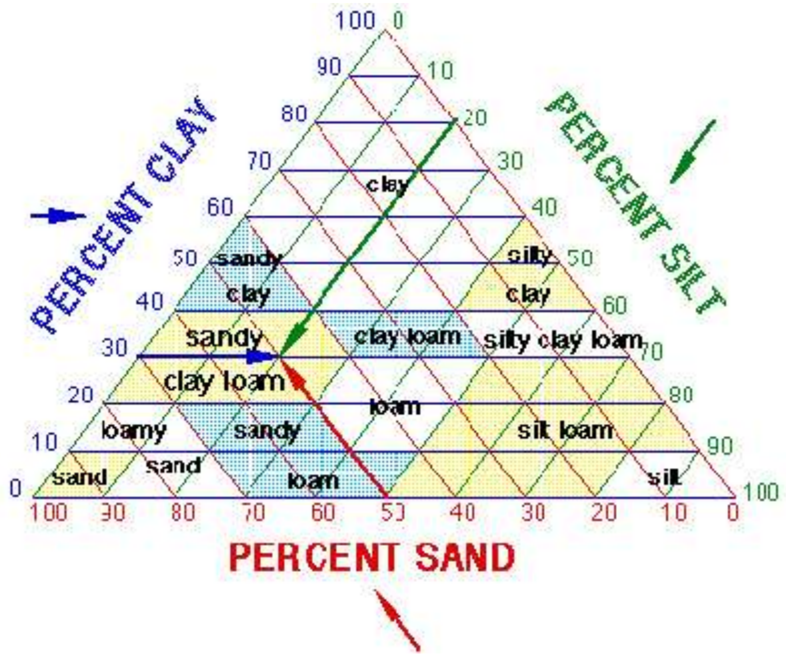
Physical Properties: Soil Texture

Soil texture describes the size (diameter) of the soil particles. Where larger mineral particles predominate, the soil is gravelly (d > 2mm), or sandy (0.05 < d < 2); where smaller, colloidal mineral particles are dominant, the soil is claylike (d < 0.002). Soils can have any combination of gravel, sand, and clay and a textural chart is used to describe the different soil textures as shown below:

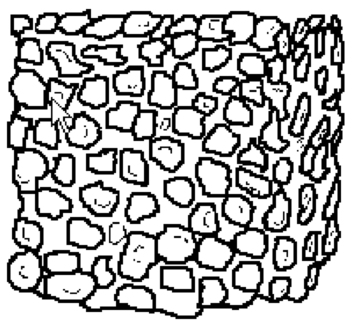
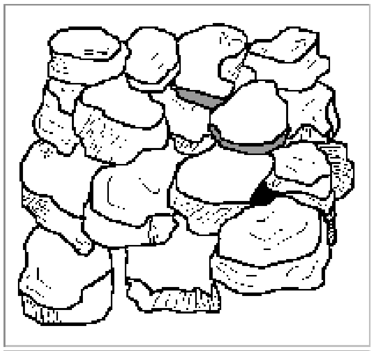
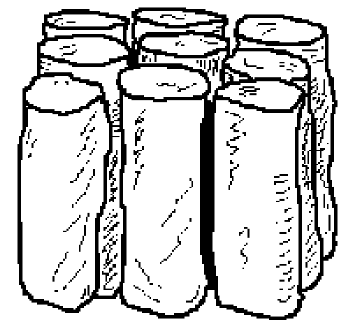
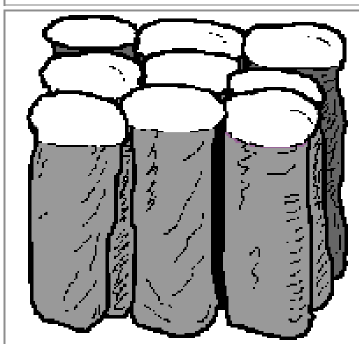
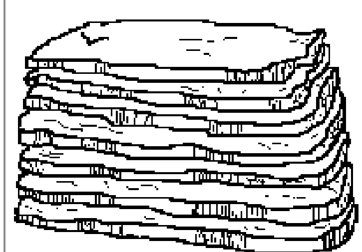
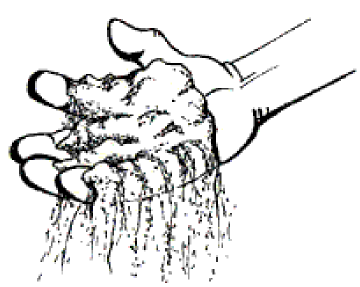


Any soil composed of all three particle sizes and not exhibiting the physical properties of any one of them is referred to as a loam. Texture influences plant growth by its direct effect on soil aeration, water infiltration, cation exchange capacity (CEC), and erodibility. Infiltration and permeability are rapid in sandy soils, very slow in clay soils, and intermediate in loam soils. Soils that are granular, with a large diversity in particle size, have many large and small pores - a desirable characteristic for plant growth.

Soil texture can be estimated in the field by experienced soil scientists. Although, accurate determination of soil texture is measured in the laboratory. The procedure commonly used involves determining particle sizes by the rates that they drop out of solution. The soil particles are first suspended in a solution. This is usually accomplished using chemical treatments along with a high-speed blender or sonicator. While a set of sieves can be used to separate out the sand fraction, a sedimentation procedure is usually used to determine the amounts of silt and clay. Soil particles are denser than water and they tend to sink. Depending on their size, they will settle at different velocities with larger particles settling faster. By measuring the amount of soil still in suspension after various amounts of settling time (using a pipette or hydrometer), the percentages of each size fraction can be determined, ultimately identifying the soil textural class. The size of the particles can be determined because settling time can be related back to the diameter of a particle by Stoke's Law (Brady and Weil, 1999).

Soil Structure

Soil structure is another description of the soil that describes the soil peds (aggregates) in terms of shape. They are classified in four principal groups of shapes: spheroidal, platy, prismlike, and blocklike. The different shapes of aggregates in the soil define the pattern of pores and peds. This pattern defines the soil structure which greatly influences water movement, heat transfer, aeration, and porosity in soils. Common activities on disturbed lands such as tillage and liming impact soils largely through their effect on soil structure, especially in the surface horizons. Soil structure is usually determined in the field by a trained individual (Brady and Weil, 1999).

		
Granular: Resembles cookie crumbs and is usually less than 0.5 cm in diameter. Commonly found in surface horizons where roots have been growing.	**Blocky**: Irregular blocks that are usually 1.5 - 5.0 cm in diameter.	**Prismatic**: Vertical columns of soil that might be a number of cm long. Usually found in lower horizons.
		
Columnar: Vertical columns of soil that have a salt "cap" at the top. Found in soils of arid climates.	**Platy**: Thin, flat plates of soil that lie horizontally. Usually found in compacted soil.	**Single Grained**: Soil is broken into individual particles that do not stick together. Always accompanies a loose consistence. Commonly found in sandy soils.

http://www.ctahr.hawaii.edu/mauisoil/a_factor_ts.aspx