Soil Erosion and Runoff

# Purpose:

The purpose of this lab is to determine why soils with vegetation have a greater water holding capacity and less runoff than soils without vegetation by collecting runoff water from each plot and testing not only the amount of water collected from each plot, but also the percent of solids collected from runoff from each of those plots.

# Materials (per group):

* (4) plastic tubs - (2) one size and the other (2) slightly bigger
* (2) 6 pack of plugs
* (2) rocks, blocks, etc.
* (1) 100 mL Graduated Cylinder
* (1) Test Tube
* (1) 250 mL Beaker
* (1) Bunsen Burner
* (1) Test Tube Clamp
* (1) Electronic Scale
* Safety Goggles

Procedure:

1. In unit 1, have each group poke 3 holes in the bottom of one of their plastic tubs.
2. Plant your 6 plugs into the tub you put holes in. Amount of soil used: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Poke holes in another tub and put the same amount of soil inside.
4. Water your plants AND your tub of soil, with the same amount of water every 2 days.
5. In unit 3, poke a hole on one side of each tub about 1” down from the soil line.
6. Put the 2 slightly bigger tubs under your soil/plant filled tubs and place your rock/block under the side of the soil/plant filled tub that you did not just make a hole in (hole side downhill).
7. Water your tubs like normal, but this time water will be collected in the bottom tub.
8. Transfer the collected runoff to the graduated cylinder and measure the amount of runoff in mL. Record this in the table below.
9. Place the 250 mL beaker on the scale and zero the scale.
10. Weigh an empty test tube and record weight (in grams) in the table.
11. Transfer the runoff from cell 1 to the weighed test tube and re-weigh. Record.
12. Carefully start your bunsen burner.
13. Using the test tube clamps, evaporate the water from the runoff by slowly passing the test tube through the flame. *DO NOT HOLD THE TEST TUBE OVER THE FLAME IN SAME SPOT FOR A LONG PERIOD OF TIME.*
14. Once evaporated, re-weigh the test tube and record. *BE CAREFUL WITH THE TEST TUBE AS IT WILL BE HOT.*
15. Repeat steps 1-11 two more times (different days).

# Observations/Data Collection:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Runoff Collected (mL) | Test Tube Weight (No Runoff) (g) | Runoff Weight (g/mL) | Dry Matter Weight (g) | Dry Matter % |
| **Vegetation 1** |  |  |  |  |  |
| Vegetation 2 |  |  |  |  |  |
| Vegetation 3 |  |  |  |  |  |
| No Veg 1 |  |  |  |  |  |
| No Veg 2 |  |  |  |  |  |
| No Veg 3 |  |  |  |  |  |

To calculate Dry Matter %: [(dry matter weight)/ (runoff weight)] x 100

# Lab Report Guide

Title: be sure it reflects the variables tested.

Purpose: written in your own words.

Procedure: include your specific and clear procedures and materials that are being utilized throughout the entire experiment.

Data: Your data section should include the following: (1) The table you filled in during the lab

Conclusion:

Use the following questions below to help guide your written response.

## Which soil sample had the greatest amount of runoff?

## Which runoff sample contained the highest percentage of dry matter?

1. Which sample had the highest proportion of organic matter? How do you know this?
2. Using your knowledge of the molecular interactions between soil and water, explain how vegetation reduces the amount of water and soil solid runoff?
3. Describe where in the experiment errors might occur that would affect the end results. How might you change the experiment to avoid these errors?