy by breaking down dead plant and animal matter. At the same time, they release nutrients in a form that plants can use. They also produce sticky substances that bind soil particles together to form granules. Soil macroorganisms further improve soil by breaking down larger residues and mixing the soil.



You can support a vigorous and well balanced population of soil organisms by adding plenty of organic matter (especially compost), making sure the soil is well aerated, and keeping it evenly moist.

Activity 2