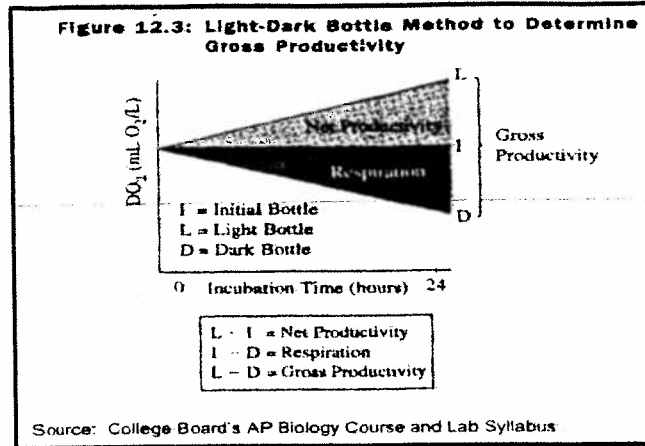


We can measure net productivity and respiration in a “Light-Dark Bottle Experiment”.



$$\text{Gross Productivity} = |\text{Net Prod}| + |\text{Respiration}|$$

“gross productivity” is arrived at by summing the absolute values

$$\text{Gross Productivity} = \text{LIGHT BOTTLE} + \text{DARK BOTTLE}$$

$$|\text{Net Productivity}| + |\text{Respiration}|$$

In real life: Net Productivity = Gross Productivity – Respiration

While an photosynthetic organism (or “autotroph”), is fixing solar energy to make glucose and oxygen, they respire, or burn up energy to meet their metabolic needs. In the bottles expose to light, both the biological processes of photosynthesis and respiration are occurring.

When you measure the dissolved O₂ left in the light bottle, you have an idea of what the organism made and used, or “net” productivity.

Therefore, the change over time in DO concentration (DO₂ final) from the initial concentrations (DO₂ initial) is a measure of **NET PRODUCTIVITY**.

Light bottle – Initial DO reading = net Productivity

RESPIRATION = Initial DO in the water – DO measured in the Dark Bottle

Remember, in the dark, no photosynthesis should be occurring.

The difference between the DO initial and DO in the dark bottle is an indication of the amount of oxygen that was consumed in **respiration** by the organisms in the bottle.

INITIAL DO – DO Dark bottle = Respiration

This value might be negative, can you think why this may be so? This is a good example of why we use the absolute values of our data.