Name _____ Date _____

Eutrophication

During this lab activity, you will set up several jars (mini-ecosystems) to find out what happens to the algae numbers and the color of the water when you add excess fertilizer to an aquatic ecosystem. You will add a fertilizer solution in two different ways: a pulse, which is a single treatment, or a press, which is a sustained treatment. Think of a pulse as a one-time event, ie a storm or an accidental spill, and a press as a long-term event, like continuing release of pollution from a factory or farm.

Step 1: Background

Think about what you already know in regards to nitrogen addition to the ecosystem. Write a hypothesis about what you think will happen during your experiment. Will you have more or less algae? Will the color of the water change? How?

_____
_____
_____

Step 2: Experiment

1. Obtain three mason jars (or other containers), pond water, a graduated cylinder, a microscope, slides, and a pipette.
2. Fill each jar (these jars are your mini-ecosystems) about halfway with the pond water (in a normal sized mason jar, this would be about 500-700 mL of water). Make sure you add the same amount of water to each jar. Write down the amount of water you added:
   _____
3. Gently stir the water, and place a drop of the water on a slide.
4. Using the microscope, count the number of algae cells that you see.
5. Note the color of the water when held up against a white sheet of paper.
6. Decide how often you are going to administer the 'pulse' and the 'press' treatments.
   Pulse: _____
   Press: _____
7. Decide what concentration of fertilizer solution you are going to use (for instance, 10 ml of fertilizer and 90 ml of water would make a 10% solution). Do not change the concentration of the fertilizer solution for the pulse and the press treatments.
   Concentration of solution: _____
8. Finally, decide how long you will leave your experiment, and how often you will check on the results: _____

Initial observations:

Jar	Treatment	Estimated amount of algae in jar	Number of algae observed under microscope	Color of water
1	Control			
2	Pulse			
3	Press			

Step 3: Experimental Results:

Jar	Treatment	Estimated amount of algae in jar	Number of algae observed under microscope	Color of water
1	Control			
2	Pulse			
3	Press			

Step 4: Discussion:

1. Create a graph that shows the growth of algae in the different jars over time.

2. What happened to the aquatic ecosystem with the addition of excess nitrogen fertilizer?
   _____
   _____
   _____

3. Which treatment, the pulse or the press, had the greatest impact on your ecosystem? Did other people in your class uses different concentrations of fertilizer solution? How did this change their results?
   _____
   _____
   _____

4. Explain the impact of excess nitrogen on aquatic ecosystems.
   _____
   _____
   _____

5. Imagine you are managing a local watershed. You need to insure that the reservoir within your watershed remains viable as a drinking water source. What measures would you take throughout the watershed to maintain this level of water quality?
   _____
   _____
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