

Grasslands

Investigation Data Sheet



Is All Soil the Same?

One of the most important factors in every ecosystem is the soil. Soil is a combination of both abiotic and biotic factors. It contains non-living things like rock particles, the remains of plants and animals called humus, and living organisms as well. One of the major components of soil is the water it contains. The texture of the soil, along with the climate and the amount of humus determine its moisture content.

Objective

Collect two distinct soil samples and compare the components of each.

Materials

- a garden trowel
- protective gloves
- 2 distinct soil samples (If possible, collect one sample of dark, rich soil with visible organic matter present and one sample of loose, sandy soil.)
- plastic containers for each sample to be collected
- a metric balance sensitive to a tenth of a gram
- an oven
- oven gloves
- two Berlese funnels
- two desk lamps with bulbs of not more than 40 watts
- two glass bowls or other oven-proof containers

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

Experiment 1: Moisture Analysis

1. Using a garden trowel, collect samples of two distinct soil types and place in labeled plastic containers.
2. Weigh an oven-proof container, and then add approximately 100 grams of your first soil sample. Record the exact beginning weight of the sample in the data table.
3. Repeat step 2 with your second sample.
4. Place both soil samples into the oven. Heat the samples at 100 degrees Celsius overnight. (A temperature higher than 100 degrees C could break down organic matter into carbon and water — in effect adding water to the sample.)
5. Carefully remove the two soil samples from the oven and weigh them again.
6. Record the mass of each sample in the data table. You should observe that the weight of both samples has decreased. Why?

7. Calculate the moisture content of the samples by dividing the weight lost by the original weight and you will get the percent of moisture in each sample.

$$\frac{\text{weight lost}}{\text{original weight}} = \% \text{ of moisture in each}$$

Data Table

	Sample 1	Sample 2
Initial sample weight		
Sample weight after heating		
Weight lost		
% moisture content		

Which soil sample contained the most moisture?

Based on the moisture content of each sample, which do you think will contain the most organisms? Why?

Experiment 2: Living Organisms in Soil

1. Place the Berlese funnels in ring stands with collection jars beneath them.
2. Fill each funnel with fresh soil samples. Each funnel should contain the same amount of soil.
3. Be sure to label each funnel.
4. Place the desk lamps 6 inches above the funnels and turn them on. (Be sure to use light bulbs with a maximum wattage of 40 Watts. Prior to the end of class, be sure the light sources are positioned in a stable manner.)
5. Leave the soil samples under the lamps overnight.
6. Observe any organisms that have collected in the jar below the funnel. Be sure to record your observations. Over the course of several days, check the samples on a daily basis and record your observations.

What's Happening? The heat of the lamps is drying the soil's surface, driving the organisms downward to the moister soil and eventually out the bottom of the bottle into the jar below.

Conclusions

What are the main components of soil?

What happens to the remains of plants and animals living in soil?
