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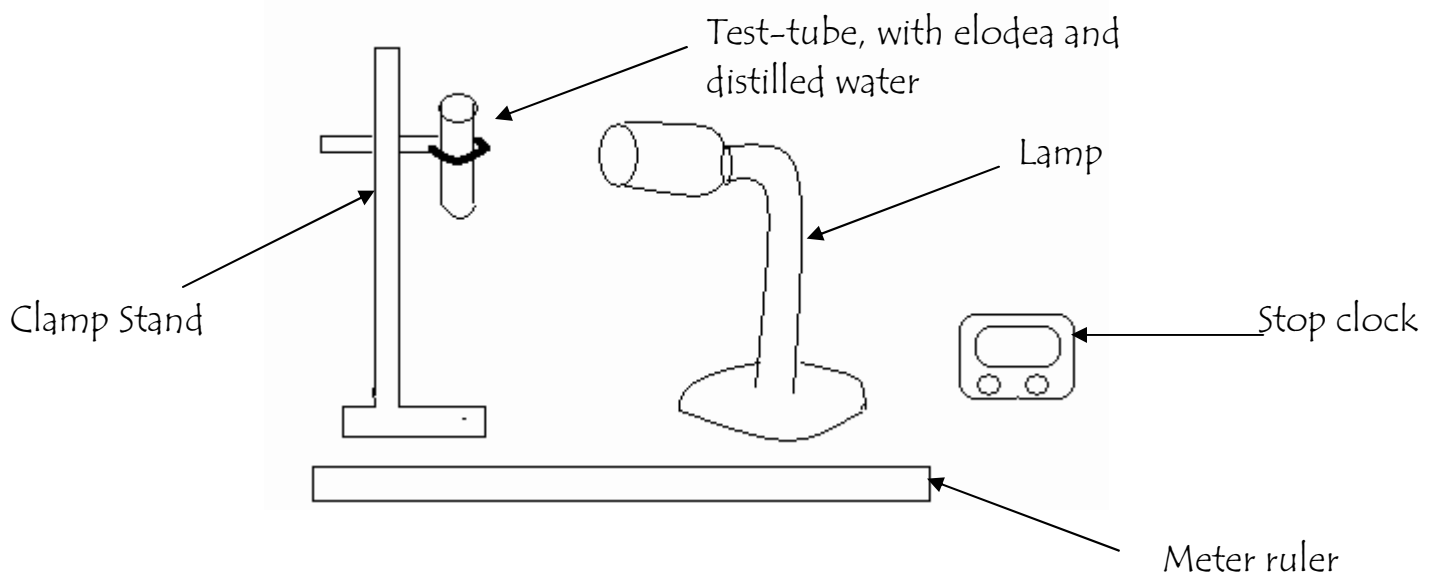
How Light Intensity Affects the Rate of Photosynthesis

In this experiment I will be trying to find out if changing the light intensity on a plant affects the rate of photosynthesis.

Below is a list of equipment that I am planning to use:

- A lamp
- Test-tube
- Clamp Stand
- Distilled Water
- Elodea (pond weed)
- Stop Clock
- Meter ruler

Below is a diagram of my equipment and the way it will be set out in the experiment.



My measurements will be approximately 10cm³ of distilled water. To obtain my results I will measure; the distance of the lamp from the elodea, the distance from the lamp to the elodea (5 minutes for 35 minutes) and how many oxygen bubbles are produced during the 5 minutes.

Also for the experiment to be fair our group will have to make sure that the following is done; every oxygen bubble must be counted, the distance must be changed every 5 minutes and the distance must be checked accurately. Accuracy of the measurements is vital as this could affect my results making them non reliable.

My Method:

I will carry out my investigation using the subsequent method:

- ♣ Set up equipment as shown in diagram, making sure that the lamp is 30cm away from the elodea.
- ♣ Start stop clock and wait for 5 minutes counting every oxygen bubble that is released.
- ♣ Record and move 5 cm forward start stop clock, watch for 5 minutes once again counting every oxygen bubble that is released.
- ♣ Continue to do this until you reach the end of the 30cm.
- ♣ Collect the last set of results from 0cm away and record.
- ♣ Repeat experiment
- ♣ Analyse results from both experiments
- ♣ If needed re-do experiment until accurate results are reached.

Preliminary Work

For my preliminary work I have done some research using different science textbooks; core science 1, core science 2 and starting science 1.

Other preliminary work carried out was a preliminary experiment, the results from this were not as I had expected as we did not get any results for when the lamp was up to 20cm away from the elodea. There

were no results for when the lamp was 30cm and 25cm away this was because the lamp was too far away from the elodea, the rays couldn't reach it in order to enable it to photosynthesis.

Using this information, I will be changing my method by starting from 20cm and going to 0cm, as it is not worth wasting time on the 25cm and 30cm, as they will most probably produce no results, as in the preliminary experiment. There will be no other changes, because I found that the experiment was set up fine and would have given better results if the lamp had been closer.

My Prediction:

I think that my results will show that the closer the lamp will get to the elodea the more oxygen bubbles will be produced. The reasons for me predicting this are gathered from my preliminary evidence.

