

Soil Texture

USDA-Natural Resources Conservation Service

Introduction

Soil is classified by the relative percentages of sand, silt, and clay or soil texture. This can be visualized using the USDA Soil Textures Triangle (see picture below). Soil texture may impact soil functions, including water and gas movement.

Supplies

Shovel

Mason jar or leak-proof jar with a lid – pint or quart (500 or 1000 ml) sized

Water

Detergent – non-foaming

Ruler

Calculator

Method

1. Cut any plant material at the soil surface and remove.
2. Collect 2 shovels full of soil to a depth of 8-12 inches in a large bucket at the desired location.
3. Remove all rocks and pebbles larger than 0.5 inch or 1.5 cm, loose vegetative matter – leaves, twigs, etc. and large roots. Mix up the remainder thoroughly.
4. Place 1-2 cups of this material into a jar.
5. Add water to about a 0.5 inch or 1.5 cm from the top.
6. Add a drop of non-foaming detergent (dishwasher soap).
7. Shake vigorously end-over-end for 2 minutes until the material has gone into solution.
8. Set jar aside on a flat surface and allow the material to settle into distinct layers at least 24 hours.
9. Measure the full height of the settled soil.
10. Repeat Steps 7-8.
11. Measure the heights of each layer – sand at the bottom and clay at the top.
12. The height of the sand layer is the size of the sand layer. Subtract the height of the sand layer from the height of the silt layer to obtain the size of the silt layer. Subtract the height of the silt layer from the total height of the soil from Step 9 to determine the size of the clay layer (**Figure 1**).
13. To determine the soil type or textural class, divide the size of each layer from Step 12 by the total height of the soil from Step 9 all three classes of particles and multiple by 100 to get the percentages. Enter the percentage of sand and silt into the table and click on ‘Get Type’ at this website: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/tools/?cid=nrcs142p2_054167 or use the textural triangle in **Figure 2** to determine the soil texture.

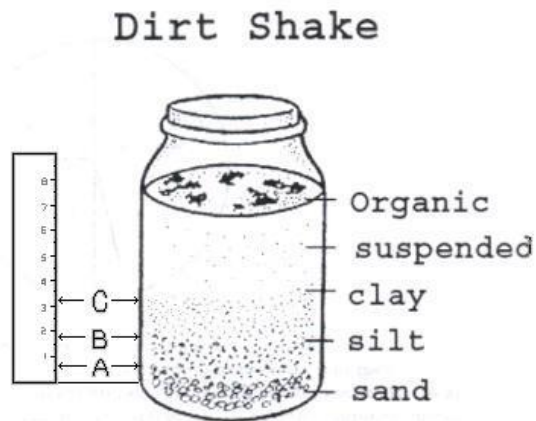


Figure 1. The soil particles (i.e. sand, silt and clay) settle in water due to gravity at different rates based on their sizes (see the USDA classification below).

USDA classification

Sand

Soil particles between 0.05 and 2.0 mm in size

Can be further divided into coarse, medium, and fine sand with a sieve test

Silt

Soil particles between 0.002 mm and 0.05 mm

Clay

Soil particles smaller than 0.002 mm (2 microns) in size

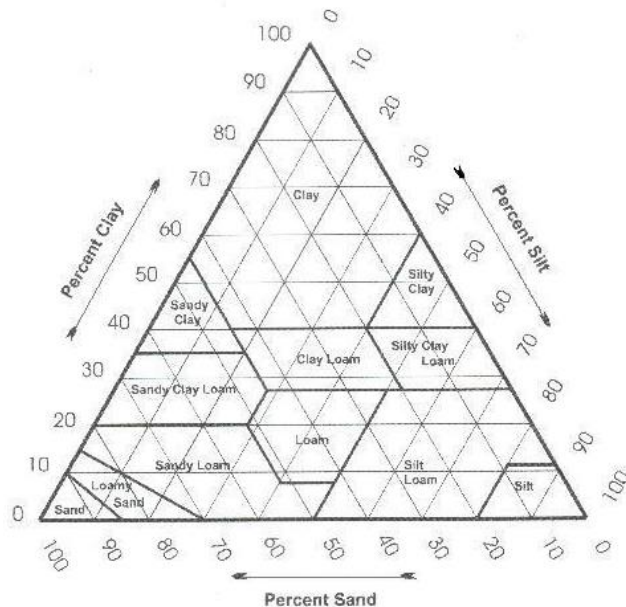


Figure 2. Use the percentages of sand, silt and clay to determine the soil texture.