

Name \_\_\_\_\_

## Algae in a Bottle: Experiment Procedure

Research Question: \_\_\_\_\_

### Materials

- 4 plastic ½ liter (500 ml) bottles or jars. The bottles should be the same or similar.
- Cheesecloth cut into small squares
- Rubber bands
- Masking tape
- Pond water
- High nitrogen fertilizer
- High phosphate fertilizer
- Bottled water
- Measuring cups and spoons
- Dissolved oxygen kit (from aquarium shop)
- Camera (optional)

### Procedure for Setup Day (Day 1)

1. Label the bottles or jars with masking tape and a magic marker. The four labels should be: Control, Nitrate, Phosphate, Nitrate + Phosphate. Put your group initials on the labels so you know which bottles are yours.
2. Fill each bottle with 250 ml of pond water and 250 ml of bottled water. Use the measuring cups to be sure you put the same amount of water in each jar.
3. Add ½ teaspoon fertilizer to the jar that says Nitrate, and ½ teaspoon fertilizer to the bottle that says Nitrate + Phosphate.
4. Add ½ teaspoon detergent to the bottle that says Phosphate and ½ teaspoon detergent to the bottle that says Nitrate + Phosphate.
5. Cover the top of each bottle with a piece of cheesecloth and hold it tight with a rubber band.
6. Record observations of each bottle in the space on your data sheet that says Day 1. Make sure to observe the color of the water, if it is cloudy or clear, and if there is anything floating or growing in it.
7. Put the bottles in a sunny location.
8. As a class, mix 250 ml of pond water and 250 ml of bottled water. Then test the dissolved oxygen level of the mix using the procedure on your test kit. Write the dissolved oxygen level on your data sheet for Day 1.

Name \_\_\_\_\_

## Algae in a Bottle: Results & Conclusions

### Results

Create a graph showing how the dissolved oxygen level has changed for each of your bottles. Use one set of axes for all of your data. Make sure to include a key to show what bottle each set of data represents.

### Analysis

- How much did the dissolved oxygen amount change for each of the bottles?
  - Control: \_\_\_\_\_  
\_\_\_\_\_
  - Nitrogen: \_\_\_\_\_  
\_\_\_\_\_
  - Phosphate: \_\_\_\_\_  
\_\_\_\_\_
  - Nitrogen + Phosphate: \_\_\_\_\_  
\_\_\_\_\_
  
- How did the appearance of each bottle change from the start to the end of the experiment?
  - Control: \_\_\_\_\_  
\_\_\_\_\_
  - Nitrogen: \_\_\_\_\_  
\_\_\_\_\_
  - Phosphate: \_\_\_\_\_  
\_\_\_\_\_
  - Nitrogen + Phosphate: \_\_\_\_\_  
\_\_\_\_\_



Name \_\_\_\_\_

## Algae in a Bottle Data Sheet

### Procedure for Days 2-14

1. Record your observations of the bottles using the data sheet. If you have a camera, take photographs of the bottles to show the changes.
2. On Day 7 and Day 14, take water samples from your bottles and test them for dissolved oxygen using the directions on your test kit. Record the dissolved oxygen level on your data sheet.

Day #	Observations	Dissolved oxygen (ppm)
1 Setup Day	<b>Control:</b>  <b>Nitrogen:</b>  <b>Phosphate:</b>  <b>Nitrogen + Phosphate:</b>	<b>Starting dissolved oxygen level:</b>
	<b>Control:</b>  <b>Nitrogen:</b>  <b>Phosphate:</b>  <b>Nitrogen + Phosphate:</b>	<b>Control:</b>  <b>Nitrogen:</b>  <b>Phosphate:</b>  <b>Nitrogen + Phosphate:</b>
	<b>Control:</b>  <b>Nitrogen:</b>  <b>Phosphate:</b>  <b>Nitrogen + Phosphate:</b>	<b>Control:</b>  <b>Nitrogen:</b>  <b>Phosphate:</b>  <b>Nitrogen + Phosphate:</b>

	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>
	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>
	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>
	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>	<p><b>Control:</b></p> <p><b>Nitrogen:</b></p> <p><b>Phosphate:</b></p> <p><b>Nitrogen + Phosphate:</b></p>