Ammonia and Phosphate Experiment Explanation and Analysis - 20th Algonquin Park Expedition

FROM HIS GUIDE:

- A recounting of the theoretical aspects of an experiment as the focus of a paper will not be well received. What does the data say pursuant to the theory? How certain can you be of the results and the claims you have made? What improvements, using existing technology, can be made (if any). How does your results compare with those found in previous years.

- Plagiarists beware, copies of previous papers are held by Mr. van Bemmel and will be consulted to verify your originality. However interviewing students who undertook previous expeditions on topics related to your paper is perfectly acceptable provided that credit for their efforts is given via citations. The issue is that you put your research and conclusions into your own words

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WATER ION TESTS [NO_3, PO_4, CA^{2+}]	This paper chronicles the results of the water tests that sought ions. These tests are effected with the ion probes. Since calibration is an important issue with these probes this paper will have to give confidence that the original set up was properly done. The data should be presented. Any trends across the park should be noted. The uncertainty of the results should be stated and it derivation discussed. The flow of ions through the part following the obvious river directions. Do the ions move as expected? Does the concentration increase or decrease as the water flows further downstream? You paper should compare the reliable values that were effected during AP2, 3 and 5 to compare from one year to another. Interviews with investigators from these expeditions are encouraged.

4.1.3 Dissolved Ions

The study of dissolved ions in the ecosystem is a method of tracking the various cycles. We can see how much oxygen is dissolved in the water of a river. We can look in on the Nitrogen Cycle through the Nitrate Ion experiment. The Total Hardness experiment will help us measure the movement of minerals such as calcium and magnesium. Phosphates are expected to be slight in Algonquin Park due to its location as a height of land and that any soaps placed in the lake last year will have been completely diluted by the spring run off.

4.1.3.2 Ammonia Testing – DSO 3-132 (WAT)

EXPERIMENT	INSTRUMENT TYPE	ASSOCIATED EQUIPMENT	CALIBRATION TYPE
AMMONIA ION TEST	AMMONIA ION TEST SOLUTIONS	AMMONIA TEST SOLUTIONS 1 AND 2 SOLUTION TUBE DIGITAL CAMERA AMMONIA COLOUR REFERENCE	COLOUR REFERENCE CHART
TECHNICIANS	UNITS	REGRESSIONS	PROGRAMS
TWO	PPM	NONE	NONE

PURPOSE

Ammonia is a water-soluble nitrate compound. It is found in its ionic form NH_4^+. Ammonia can enter water through fish excrements that are not sufficiently microbiologically degraded, or through the excrements of other animals. In bodies of water near human development, fertilizers are a large cause of ammonia content. However, we can expect that Ammonia levels will be low in many parts of Algonquin Park because of their distance from human activity. Ammonia is toxic to aquatic life, especially by damaging the mucus membranes of fish. Ammonia is more toxic in water with high pH.

PROCEDURES FOR AMMONIA ION TESTING

1. Fill test tube to 5mL with the water to be tested.

2. Add 8 drops of AMMONIA TEST Solution #1. Hold the bottle completely vertical to ensure uniformity of the drops.

3. Add 8 drops of AMMONIA TEST Solution #2. Hold the bottle completely vertical to ensure uniformity of the drops.

4. Cap and shake the test tube vigorously for 5 seconds. DO NOT hold finger over end of the test tube, as this will change the results.

5. Wait 5 minutes for colour to develop.

6. Hold strip in proper location on the Chlorine colour reference chart.

7. Take a picture of the strip and the reference chart. The picture must be focused and as large as possible. The optimal distance is under an arms length. An action or speed setting that reduces the shutter time may be helpful for keeping the picture focused by preventing inadvertent camera movement. It best if the flash is NOT used on images taken so close. If you have a macro setting on your camera please use it.

SSRF INSTRUCTIONS - FDS INSTRUCTIONS

Enter picture numbers on FDS1 in the appropriate location in row 9. NOTE the reference for this experiment has been combined with the phosphate experiment (PO4) and since only one image number can be coded on the FDS the image for these must have BOTH experiments at the same time. Observe carefully the timing of the maturity of both of these experiments so that the image of both is taken at the appropriate time.

TIME CONSTRAINTS	TIME NOTES
Experiment Duration (w/o Cal) 1 Set 06:00	**The 5 minutes for the colour to develop is essential**. During this time, the colour varies immensely. The picture should be taken soon after the 5 minutes has elapsed. This should be timed with a watch of some type.

4.1.3.7 Phosphate Ion Analysis (PIA) DSO 3- 137

EXPERIMENT	INSTRUMENT TYPE	ASSOCIATED EQUIPMENT	CALIBRATION TYPE
PHOSPHATE ION TEST	PHOSPHATE TEST SOLUTIONS	PHOSPHATE TEST SOLUTIONS 1 AND 2 SOLUTION TUBE DIGITAL CAMERA PHOSPHATE COLOUR REFERENCE	COLOUR REFERENCE CHART
TECHNICIANS	UNITS	REGRESSIONS	PROGRAMS
TWO	PPM	NONE	NONE

PURPOSE

Phosphate is produced by fish and invertebrate waste as well as decaying organic matter. Water treatment facilities may add phosphate to their tap water.

High phosphate levels are generally associated with the growth of algae. Phosphate levels of over 0.03 mg/L can trigger excessive algae growth. Dead algae decompose, and release more phosphate into the water, which causes the growth of more algae in a rapid cycle. The excessive algae growth will increase the levels of DO, but when the algae die aerobic bacteria consume them. These aerobic bacteria consume DO. This sharp drop in the DO levels can cause suffocations amongst the aquatic organisms that require significant levels such as fish.

PROCEDURES FOR DISSOLVED OXYGEN TESTING

1. Fill test tube to 5 mL with the water to be tested.
2. Add six drops of Phosphate Test Solution #1. Hold the bottle completely vertical to ensure uniformity of the drops.
3. Cap and shake the test tube vigorously for 5 seconds.
4. Add six drops of Phosphate Test Solution #2. Hold the bottle completely vertical to ensure uniformity of the drops. Note: This solution is very thick.
5. Cap and shake the test tube vigorously for 5 seconds.
6. Wait three minutes for colour to develop.
7. Hold strip in proper location on the phosphate colour reference chart.
8. Take a picture of the strip and the reference chart. The picture must be focused and as large as possible. The optimal distance is under an arms length. An action or speed setting that reduces the shutter time may be helpful for keeping the picture focused by preventing inadvertent camera movement. It best if the flash is NOT used on images taken so close. If you have a macro setting on your camera please use it.

SSRF INSTRUCTIONS - FDS INSTRUCTIONS

Enter picture numbers on FDS1 in the appropriate row. NOTE that for AP10 and later expeditions, the reference for this experiment was placed on the same sheet as the reference for the NH3 experiment. Care will be required to permit these two experiments to mature at the same time so that the image will be representative.

TIME CONSTRAINTS	TIME NOTES
Experiment Duration 1 Set 04:00	The three minutes for the colour to develop is essential. During this time, the colour varies immensely. **The picture should be taken immediately after the 3 minutes has elapsed.**

Notes:

NH_3 AND PO ANALYSIS

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