



Designing Rain Gardens for Stormwater Solutions

Handout: Investigating Soil Texture and Infiltration

Objective: You will explore soil texture and infiltration rates through hands-on tests to see how different soil types affect water movement. This will help you analyze outdoor soils and determine if a location is suitable for a rain garden.

SOIL SAMPLE ANALYSIS

1. Record observations of two soil samples on the provided data table, including how they look and feel, as you go through the following procedure..
2. Moisture Test:
 - a. Slowly add a few drops of water to the soil sample.
 - b. Knead the sample in your palm until it holds together but is not muddy.
 - c. Observe how the soil changes as water is added.
3. Ribbon Test: Roll the moist soil into a ball and then press it between your thumb and forefinger to form a ribbon. Note how long the ribbon was before it broke.
4. Use the [Soil Texturing Field Flow Chart](#) to identify the soil texture.
5. Analyze the soil in a jar demonstration.
 - a. Record observations of each sample.
 - b. Use a ruler to measure the thickness of each layer.
 - c. Calculate the percentage of each particle type by dividing each layer's height by the total height of the soil.
 - d. Use the Soil Texture Triangle to determine the soil texture of the sample based on the sand, silt, and clay percentages.
6. Infiltration Demonstration
 - a. Take notes about the experimental set up.
 - b. Record observations of the demonstrations.
 - c. Calculate Infiltration Rate using the formula:

Infiltration Rate = $1 / [(\text{minutes for infiltration to occur}/60) + (\text{seconds for infiltration to occur}/3600)]$

- d.** Imagine carrying out the procedure on the two soil samples instead of sand. How might the results be similar and different for each sample?

WEB SOIL SURVEY

- 1.** Using the Web Soil Survey handout, explore the soil in your area, especially in potential rain garden locations.
- 2.** Record notes here:
- 3.** Save relevant maps by selecting "print" and saving the PDF.

COLLECTING SOIL DATA FOR POTENTIAL SITES

- 1.** Collect and Analyze Soil Samples
 - a.** Dig 6 inches deep at each potential site and collect approximately two cups of soil.
 - b.** Use one cup to conduct a soil texture analysis by feel.
 - c.** Use the second cup for a settling jar test (to determine sand, silt, and clay composition).
- 2.** Conduct Infiltration Tests
 - a.** Near the sampling location, set up the infiltration experiment.
 - b.** Conduct the test twice.
 - c.** Use the second test result to calculate the infiltration rate (inches per hour).

ANALYSIS

1. Describe your soil analysis for each potential site.
2. How did the field test results compare with Web Soil Survey (WSS) data? What similarities or differences did you notice?
3. Based on your observations, are the locations you tested suitable for a rain garden from a soil perspective? Why or why not?
4. If a site is not ideal, what soil modifications (e.g., adding organic matter, aerating, amending with sand) could improve infiltration and rain garden performance?

Observations and Data of Soil Samples 1 and 2

Soil Observations, Tests, and Data	Sample 1	Sample 2
Look		
Feel		
Infiltration Demonstration		
Moisture Test		
Ribbon Test		
Soil Texture from Flow Chart		
Soil in a Jar Observation		
Soil in a Jar Measurements		
Soil Texture from Soil in a Jar		