# Pond Water Lab: Biodiversity of Ponds

<table>
<thead>
<tr>
<th>Scientific Planning (WE):</th>
<th>Not Proficient</th>
<th>Proficient</th>
<th>Exceeds Proficiency</th>
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</thead>
</table>
|                          | Missing some elements of proficient - please correct and turn back in within one class period. | Includes most of the following Hypothesis & Variables:  
  - Testable question or hypothesis  
  - IV & DV  
  - CONTROL  
  - 1 appropriate constant listed | Meets plus most of the following Hypothesis & Variables:  
  - Background illustrates the context of the lab  
  - Several appropriate constants listed. |
|                          | Procedure:  
  - Repeatable numbered steps that are clear | Procedure:  
  - Detailed and concise | Procedure:  
  - |

<table>
<thead>
<tr>
<th>Data Collection &amp; Analysis:</th>
<th>Not Proficient</th>
<th>Proficient</th>
<th>Exceeds Proficiency</th>
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|                           | Missing some elements of proficient - please correct and turn back in within one class period. | Includes most of the following Data Analysis and Conclusion:  
  - Type of graph and/or table is appropriate for data  
  - Labeling of graph or table is correct (axis, units, and title)  
  - Conclusion addresses original question or hypothesis using data | Includes most of the following Data Analysis and Conclusion:  
  - Calculations are used when appropriate (mode, average, error)  
  - Conclusion discusses limitations and errors (individual and procedural) and suggestions are made to improve and correct lab  
  - Applies data and conclusions to other class content or real life examples by using additional research |
|                           | Procedure:  
  - Repeatable numbered steps that are clear | Procedure:  
  - Detailed and concise | Procedure:  
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<thead>
<tr>
<th>Application of Science:</th>
<th>Not Proficient</th>
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<th>Exceeds Proficiency</th>
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|                        | Missing some elements of proficient - please correct and turn back in within one class period. | Includes most of the following:  
  - Describes how many people contributed to a scientific understanding  
  - Explains how technology aided the procedure  
  - Apply related concepts to topics in the news, scientific community, or your life. | Includes most of the following:  
  - Cites specific examples of other areas in science or current events that this topic relates to.  
  - Use specific examples of how collaboration helped to collect data or form conclusions.  
  - Suggests future uses of technology |
|                        | Procedure:  
  - Repeatable numbered steps that are clear | Procedure:  
  - Detailed and concise | Procedure:  
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<tr>
<th>Work Ethic:</th>
<th>Not Proficient</th>
<th>Proficient</th>
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|             | Missing elements listed in proficient AND/ OR JEOPARDIZES SAFETY. | Includes most of the following:  
  - Student is on task and works consistently to complete lab during class period  
  - Student leaves lab area clean and prepared for next class | Includes most of the following:  
  - Student helps to clean common areas OR student assists other students when appropriate OR student utilizes time to pursue |
|             | Procedure:  
  - Repeatable numbered steps that are clear | Procedure:  
  - Detailed and concise | Procedure:  
  - |

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<tr>
<th>Communication:</th>
<th>Not Proficient</th>
<th>Proficient</th>
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|               | Missing elements listed in proficient. | Includes most of the following:  
  - Answers fully address question  
  - Limited grammatical errors and conventions  
  - Uses scientific language (avoid the use of pronouns like I, you, me, we, our, etc.) and is concise but detailed | Includes most of the following:  
  - Discussion fully connects findings or implications to class concepts or real world events.  
  - Appropriate scientific vocabulary used extensively and accurately |
|               | Procedure:  
  - Repeatable numbered steps that are clear | Procedure:  
  - Detailed and concise | Procedure:  
  - |
Introduction:
Although we often think of life as things we can see with our naked eye, there are thousands of species surrounding us that require a microscope to examine. Pond water contains thousands of such species and includes a variety of decomposers, herbivores, consumers, and producers. In this lab, you will examine a sample of pond water you collect to identify different microscopic organisms. The following resources (also on the class website) will serve as your guide to correctly identifying the organisms you observe. Be sure to **label and count number of species, identify the power for each observation, and describe the organism’s role in the food chain (producer, consumer, decomposer, herbivore).**

- [http://www.microscopy-uk.org.uk/index.html](http://www.microscopy-uk.org.uk/index.html)
- Posters available in the classroom

Purpose:
**THIS IS A FULL LAB.** In this lab you will observe microscopic organisms in different tropic levels, and measure the amount of organisms you observe in different samples for different trophic levels. You will then use this data to explore one of the potential topics/questions below:

- How does the diversity of pond organisms differ between high and low levels of sample
- How does the number of produces compare to consumers in pond water
- What affect does water clarity have on the type of organisms found in different trophic levels
- A question of your own design (must fit the scope of the lab and time constraints)

Background:
Include what you are studying and how you are studying it. Write an overview of the lab in paragraph form.

Question, Hypothesis, Procedure:
Your group will develop a question to attempt to answer as you observe the organisms found in your pond water. (You may adapt one of the suggestions above.) From this question, you will develop a hypothesis and make observations to test the hypothesis.

**Question:**

Question:
Directions:

1. In your group, identify a question that you would like to answer. Record it in the space provided above.
2. From your question, create a hypothesis to answer your question. Record it in the space provided above.
3. Develop an experimental procedure to test your hypothesis. Identify which group members will complete each part/step. **Write group member names next to each task.** Be careful that you have enough time.
4. Complete observations to carry out your experiment; use the following pages to record drawings as well as quantitative and qualitative data.
5. Use your RAW data to create an overall organized EDITED data table and FINAL graph to represent the data.
   a. One graph/data table can be made per group and will be printed. Use Google Docs and Spreadsheets to create your graph(s) and table(s). Graphs must be printed at home.
6. Write a conclusion **individually** to answer your question and describe results; space provided below. **READ THE RUBRIC CAREFULLY** - do not forget to include a section on limitations and application of science.
**Data: Pond Water Observations**

**Algae Observation:**
1. With forceps, transfer a few strands of algae from your sample of pond water to a slide.
2. Add 2 drops of pond water.
3. Observe under low power.
4. Move slide to bring all areas into view.
5. Sketch a small section of each kind of algae you see.
6. Label the algae you can identify.

**Low Power Pond Water Organisms:**
1. Using the same slide as in 1, draw all other organisms other than algae you can find.
2. Label all those you identify.
3. Describe the different methods by which organisms move (include those you can’t identify).

<table>
<thead>
<tr>
<th>Trophic Level</th>
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<tbody>
<tr>
<td>Producer</td>
<td></td>
</tr>
<tr>
<td>Primary Consumer</td>
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<tr>
<td>Secondary Consumer</td>
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**High Power**

**Pond Water Organisms:**

1. Using the same slide as in 1, draw all other organisms other than algae you can find **under high power**.
2. Label all those you identify (Rapidly moving organisms are probably flagella, any hardly visible drifting organisms are probably bacteria).

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**Low Power Bottom Pond Water Organisms:**

1. Get a few drops from the bottom of the pond water; **try to get some containing organic matter**.
2. Use **low** power to draw any new organisms you discover.
3. **Include edges of slide**.

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**High Power Bottom Pond Water Organisms:**

1. Examine the same slide under high power and draw new observations.

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**Description of Observations:**

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__________________________________________________________________________
Conclusion: Briefly restate hypothesis, state the answer to your question, explain your results, and describe any limitations and modifications or next steps. How can these results be applied to the real world, current understandings of ecology, or future experiments?