

Soil Components:

Mineral Particles	Water	Air	Organic Particles	Organisms
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1 acre-foot of soil may contain 3 tons of organisms!

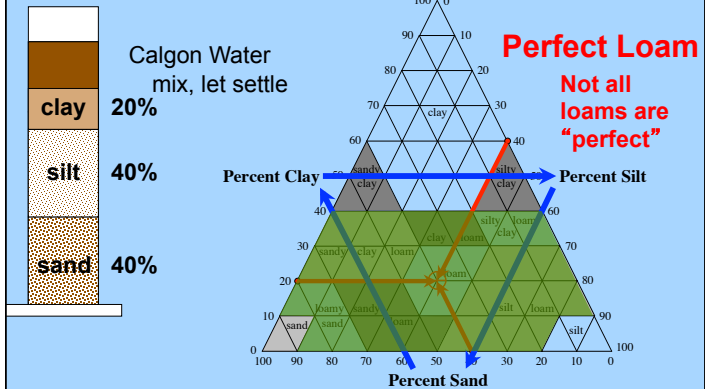
Mineral Particles - We will ignore boulders, rocks, stones and pebbles

	size	drainage	air capacity	water capacity	nutrient capacity
sand	1-0.1 mm	+++	+++	-	-
silt	0.1-0.001	+	++	+	+
clay	< 0.001	-	-	+++	+++

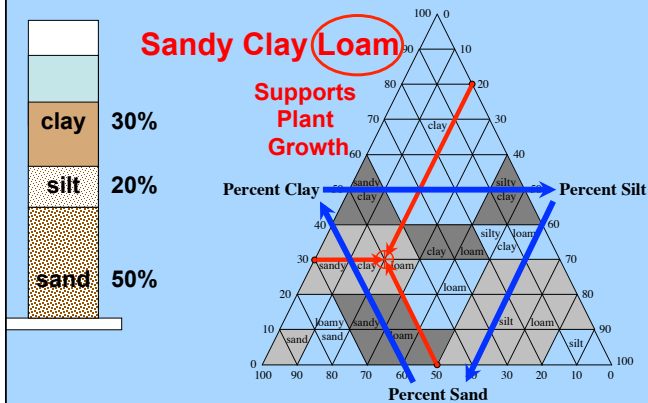
None of these single particles is ideal for growing plants
Loam: a mixture suitable for growing plants

How Do We Know If We Have Loam?

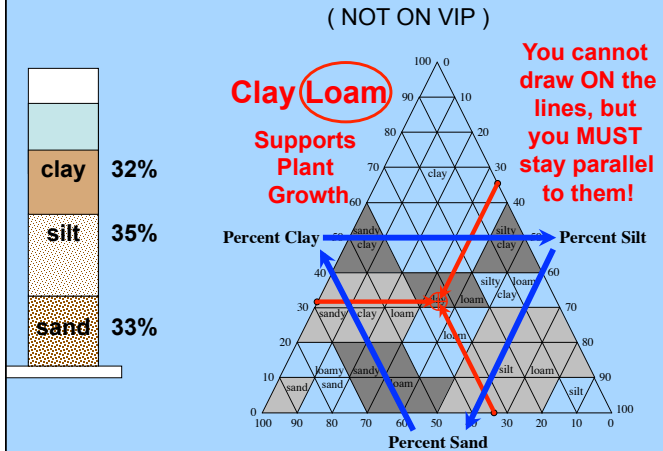
Surface Active Agent
 Surfactant



Let's Try Another Example (NOT ON VIP!)



Let's Try A More-Challenging Example (NOT ON VIP)



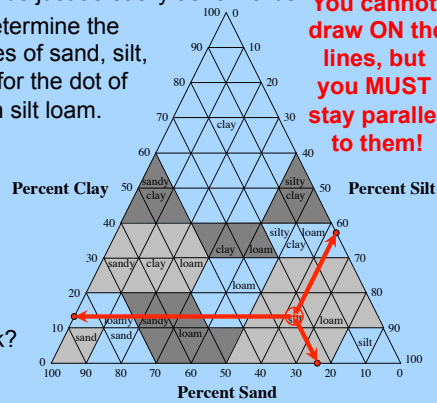
Do You Really Understand This? (NOT ON VIP)

If so, then you should be able to work this process backwards just as easily as forwards!

Try to determine the percentages of sand, silt, and clay for the dot of the i in silt loam.

You cannot draw ON the lines, but you MUST stay parallel to them!

clay 13%
silt 63%
sand 24%
100%



How do you check your work?

Macronutrients C. Hopkins Café: Mighty Good

C	H	O	P	K	N	S	Ca	Fe	Mg
CO ₂	H ₂ O		limited in most soils the three parts of normal fertilizer				limited in CT soils due to acid rain... dolomitic limestone		

Fertilizer Guaranteed Analysis: **N-P-K**

Example Analysis: **5-10-15** Balanced Fertilizer:
Good for flower garden

%phosphorus = **10%** %potassium = **15%** %nitrogen = **5%**

Another Example: **25-0-0** Single Fertilizer:
Nitrogen good for lawn

%phosphorus = **0%** %potassium = **0%** %nitrogen = **25%**

Micronutrients Come on cousin, see Mo by Al and Cleo

Co	Mn	Cu	Zn	Si	Mo	B	Al	Cl
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- Micronutrients are just as important but are needed in smaller amount
- These metal ions serve as cofactors for many enzymes
- Leached out of soils by acid rain
- Added to some blended fertilizers
- Recommended for Connecticut

Nutrients Available to Plants Via Soil Water

Water dissociates: $H_2O \rightarrow H^+ + OH^-$ $[H^+] = 10^{-7}M$ pH 7

[H ⁺]:	10 ⁰	10 ⁻⁷	10 ⁻¹⁴
pH Scale:	0	7	14
Pioneer farmers tasted the soil to decide where to homestead	acid sour	neutral sweet	alkaline bitter
		vinegar	dH ₂ O soap
		cranberry	bean grass

Cation Exchange - how plants "mine" soils

