

On-line Science Simulations - Waterweed Student Worksheet

Task 1

To investigate the effect of increasing light intensity on the rate of photosynthesis of waterweed (keeping all other factors constant)

The rate at which bubbles of oxygen are released by a waterweed is an indication of the rate at which it is photosynthesising.

1. Make sure that the waterweed is being exposed to **white** light (i.e., no colour filter is being used).
2. Set the CO₂ concentration at **10.0** arbitrary units.
3. Set the light intensity at **1.0** arbitrary unit.
4. Click on **START** and allow the experiment to run for a 30 s period. (You may choose to click on 'fast forward' to save time.)
5. Carry out 5 runs. Calculate and record the average number of bubbles released.
6. Keeping the CO₂ concentration at 10 arbitrary units, repeat procedures 4 and 5 at the following light intensities : **2.5, 4.0, 5.5, 7.0, 8.5, and 10.0** arbitrary units.
7. Plot a graph of bubble count against light intensity.

What conclusions can you draw about the rate of photosynthesis in the waterweed and the light intensity to which it is exposed?



Task 2(a)

To investigate the effect of increasing CO₂ concentration on the rate of photosynthesis of waterweed (keeping all other factors constant)

1. Make sure that the waterweed is being exposed to **white** light.
2. Set the light intensity at **10.0** arbitrary units.
3. Set the CO₂ concentration at **0.5** arbitrary units.
4. Click on **START** and allow the experiment to run for a 30 s period ('fast forward' will save time).
5. Carry out 5 runs. Calculate and record the average number of bubbles released.
6. Keeping the light intensity at 10 arbitrary units, repeat procedures 4 and 5 at the following CO₂ concentrations : **2.0**, **4.5**, **6.0**, and **7.5** arbitrary units.
7. Plot a graph of bubble count against CO₂ concentration.
8. What conclusions can you draw about the rate of photosynthesis of the waterweed and the concentration of CO₂ available to it?

Task 2(b)

To investigate the effect of different colours of light on the rate of photosynthesis of waterweed

1. Set the light intensity at **6.0** arbitrary units.
2. Set the CO₂ concentration at **6.0** arbitrary units.
3. Select **white** light.
4. Carry out five runs and record the average number of bubbles released.
5. Select the **red** filter and repeat 4. above.
6. Select the **green** filter and repeat 4. above.
7. Draw a **bar graph** to compare the rates of photosynthesis of the waterweed under the different colours of light.
8. What conclusions can you draw about the effect of different colours of light on the rate of photosynthesis in the waterweed ?