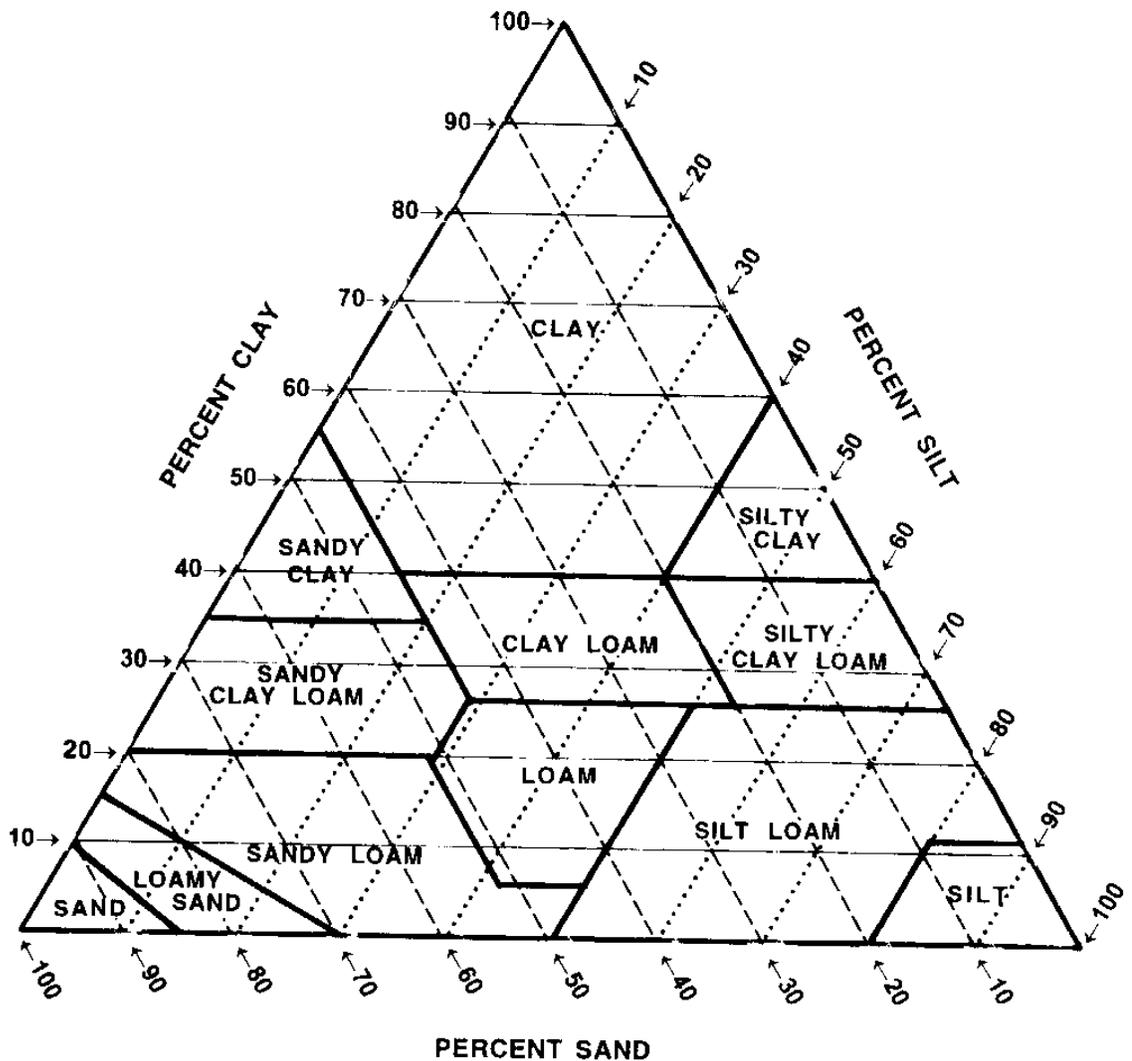


The Size of Sand, Silt and Clay

Name	particle diameter
Very coarse sand	2.0 to 1.0 millimeters
Coarse sand	1.0 to 0.5 millimeters
Medium sand	0.5 to .25 millimeters
Fine sand	0.25 to 0.10 millimeters
Very fine sand	0.10 to 0.05 millimeters
Silt	0.05 to 0.002 millimeters
Clay	below 0.002 millimeters

