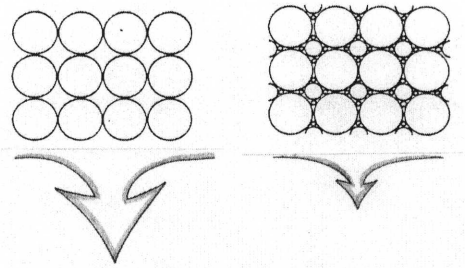
Soil Texture

Developed by: Peter C. Fletcher

Relative proportion by weight of clay, silt, and sand size particles.

Importance of Soil texture



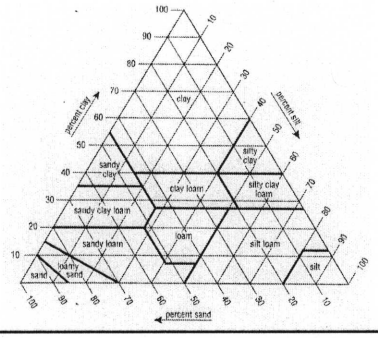
Systems for Classifying Particle Size Distribution

- American Society for Testing and Materials
- American Assoc. of State Highway Officials
- Geologists
- Engineers, Unified Classification System
- United States Department of Agriculture (USDA System)

Need for Standardized Terminology with well defined specifications.

- Silty sand
- Sand, little silt
- Loamy sand
- Boney, gravelly, silty, sandy clay with trace of organic

USDA Textural Triangle



Organic Soil Material verses Mineral Soil Material

Organic Soil Material

- Most common in woodland areas
- High percent organic matter
- Typically dark brown or black color
- Often high fiber content
- When dry, retains dark color and has light weight

Mash Potato Test

Peter C. Fletcher

Word of Caution

A very dark or black color most often indicates the presence of organic material in the soil but by itself does not verify an organic soil material.

Live roots do not count as soil organic matter

USDA - Soil Particle Sizes

Fine Earth Fraction

- Clay — less than .002 mm
- Silt — 0.002 mm to 0.05 mm
- Sand — 0.05 mm to 2 mm

USDA – Soil Particle Sizes

Rock Fragments

- Gravel — 2.0 mm to 3 inches
- Cobbles — 3 inches to 10 inches
- Stones — 10 inches to 2 feet
- Boulders — greater than 2 feet

Clay Size Particles

- Very smooth, non gritty feel
- When wet – very smooth, sticky, and forms a strong ribbon
- When dry – extremely firm and requires very strong pressure to crush
- Dirties the pores of one's hands

Ribbon Test

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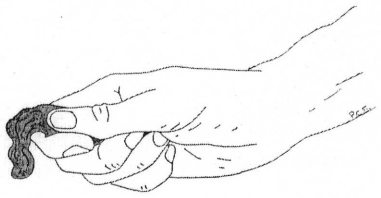

Stickiness Test

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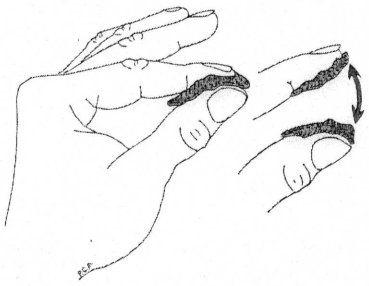

Silt Size Particles

- Very smooth, non gritty feel similar to talcum powder
- When wet – slightly to non sticky, forms a weak ribbon
- When dry – crushes with moderate pressure,
- Dirties the pores of one's hand

Sand Size Particles

- When dry – loose with a gritty feel
- When Moist – has a gritty feel
- Hands can easily be wiped clean

Grittiness Test

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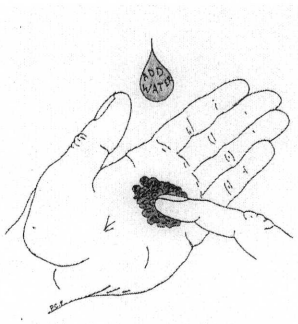

Forming a Cast

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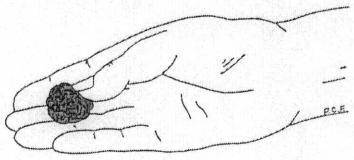
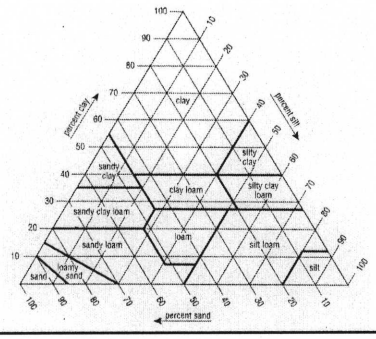


USDA Soil Textural Classes

- Most soils are a mixture of different particle sizes. These different mixes of particle sizes are referred to as Soil Textural Classes.

USDA Textural Triangle



Determining soil texture class using the textural triangle

- 85% sand, 5% clay = loamy sand
- 70% silt and 20% sand = silt loam
- 65% sand and 10% clay = sandy loam
- 10% sand, 60% silt, and 5% organic matter = silty clay loam

Soil Textural Classes Common to Southern New England

- Sand
- Loamy Sand
- Sandy Loam
- Loam
- Silt loam
- Silty Clay Loam
- Silty Clay

Soil Textural Class Modifiers

• Gravelly	15 to 35 percent
• Very gravelly	35 to 60 percent
• Extremely gravelly	greater than 60 %