



Evaluate: Soil Quality Lab

**Please be sure you have reviewed this procedure with a parent or the owner of the land that you will take the sample from. Do not trespass or remove any materials from federally- or state-owned lands.*

Pre-Lab Questions

1. Describe how soil forms.
2. Compare clay, silt, and sand.
3. Describe the characteristics of fertile soil.

Purpose of Lab

In this lab, you will determine the health and fertility of a sample of soil based on five factors:

- The nitrogen levels
- The phosphorus levels
- The potassium levels
- The pH
- The percent composition of clay, silt, and sand

Materials

- Shovel
- Soil sample
- Clear, straight-sided jar
- Water
- Tablespoon of laundry or dish detergent
- Ruler
- Water-soluble marker
- Soil test kit with P, K, N, and pH tests
- 4 small cups
- Camera

Procedure

Part A: Soil collection

1. Using a shovel, remove the grass and top two inches of soil.
2. Dig a hole about eight inches deep and collect your sample. Remove any large rocks, roots, or plant matter.
3. Place the soil sample into the jar and fill it until it's about 1/3 full.

Part B: Soil quality test

4. Fill the jar with water and shake for several minutes.
5. Transfer a small amount of the soil solution to four small cups.
6. Follow the procedure on the soil test kit to perform the four tests (P, K, N, and pH).
7. Record the results of the tests in a data table and by taking pictures.



Part C: Percent composition analysis

8. Add the tablespoon of detergent to the jar of soil and water and shake for several minutes.
9. Set the jar down on a table.
10. The sand should settle out of the solution first. After one minute, use the marker to mark the sand level in the jar.
11. The smaller silt will settle next. Mark the silt layer after about four to six hours.
12. The clay will settle last. Wait two days and then mark the clay level.
13. Take a picture of the jar.

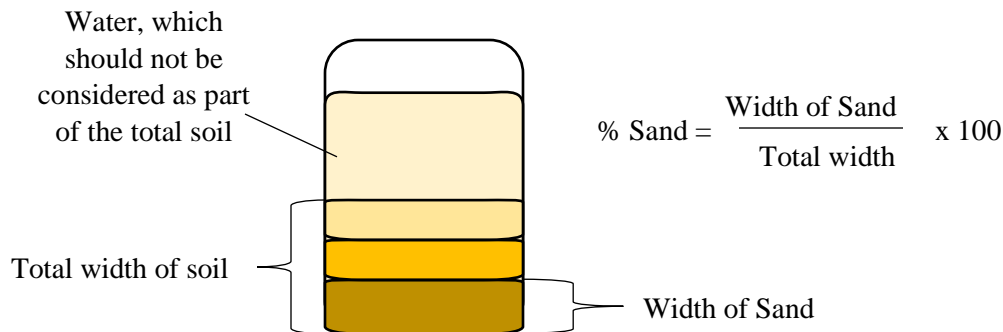
Data:

Create a data table that lists the phosphorus, potassium, and nitrogen levels of the soil, as well as the pH. Be sure to also include your pictures of the test results and the marked jar.

Analysis:

To determine the percent composition:

- Measure the total width of the soil solution
- Measure the width of each layer
- For each layer, divide the width of the layer by the total width and multiply by 100



Use the percentages of sand, silt, and clay and the soil classification period to determine what type of soil your sample is.

Conclusion

Write a conclusion with the following components:

- Describe what soil is, how it forms, and its importance to humans and ecosystems
- Describe four components of fertile soil
- Summarize your procedure
- Summarize your results (you should have five items here)
- Evaluate the health and fertility of the soil
 - It is healthy and fertile because...
 - It is unhealthy because...
- Describe the negative effects of unhealthy soil
- Describe two mechanisms by which soil degrades
- Describe at least two ways to avoid soil degradation
- If you used any additional sources, be sure to include a citation