

Brightwater Experience Soil and Aquatic Studies

Purposes: To analyze the physical and chemical factors of soil composition. To analyze biological factors of water samples.

Pre-Lab Questions:

Where did your soil sample come from? Describe the landscape of the general area.

What was growing in this area?

How will the local environmental factors influence your soil sample?

Where did your water sample come from? Describe the landscape of the general area.

How will the local environmental factors influence your water sample?

Part I – Physical Factors of Soil Samples

Obtain a soil sample by measuring 1 cup of soil from the container provided and place it in the ice cream pail provided.

Soil is generally classified by its color and texture. Use this sample to answer the following questions to determine the classification on your soil sample.

Structure

Is the soil smooth or lumpy?

If there are lumps, how difficult is it to break them up?

If you add water to a handful of soil, can you form it into a ball?

Based on these observations is the structure of your soil smooth or lumpy?

Size of Particles

Look carefully at the soil. Can you see individual soil particles? Describe what they look like.

Organic Material

Do you see any twigs, stems, leaves, or roots in your soil? Describe what they look like.

Soil Creatures

Are there any insects or worms in your sample? If yes, are they alive? Describe what they look like and/or identify the species present.

Texture

Rub some soil between your fingertips.

Does it feel powdery like talcum powder?

Grainy like sand?

Hard like dry clay?

Put a bit of soil in the palm of your hand and add a few drops of water from the squirt bottles.

Rub it between your fingers again. Now that it is wet how does it feel?

Classification Conclusions

Based on your observations which of the following best describes your soil sample:

Sandy, Silty, Clayey. Why?

Based on your observations which of the following best describes your soil sample:

Brown Soil, Dark Brown Soil, Black Soil, or Grey Soil. Why?

Part II – Chemical Factors of Soil Samples

pH

Use the materials and ALL of the instructions located at the pH station to conduct the pH test.

Record your results here:

At this time please prepare your soil sample for the next three chemical tests by completing the following steps:

Take your pail with 1 cup of soil in it and add 5 cups of water.

Thoroughly shake or stir this mixture for 1 minute.

Allow the mixture to sit undisturbed at your desk until it settles (about half an hour). Please note that this represents steps 1 and 2 for the Nitrogen, Phosphorus, and Potash tests!

While the mixture settles please work through Part III!

Nitrogen

Use the materials and ALL of the instructions located at this station to conduct the Nitrogen test.

Record your results here:

Phosphorus

Use the materials and ALL of the instructions located at this station to conduct the Phosphorus test. Record your results here:

Potash

Use the materials and ALL of the instructions located at the station to conduct the Potash test. Record your results here:

Chemical Factor Conclusions

What nutrients are plentiful in your soil sample? How is this ecologically significant to the environment?

What nutrients are depleted in your soil sample? How is this ecologically significant to the environment?

What impact does soil pH have on the plants that grow in the area?

When you are done with your soil sample please drain as much water out of your pail into the bucket provided. Combine the remaining wet soil into a single pail so that it can all be returned to the environment. Thank you.

Part III – Biological Factors of Water Samples

For this section of the lab you will be working with your water samples to observe macroinvertebrates and microinvertebrates. You will be given biological keys to identify the organisms you are viewing. You will also be given instructions on how to prepare slides, and how to use the microscopes safely and efficiently. Please follow the steps provided in both guides to ensure technical accuracy and the proper handling of the technology.

Dissecting Scope

Pour your water sample into a petri dish. Leaving the cover off of the dish place it on the stage of the dissecting scope. Turn on the light and use the adjustment knob on the side of the scope to bring your sample into focus.

Once you can clearly see your water sample and the organisms within it, use the space provided below to draw simple diagrams of the species that you see. Use the identification keys provided to determine what species each is.

Compound Microscope

Use the instructions provided to make a wet mount slide using your water sample.

Set up your microscope using the instructions provided and observe the organisms within your sample.

Use the space provided below to draw simple diagrams of the species that you see. Use the identification keys provided to determine what species each is.

Biological Factor Conclusions

What environmental factors currently influence the organisms that you are observing?

Based on the organisms that you have observed is this a productive ecosystem? Why or why not?