

**ANSWER IN YOUR NOTE BOOK AND
PLEASE RETURN THESE SHEETS**

Were your Winkler bottles kept outside in natural light, or inside under fluorescent light?

What is the weather like today (and why does this matter)?

Convert your results so you can compare your data to real ecosystems.

- | |
|---|
| 1. Convert your answer in ppm for Gross Primary Productivity to mL O ₂ /L |
| 2. Convert your answer to mg of carbon fixed/L |
| 3. Assuming the experiment ran for six hours, how many mg of carbon were fixed in one hour? One day (12 hr sunlight / day)? One year? How many grams of carbon is this in one year? |

<p>Some useful conversion equations:</p> <ul style="list-style-type: none"> - ppm O₂ = mg O₂/L - mg O₂/L x 0.698 = mL O₂/L <p>(at 0°C and 1 atmosphere of pressure)</p>	<p>Eg. 6 mg O₂/L x 0.698 = 4.188 mL O₂/L</p>
<p>Primary Productivity is usually defined by grams or milligrams of carbon fixed per meter per year.</p> <p>When we measure primary productivity in terms of dissolved O₂ we can convert our results to find out how much carbon was fixed. The conversion is</p> <p>mL O₂/L x 0.536 = mg carbon fixed/L</p>	<p>Eg. 4.188 ml O₂/L x 0.536 = 4.25 mg carbon fixed/L</p>

Primary Productivity values for other ecosystems:

B.C. *Macrocystis* (giant kelp) beds = 1300 g C/m²/year

Nova Scotia kelp beds = 1750 g C/m²/year

Coastal phytoplankton = 200 g C/m²/year

Puerto Rico alfalfa = 2100 g C/m²/year

Discussion Questions:

For which species of seaweed is primary productivity highest?

What are some sources of error in this experiment?

Which error do you think contributes most to the variation in this experiment?

What roles do primary producers play in ecosystems?

What factors affect primary productivity 1) of *Macrocystis*, and 2) worldwide?