Soil Texture Triangle



The *soil texture triangle* gives names associated with various combinations of sand, silt and clay. A *coarse-textured* or *sandy* soil is one comprised primarily of sand-sized particles. A *fine-textured* or *clayey* soil is one dominated by tiny clay particles. Due to the strong physical properties of clay, a soil with only 20% clay particles behaves as sticky, gummy clayey soil. The term *loam* refers to a soil with a combination of sand, silt, and clay sized particles. For example, a soil with 30% clay, 50% sand, and 20% silt is called a *sandy clay loam*.

Identifying texture by feel

Feel test – Rub some moist soil between fingers

- Sand feels gritty
- Silt feels smooth
- Clays feel sticky

Ball squeeze test – Squeeze a moistened ball of soil in the hand

- Coarse textures (sand or sandy loam) soils break with slight pressure
- Sandy loams and silt loams stay together but change shape easily
- Fine textured (clayey or clayey loam) soils resist breaking

Ribbon test – Squeeze a moistened ball of soil out between thumb and fingers

- Sandy or sandy soils won't ribbon
- Loam, silt, silty clay loam or clay loam soil ribbons less than 1 inch
- Sandy clay loam, silty clay loam or clay loam ribbons 1 to 2 inches
- Sandy clay, silty clay, or clay soil ribbons more than 2 inches

Note: A soil with as little as 20% clay may behave as a heavy clayey soil. A soil needs 45% to over 60% sand to behave as a sandy soil.

Soil Texture

Step 1 (Get and moisten sample)

Use the triangle to determine the soil texture of your horizon.

Place some soil from a horizon (about the size of a small egg) in your hand, and, using the spray mist bottle, moisten the soil. Let the water soak in and then work the soil between your fingers until it is the same moisture throughout. Once the soil is moist, try to form a ball. If the soil forms a ball, go on to Step 2. If the soil does not form a ball, go to Step 5.

Step 2 (Test for Clay)

A. If the soil:

- Is really sticky
- Hard to squeeze
- Stains your hands
- Has a shine when rubbed
- Forms a long ribbon (5+ cm) without breaking,

Call it a **clay** and go to Step 3.
Otherwise, go to B.

B. If the soil:

- Is somewhat sticky
- Is somewhat hard to squeeze
- Forms a medium ribbon (between 2-5 cm)

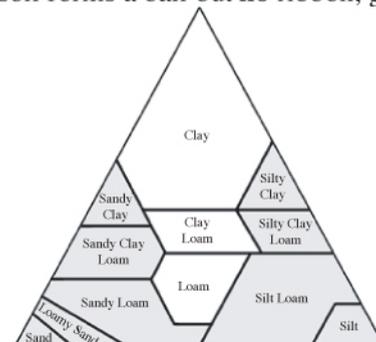
Call it a **clay loam** and go to Step 3.
Otherwise, go to C.

C. If the soil is:

- Soft
- Smooth
- Easy to squeeze,
- At most slightly sticky,
- Forms a short ribbon (less than 2 cm)

Call it a **loam** and go to Step 3.
Otherwise, go to D.

D. If the soil forms a ball but **no** ribbon, go to Step 4.



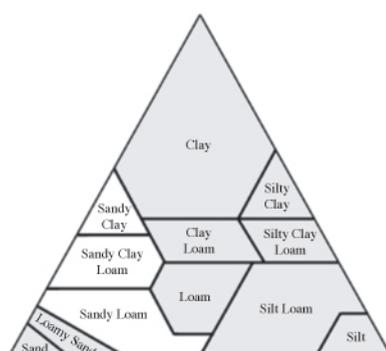
Step 3 (Refine initial soil texture classification from Step 2 for relative amounts of sand and silt)

Wet a small pinch of the soil in your palm and rub it with a forefinger.

