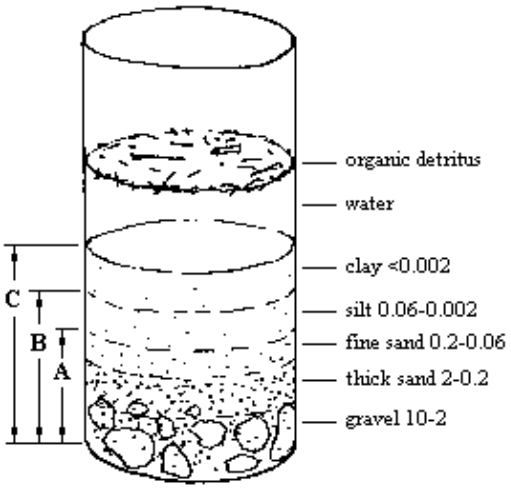

Figure 1 - Test for the composition of the soil.
(The sizes are in mm)

Soil Regeneration Training

Soil Structure: Analysis of Soil Composition

ANALYSIS OF THE SOIL COMPOSITION

The soil is composed of many different sized particles. With this simple experiment you can separate the main components of the soil and evaluate their proportions.

1 - Go into a field and collect a sample of soil. Put it in a jar of water. Stir it well and let it settle. Observe and describe the different layers of materials.

2 - In water, particles settle more quickly the bigger they are. It is possible to use this property to determine the amount of each component of the soil. Put 3 parts water and 1 part of soil in the container (try 1 cup soil and three cups of water in a quart jar); shake the container for 5 minutes and let the material set. With reference to figure 1, after 40 seconds, measure the thickness of sediment. Call this A; after 30 minutes measure again and call this B; after 24 hours measure C. Now, by subtraction, you can determine the thickness of the main layers: C-B = layer of clay, B-A = layer of silt, A = layer of gravel and sand. Using a sieve with 2 mm holes (less than 1/8 inches), you can separate the gravel from the sand and determine their ratio. On the basis of these data, calculate the content (%) of each component of the soil sample.

3 - Repeat the same experiment with soil collected in other places or that have a different geological origin (i.e: meadow, wood, river bank) or any place the soil has a different consistency or texture (i.e: muddy, sandy). Describe the composition of each soil and try to explain the differences. You can also apply this technique to evaluate the composition of the soil for a potted plant and correct it. Example: if water doesn't drain well, would more sand help? If it needs to hold water longer would clay or organic matter be helpful?

4 - With a microscope, measure the size of the particles. With a clock, measure the time to drop to the bottom of a jar of water. Time of the particles in water verses their size, then graph with the Y-axis for the size of the particle and X-axis the time to fall.

http://interactive.usask.ca/skinteractive/modules/agriculture/activities/soil.html Soil and Environment Activities
http://fbe.uwe.ac.uk/public/geocal/soilmech/classification/soilclas.htm Soil description and classification
Internet keywords: soil sedimentation test.

SOIL MOISTURE AND PERMEABILITY

The composition of the soil has important consequences on its permeability towards water and on its ability of keeping it. In a flower pot does it retain water or does it drain well. With this experiments you will be able to evaluate the characteristics of some basic components of soil.

1 - Put sand in one glass, clay in another, and mixed soil rich in humus in a third. Push a finger into each glass and smear the sample to the wall of the glass. Pour some water in each glass and observe what it happens: in the glass with sand the water falls to the bottom quickly, in the one with clay water remains in the top or falls very slowly, in the one with mixed soil and humus water is absorbed and distributed in a homogenous manner (figure 2). Try to give an explanation of these different properties. What consequences can a storm have on lands with these different compositions?

2 - Assess the drainage and water holding ability of different soils and make a connection with their composition determined from the previous experiment.
In this test we have not taken into account the important role of the organic substances provided by the humus.
http://ag.arizona.edu/turf/tips1095.html Soil Characteristics and How They Affect Soil Moisture
http://wcuvax1.wcu.edu/~burr/soilinfo.html Soil permeability
Internet keywords: soil permeability moisture.

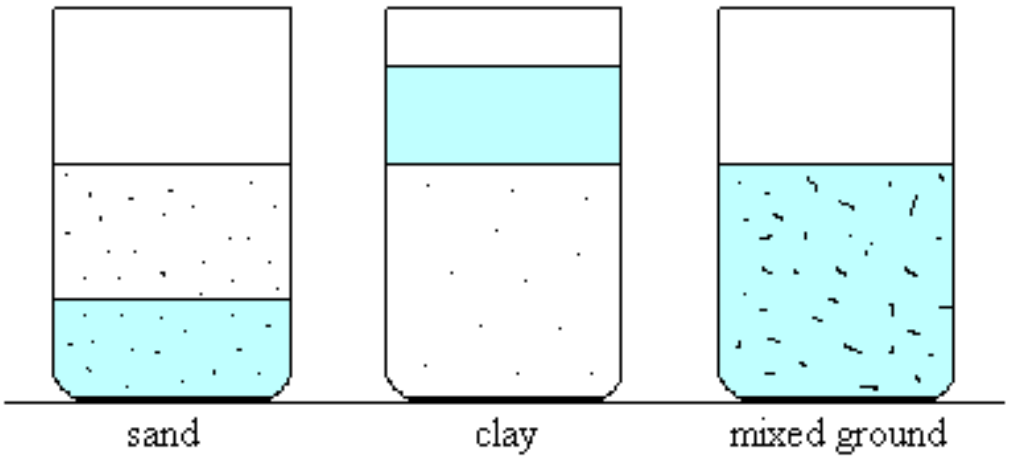

Figure 2 - Permeability of different types of soil components. In blue the distribution of water.