The preliminary work shows, that by keeping the lamp 30cm away no oxygen bubbles were produced, however the closer the lamp got to the elodea bubbles started to be produced. In my preliminary research, I found that, by increasing the amount of light a plant receives the quicker it will photosynthesize. Also to me, it seemed like it would make sense for an item to do things faster if it received more of 1 substance needed for tip to produce.

Obtaining Evidence (Results)

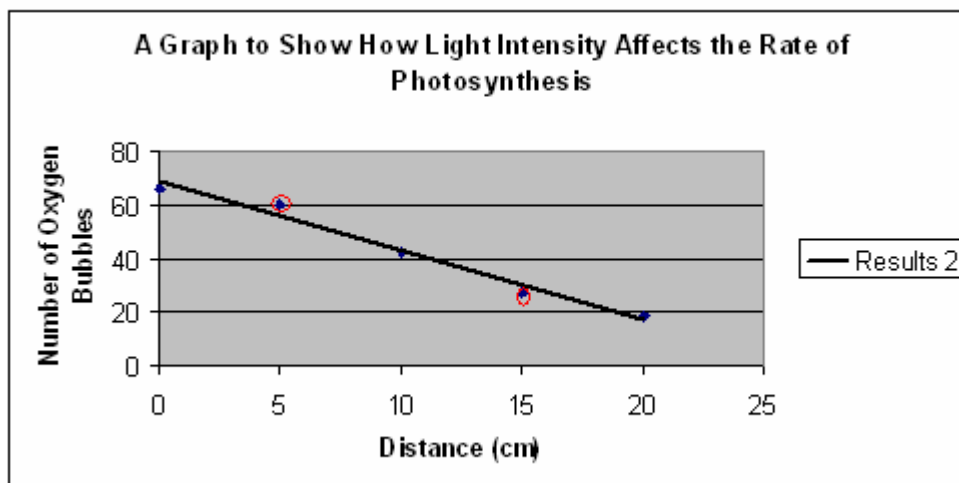
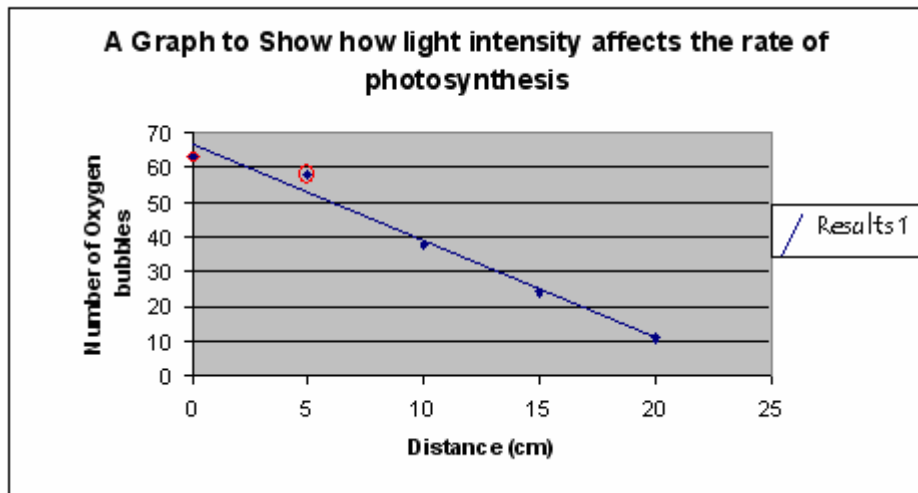
Results 1:

Distance of Lamp from Elodea(cm)	Number of Oxygen Bubbles produced
0cm	63
5cm	58
10cm	38
15cm	24
20cm	11

Results 2:

Distance of lamp from Elodea(cm)	Number of Oxygen Bubbles Produced
0cm	66
5cm	60
10cm	42
15cm	27
20cm	18

My results can also be presented in a line graph:



Analysing and Evaluating My Results

Within my line graphs, I have circled the anomalous results. These results did not follow the same trend as the others this is shown by looking at the line of best fit or the trend line. The fact that they do not lie near to the trend line displays that these results may be inaccurate or that something may have affected the results, such as equipment or human error. The clarity of results was better seen on the computerised graphs as opposed to the ones drawn by hand. This is due to the computerised graphs being able to immediately detect the anomalous results, whereas when drawing by hand the graphs they are susceptible to human error, for example, one can easily be misled as what is the position of the line of best fit.

I think that I have found anomalous results in my experiments due to human error; as there were many bubbles rising from the elodea at one time therefore I may have either counted some twice or missed some out. Another reason could be due dirt floating around in the test tube, these may have been counted as oxygen bubbles as when looking from a short distance they did indeed look as though they were oxygen bubbles.

I thought that if the things mentioned above were changed the experiment would have been more successful. To improve the investigation I would have more than one person counting the bubbles in the test-tube so that you can compare results which will get a more accurate reading which should help to not create anomalous results. Also I would double check that the water which the elodea is in is clean, so that there is no confusion of dirt and oxygen bubbles.