

Soil Analysis Lab

Part I. Classification of Soil Texture by Hand

Background: There are a variety of methods used to determine the type of soil you have. Some people simply pinch soil between their fingers and thumb and if it feels gritty, it contains a lot of sand. If it feels sticky and can be molded into a ball, it contains a lot of clay. If it feels quite smooth, almost like flour, it contains a lot of silt. The best soil for plant growth is a "loam" which contains a high amount of silt mixed with a low amount of clay and a middle range of sand.

A: Using the method described above, try to classify your soil as mostly sand, mostly silt, or mostly clay. How did you classify your soil based on this "by hand" method? What lead you to this conclusion?

Classification → _____

B. Now use the dichotomous key to classify your soil. What soil texture would you classify your sample based on this method?

Classification → _____

Dichotomous Key

- | | | |
|---|-----|----------------------------|
| 1. Does the soil feel or sound noticeably sandy? | YES | Go to Q.2 |
| | NO | Go to Q.6 |
| 2. Does the soil lack all cohesion? | YES | SAND |
| | NO | Go to Q.3 |
| 3. Is it difficult to roll the soil into a ball? | YES | LOAMY SAND |
| | NO | Go to Q.4 |
| 4. Does the soil feel smooth or silky as well as sandy? | YES | SANDY SILY LOAM |
| | NO | Go to Q.5 |
| 5. Does the soil mold to form a strong ball which smears without taking a polish? | YES | SANDY CLAY LOAM |
| | NO | SANDY LOAM |
| 6. Does the soil mold to form an easily deformed ball and feel smooth and silky? | YES | SILT LOAM |
| | NO | Go to Q.7 |
| 7. Does the soil mold to form a strong ball which smears without taking a polish? | YES | Go to Q.8 |
| | NO | Go to Q.10 |
| 8. Is the soil sandy? | YES | SANDY CLAY LOAM |
| | NO | Go to Q.9 |
| 9. Is the soil also smooth and silky? | YES | SILTY CLAY LOAM |
| | NO | CLAY LOAM |
| 10. Does the soil mold like plastic, polish and feel very sticky when wetter? | YES | Go to Q.11 |
| | NO | Start again unless organic |
| 11. Is the soil also sandy? | YES | SANDY CLAY |
| | NO | Go to Q.12 |
| 12. Is the soil also smooth and buttery? | YES | SILTY CLAY |
| | NO | CLAY |

Part II. Soil Texture

1. Add 25 mL of soil to 100mL graduated cylinder.
2. Add water up until the 50mL mark.
3. Invert the graduated cylinder with your hand clasped tightly on the top for 2 minutes.
4. Let the solution sit for 30 minutes.
5. Measure the thickness of the sand, silt, and clay layers. Sand will be on the bottom, silt in the middle and clay on the top.
 - a. Thickness of sand deposit ____
 - b. Thickness of silt deposit ____
 - c. Thickness of clay deposit ____
 - d. Thickness of total deposit ____
6. Calculate the percentage of sand, silt, and clay.

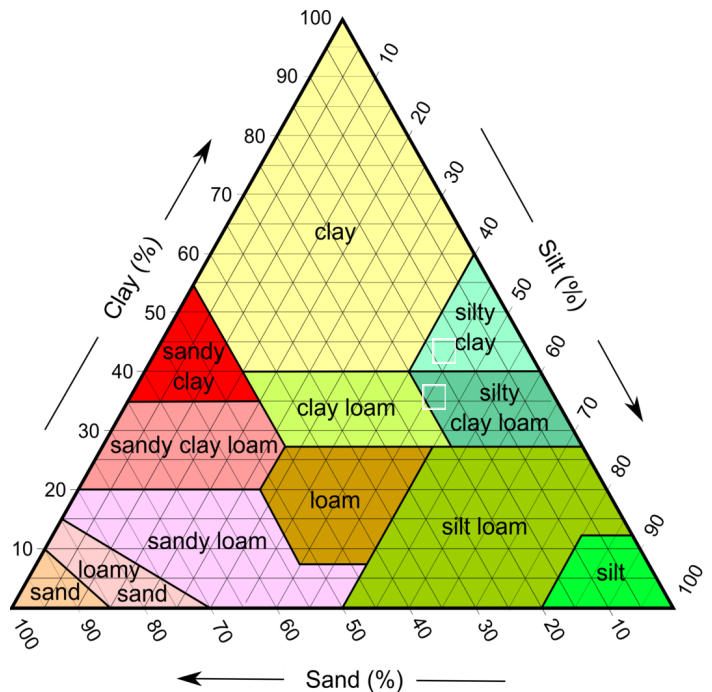
$$\frac{[\text{clay thickness}]}{[\text{total thickness}]} \times 100 = \text{ ___ percent clay}$$

$$\frac{[\text{silt thickness}]}{[\text{total thickness}]} \times 100 = \text{ ___ percent silt}$$

$$\frac{[\text{sand thickness}]}{[\text{total thickness}]} \times 100 = \text{ ___ percent sand}$$

7. Turn to the soil texture triangle and look up the soil texture.

Classification → _____



Part III. Soil pH

1. Remove the cap from the green comparator and take out the package of capsules.
2. Fill the test chamber to the line with water sample from settled soil beaker
3. Holding the capsule horizontally over the test chamber, carefully separate the two halves of the green capsule and pour the powder into the test chamber.
4. Fit the cap onto the comparators, making sure it is seated properly and caps tightly.
5. Shake thoroughly.
6. Allow results to develop for one minute
7. Compare color solution against the pH chart. For best results allow daylight to illuminate the solution.

Soil pH → _____

Part IV. Nutrients

1. Fill a beaker with 100mL of soil and 500 mL of water.
2. Thoroughly stir the soil and water together for at least one minute and then allow the mixture to stand undisturbed until it settles (30minutes).

Nitrogen

1. Using the dropper provided, fill the test chamber to the fill mark with the solution from the soil sample.
2. Holding a **PURPLE** capsule horizontally over the test chamber, carefully separate the two halves and pour the powder into the test chamber.
3. Fit the cap on the comparator. Shake thoroughly.
4. Allow color to develop for 10 minutes.

Phosphorus

1. Using the dropper provided, fill the test chamber to the fill mark with the solution from the soil sample.
2. Holding a **BLUE** capsule horizontally over the test chamber, carefully separate the two halves and pour the powder into the test chamber.
3. Fit the cap on the comparator. Shake thoroughly.
4. Allow color to develop for 10 minutes.

Potassium

5. Using the dropper provided, fill the test chamber to the fill mark with the solution from the soil sample.
6. Holding an **ORANGE** capsule horizontally over the test chamber, carefully separate the two halves and pour the powder into the test chamber.
7. Fit the cap on the comparator. Shake thoroughly.
8. Allow color to develop for 10 minutes.