Name: Date:

HANDS-ON LAB

Limiting Factors for Algae

All organisms require sufficient nutrients to grow. If the concentration of a nutrient is so low that it limits the plant's growth, the substance becomes a limiting factor. Nitrogen is a component of all proteins and is necessary for chlorophyll formation and photosynthesis. Phosphorus is necessary for transforming solar energy into chemical energy. In this lab you will determine whether nitrogen and phosphorus are limiting factors on plant growth.

PREDICT

Are nitrogen and phosphorus limiting factors for algae growth? Explain.

MATERIALS

- algae culture, 50 mL
- ammonium sulfate or urea solution, 10% (5 drops)
- baby food jar with lid (3)
- glass marking pencil
- graduated cylinder, 50 mL
- pipette, plastic disposable (3)
- pond water, 200 mL
- trisodium phosphate solution, 10% (5 drops)

PROCEDURE

1. Mark the three jars *Control, A,* and *B,* and add pond water until each is two-thirds full.
2. Add 40 to 50 mL of algae culture to each jar.
3. Add 4 or 5 drops of the trisodium phosphate solution to Jar A. This is a source of phosphorus. Swirl to mix.
4. Add 4 or 5 drops of the ammonium sulfate or urea solution to Jar B. This is a source of nitrogen. Swirl to mix.
5. Cap the jars and place them in a sunny window.
6. Predict how algae levels will change in each jar after seven days.
7. Observe every day for seven days. Record your observations in the Data Table.

Name: **Date:**

DATA TABLE: EFFECT OF LIMITING FACTORS ON ALGAE GROWTH

ALGAE LEVEL			
DAY	CONTROL	A: TRISODIUM PHOSPHATE	B: AMMONIUM SULFATE OR UREA
1			
2			
3			
4			
5			
6			
7			

ANALYZE

1. After seven days, how did the appearances of the three jars differ? How did their aromas differ?

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2. Use your data to explain whether or not your results support your prediction.

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3. Explain how you know whether phosphorus or nitrogen was a limiting factor.

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4. In what way did your experiment fall short in revealing limiting factors for algae?

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5. Based on what you learned in this experiment, which nutrients would you add to a vegetable garden? Explain your answer.

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