

**Pollutant Effects of Phosphates and Nitrates from Fertilizers**  
**Water Quality Supplemental Lab**  
**Student Worksheet and Guide**  
**4empowerment®**

### **Background Information**

Algae, which are normally present in fresh water and aquatic ecosystems, will undergo a series of changes when phosphate and nitrate compounds are added. These changes can influence the quality of the entire body of water resulting in an “algal bloom”.

This lab activity allows you to simulate a controlled experiment to observe and determine what changes occur in water as a result of the addition of fertilizers high in phosphate and/or nitrate.

Students will be assigned to a group of six students, and each group will conduct the activity with a sample of freshwater from a nearby site (waterway) or with a sample supplied by the instructor.

### **Materials Needed**

1. Seven plastic cups (150ml) or beakers
2. A grow light system (or well lighted area)
3. Pressure sensitive labels
4. Markers
5. Solutions of fertilizers with high phosphate and nitrate content. (Available in small amounts as plant food.) Check concentrations of the nitrates and phosphates using the La Motte test kit at the beginning of the experiment as a control. At the end of the project, check concentration levels again to get a final reading.
6. La Motte testing kit for Phosphates and Nitrates

### **Procedure**

Each group of six students should follow the following steps:

1. The group obtains 7 clear testing containers. Each student in the group is responsible for testing their assigned container.
2. Label containers with sensitive labels (one label per container) numbers 1-7. Tube Number 1 will be the control.
3. Place 100ml of water from the chosen site into each testing container (recording the date and location of the collection on the data sheet.

4. Add the appropriate nitrate and phosphate “fertilizer-pollutants” to the containers carefully (counting the drops) each day for a period of 10 to 12 days, according to the schedule below.
5. Place a small piece of white tissue or paper toweling on the top of each container (to prevent particles from the air being added) and place the containers in a well lighted area or under a plant grow light.
6. Even though you have set up only one container you are responsible for recording in the data chart observations of all 7 containers of your group.

**Container**

**Solutions Added Daily**

1.	Nothing added – CONTROL
2.	10 drops of phosphate (fertilizer) solution
3.	20 drops of phosphate (fertilizer) solution
4.	10 drops of nitrate (fertilizer) solution
5.	20 drops of nitrate (fertilizer) solution
6.	10 drops of nitrate + phosphate solution
7.	20 drops of nitrate + phosphate solution

**Water Sample**

Date collected \_\_\_\_\_ Location collected \_\_\_\_\_

General appearance of the sample: \_\_\_\_\_

\_\_\_\_\_

In the [data chart](#), note the appearance of the samples and any changes that may occur in the sample and the control in the appropriate spaces. (Comments range from “no change” to “cloudier appearance”, “green color”, or any other subjective interpretation.)

**Observations**

Utilize the [data chart](#) to record observations.

**Conclusions**

Formulate conclusions based on data collected and analyzed from observations.