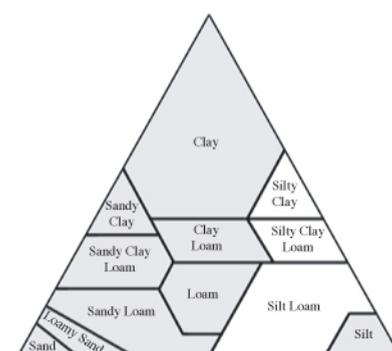
If the soil:

- Feels very gritty, go to **E**
- Feels very smooth, with no gritty feeling, go to **F**
- Feels only a little gritty, go to **G**

E. Add the word **sandy** to the initial classification.
Soil texture is (check one): sandy clay, sandy clay loam, sandy loam
Soil Texture is complete.



F. Add the word **silty** or **silty** to the initial classification.
Soil texture is (check one): silty clay, silty clay loam, silt loam
Soil Texture is complete.



G. Leave the original classification of (check one): clay, clay loam, loam
Soil Texture is complete.

Step 4 (Test for loamy sand or silt)

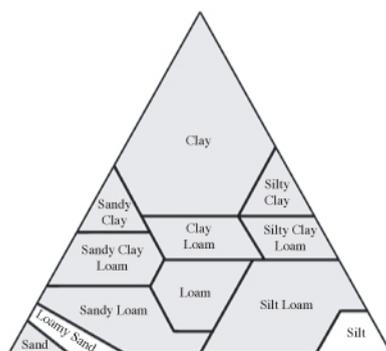
If the soil:

- Forms a ball
- Forms **no** ribbon
- And is

H. Very gritty
Soil texture is: loamy sand
Soil Texture is complete.

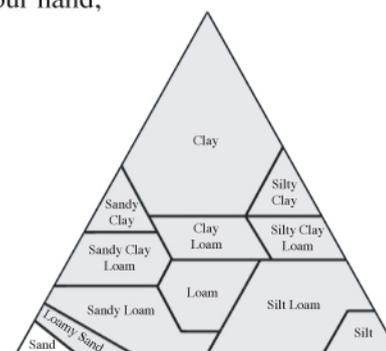
Or

I. Very soft and smooth with **no** gritty feeling,
Soil texture is: silt
Soil Texture is complete.



Step 5 (Test for sand)

If the soil:
Forms no ball and falls apart in your hand,
Soil texture is: sand
Soil Texture is complete.



Free Carbonates

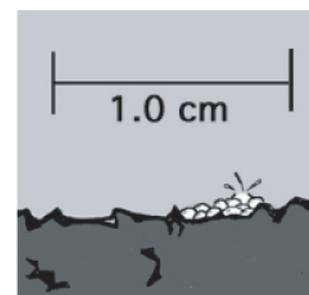
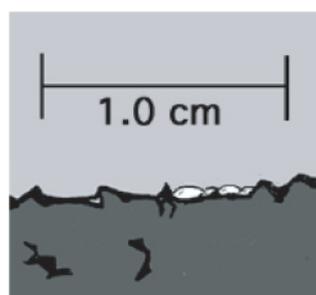
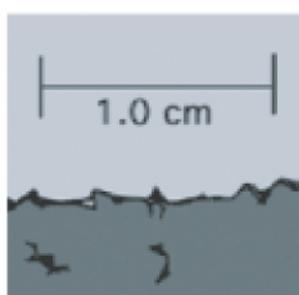
Working from the bottom of a profile up to the top, squirt vinegar in a straight line onto the soil. If free carbonates are present, they will “effervesce” or bubble when the vinegar reacts with them.

