Analysis of Water Laboratory: Veatta Berry

Students' Guide

Goals

- To practice chemical analysis of water samples
- To do real life environmental studies

The Laboratory

In this laboratory, you will go to a nearby lake and measure the water's content and quality, including several parameters such as chemical content, pH, depth, and so on.

Materials for Each Group

- A meter stick
- pH sticks
- Phosphate, nitrate, nitrite, and chloride chemical tester kits (HACH Co.)
- 500 ml water bottle
- Distilled water
- Markers and stickers
- Plastic box for carrying these materials
- Temperature meter
- Oxygen measurement kit: methylene blue indicator solution, 20 ml test tubes, test tube racks, stopwatch
- Apparatus for phosphate measurement in soil

Instructions

You have to perform six tests: Each of you is going to go to a different place around the lake, and when you come back you will do all tests on your samples. Each group will summarize the results of one test from all lab groups, and present it to class using Power Point.

In Class

Make sure that you have little bags for your sediment samples. Label them with the group and the date, and where you took it from.

Collect the water samples in the bottle. Put a piece of tape on the bottle, and write your group name and date on it.

Make sure you have everything that's on the list in your box.

At the Lake

Taking the water sample:

A. You do not want to stir the sediments into the water, because you want to get it as naturally as possible.

B. Pre-rinse the water bottle of soap residues, or from something left in the bottle, by filling it half-way.

C. Dump the water in a different place than where you took it, and then fill up your bottle to the rim, living no space for air. You want to find out how much oxygen is inside the water, and if you leave air, the oxygen content will change.

Taking Sediments:

Take your bag, put your hand inside, and reach in the water as far as you can without falling in. Grab some dirt from the bottom of the lake, and close the bag.

Measuring Sediment Depth:

Measure how far you can push your meter stick easily, at the place where you are getting your sediment sample:

_____

Is the soil soft? What do you see in it? _____

_____

What is the reason for this? _____

_____

Measuring pH:

Measure the pH with the dipsticks that are in the box. Dip the sticks in the water for several seconds and then compare to the chart on the box, to see what the pH is: _____

Compare to tap water: _____

Why is there a difference? _____

_____

Measuring Phosphates, Nitrates, Nitrites, and Chlorides:

Follow the instructions on your measuring kit. Record and explain:

Test	Lake	Tap Water	Comments
Phosphate			
Nitrate			
Nitrite			
pH			
Other _____			

Where do you find more phosphate? Why? _____

_____

Where do you find more nitrates/nitrites? Why? _____

_____

Measuring the Temperature:

A. Measure the temperature of the air and record it: _____

_____

B. Dip the measuring device into a sample of water, and wait for the temperature to stabilize. Record your measurement: _____

_____

What is the difference between the two measurements? Explain: _____

_____

_____

_____

Drawing the Vegetation and Landmarks:

Draw a picture of the lake from the point at which you are standing. Notice major landmarks and vegetation around the lake.

Explain what you think the influence of the surrounding area is on the measurements that you are taking: ____

_____

_____

_____

_____

Back in Class

Test the water sample for oxygen, using the following method:

> Pour about 2 oz. of water into a test tube. Add 1/2 oz. of methylene blue indicator solution. Record the amount of time it takes to change from dark blue to light blue or clear. The faster the color changes, the less oxygen is present and the more carbon dioxide and bacteria there are.
>
> *Taken from http://kids.lth2.k12.il.us/kids/schools/SHABBONA/PAGES/lessons.html*

Rate of Color Change

Lake water: _____

Tap water: _____

What can you learn about the oxygen content of the water from the color change? _____

_____

What might be the reason for this? _____

_____

Test the soil for phosphates, using the procedure described in the handout that your teacher gave you. Compare to tap water. What might be the source of the phosphates? _____

_____

_____

_____

Summary

Collect all data about one of the tests that you have performed from all the lab groups. Fill in the table.

Measured property: _____

Group Number	Lake Water	Tap Water

Take the drawing and explanation of each group about the area in which they measured and try to explain the results that you see and the processes, which you think led to them. Compare the values of each group to these of tap water. Explain: _____

_____

_____

_____

_____

_____

_____

_____

_____

Prepare a Power Point slide show to present your results in class.