

How light intensity effects the Rate of photosynthesis

Aim:

To find the rate of photosynthesis at different light intensities by measuring the amount of bubbles produced.

Prediction:

When the lamp is close to the pond weed, the rate of photosynthesis will increase. I think this because by increasing light intensity, we are allowing more light energy to be absorbed by chlorophyll in the chloroplasts. The light gives energy to the particles in the cytoplasm causing them to collide more, therefore increasing the rate of photosynthesis.

I predict that when the light source is nearest the plant, the more oxygen will be produced.

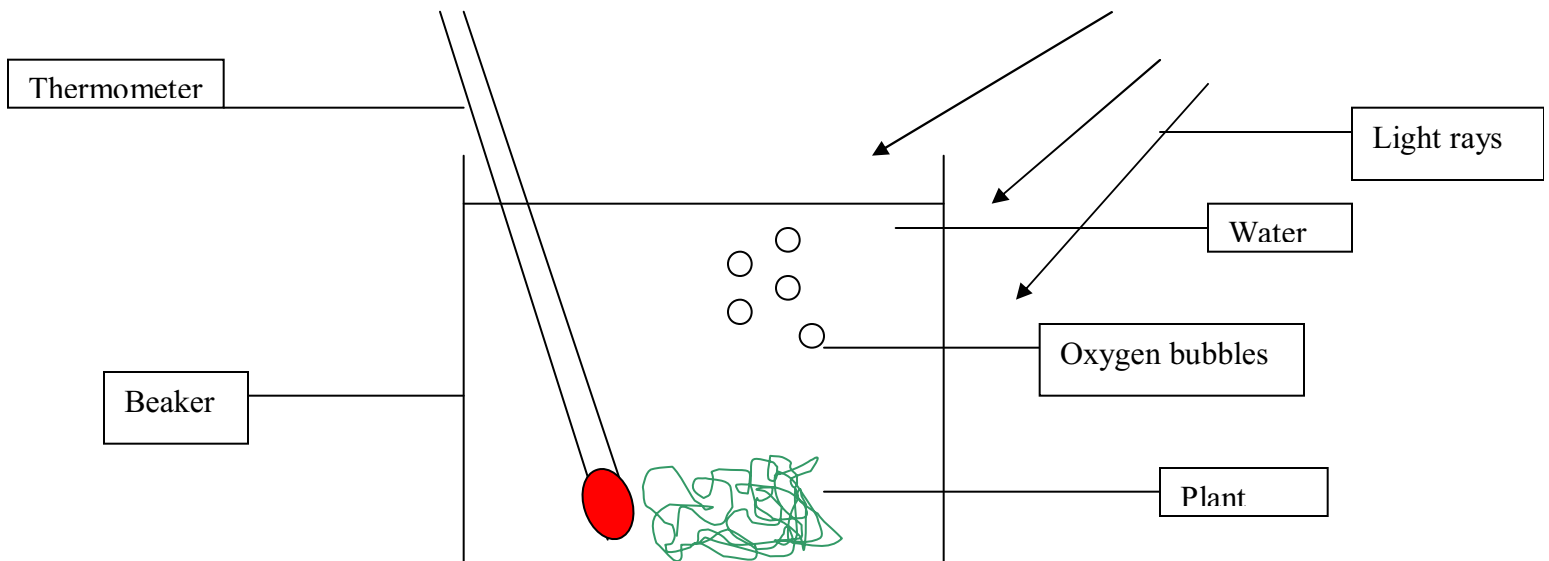
Apparatus:

200 cm water in a beaker, paper clip, Elodea pond weed, thermometer, lamp, ruler, sodium hydrogen carbonate, stop watch.

Method:

1. Fill beaker with 200 cm of water.
2. Stir in sodium hydrogen carbonate.
3. Put paper clip on pond weed and place in beaker – snap off end under water.
4. Turn on lamp next to the beaker for 1 minute.
5. After 1 minute, take temperature reading and count the number of bubbles produced by the snapped end of the weed for 2 minutes.

6. Then move the lamp 5 cm away from beaker and leave for 1 minute.
7. Take the temperature reading and bubbles emerging from the snapped end for 2 minutes.
8. Repeat steps 4-6 for 10 cm, 15 cm, 20 cm and 25 cm.
9. Then repeat 1-8, 2 more times.



Fair test:

In this experiment we are looking for the effects of light intensity only. So to prevent any other limiting factors such as carbon dioxide and temperature;

We are diluting sodium hydrogen carbonate in the water to supply carbon dioxide, and completing the experiment in one day to lessen the chance of a temperature change.

We are also keeping the same times for each stage – 1 minute for the plant to adjust to the new light distance (other wise we will be including the bubbles from the distance before) and 2 minutes to count the bubbles.

Results:

Length (cm)	Try 1 (No. Bubbles)	Try 2 (No. Bubbles)	Try 3 (No. Bubbles)	Average (No. Bubbles)
0	44	37	43	41.33
5	29	32	39	33.3
10	23	25	30	26
15	26	22	21	23
20	13	19	22	18
25	11	15	12	$\frac{1}{2.67}$

Conclusion:

My graph shows that when the distance increases, photosynthesis decreases.

I can tell this because there are less bubbles of oxygen (being produced by photosynthesis) at the maximum distance.

This is because less light energy can reach the pond weed.

Evaluation:

I think my results are mostly accurate - the number of bubbles goes down as distance increases, which is expected in this experiment.

But I did have 2 anomalies. These were higher than expected at their distance. The cause of these anomalies could be that we timed wrong (someone's eye might have slipped), the temperature might have increased, or someone else's lamp shone on our weed to briefly add an extra light source.

If I did this experiment again then I would do it in a dark room, with no other light source and carefully watch the time and amount of bubbles being produced.