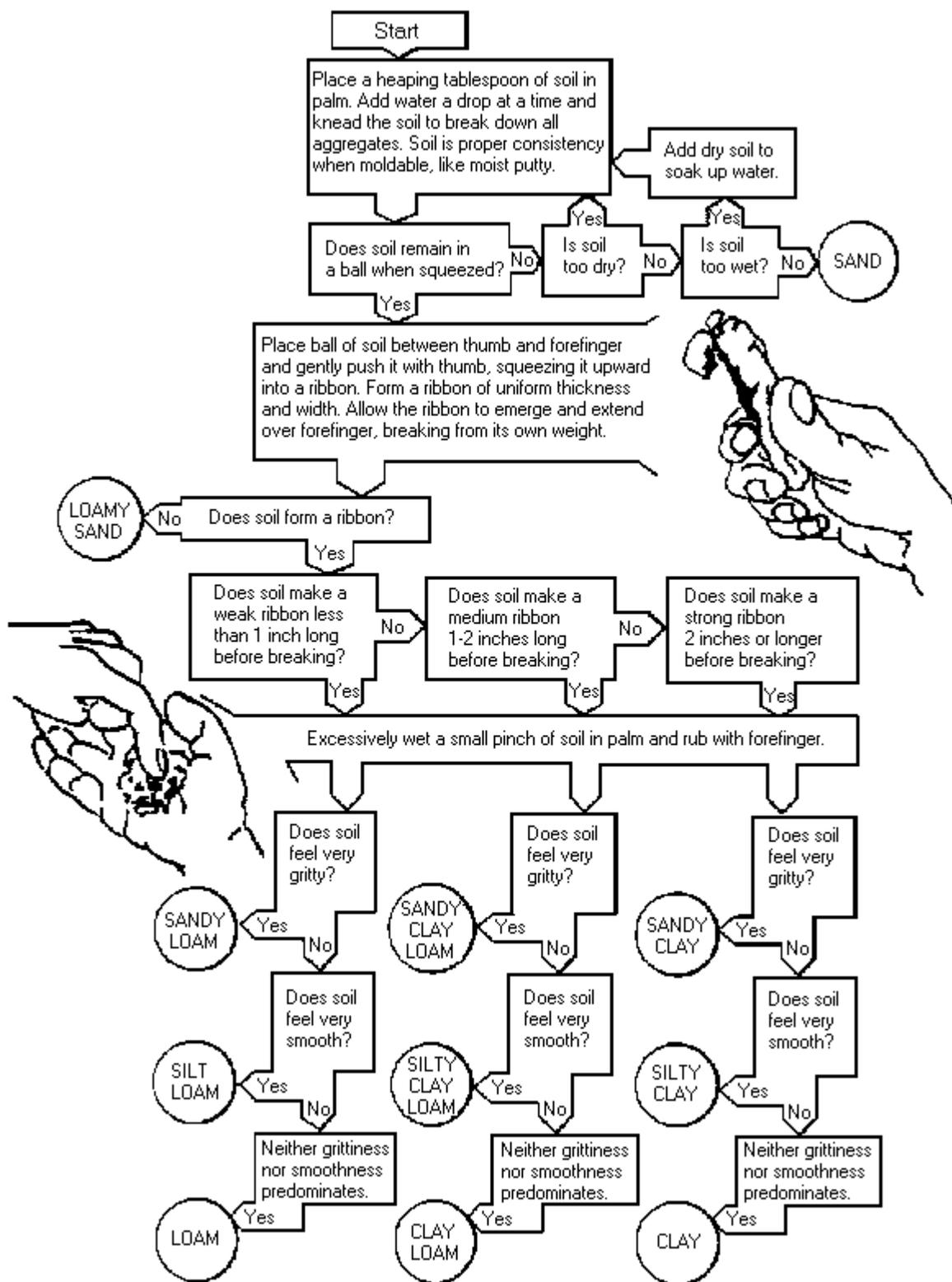
Record one of the following based on your observation:

None: you observe no reaction (the soil has no free carbonates).

Slight: you observe a slight amount of bubbling (the soil is coated with some carbonates).

Strong: you observe a strong reaction (many bubbles) (the soil has many carbonate coatings present).





adapted with permission; originally published in Thien, Steve, "A flow diagram for teaching texture-by-feel analysis," *Journal of Agronomic Education*, 1979, vol. 8, pp. 54-55.