Investigation into one of the factors that affects photosynthesis

Plan

The aim of this activity is to investigate one of the factors that affect the rate of photosynthesis in pond-weed. I am trying to find out if the distance of the pond-weed from a lamp will change the rate of photosynthesis. I will measure the rate of photosynthesis by counting the number of bubbles that are released by the stem of the pond -weed when the lamp is shone on it from different distances. What I think will happen is as the pond weed is moved further away from the lamp, less bubbles will be produced. I think this will happen because the light intensity will be less on the pond-weed as it gets further from the lamp therefore the rate of photosynthesis will not be as high. The word equation for photosynthesis is:
Carbon Dioxide + Water = Glucose + Oxygen + Energy

Pond-weed is being used fro this experiment because with a normal plant that does not live in water it would be a lot more difficult to view photosynthesis taking place because you can not see bubbles being produced. To make this a fair test we are going to make sure the temperature is the same for every reading we take. I am going to record the rate of photosynthesis on 10 different distances, three times each.to ensure the results are accurate.

For this experiment I am going to need;
-A lamp
-About 4cm of pond-weed (Elodea)
-A paperclip
-Sodium Hydrogen Carbonate
-A metre rule
-A stopwatch
-A thermometer
-A test tube

I can't think of any major risks in this experiment just make sure not to break the thermometer because it contains mercury, which is poisonous.

-First of all plug the lamp into a plug power socket.
-Attach a paperclip to the top of the 4cm of Elodea you have cut so that the Elodea can be held upside down.
-Place the Elodea into a test tube and fill with water.
-Add a spatula full of sodium hydrogen carbonate to produce more carbon dioxide.
-Measure the distance you are going to test between the lamp and the test tube containing the Elodea using a metre rule.
-Record the temperature of the water before you start.
-Switch on the lamp and wait for about 30 seconds.
-At the same time start the stopwatch and start counting the bubbles produced by the Elodea.
-After 30 seconds stop the stopwatch and record how many bubbles are produced by the Elodea.
-For each reading make sure the temperature of the water is the same as when you started the experiment.
-Carry out this procedure 3 times with each of your chosen different distances and record the results.

Before I begin my experiment I am going to take preliminary results to practice this method before I start.

Preliminary results

	Ammount of bubbles produced per 30 seconds			
Distance from light	**1st attempt**	**2nd attempt**	**3rd attempt**	**Average**
10cm	63	65	60	62.7
20cm	17	14	16	15.7
30cm	9	11	10	10
40cm	3	5	5	4.3
50cm	3	3	3	3
60cm	2	3	3	2.7
70cm	2	2	2	2
80cm	1	1	2	1.3
90cm	0	0	0	0
100cm	0	0	0	0

These preliminary readings fitted what I expected so I am not going to change my experiment.

Observations

	Ammount of bubbles produced per 30 seconds			
Distance from light	**1st attempt**	**2nd attempt**	**3rd attempt**	**Average**
10cm	67	46	61	58
20cm	40	14	18	24
30cm	10	8	9	9
40cm	6	6	4	5.3
50cm	3	3	2	2.7
60cm	2	2	3	2.3
70cm	1	2	2	1.7
80cm	1	1	1	1
90cm	0	0	0	0
100cm	0	0	0	0

Analysis

I have found out from these results that the further away from the light the Elodea is, the slower the rate of photosynthesis is not as high. My graph shows that when the Elodea was 10cm away from the lamp the rate of photosynthesis was high with there being around one bubble produced per second The average amount of bubbles produced in 30 seconds was 58. When the Elodea was 20cm away from the lamp the rate of photosynthesis decreases by more half as much with the average number of bubbles produced being only 24. From then on the rate of photosynthesis decreases slowly until when the Elodea is 90cm away from the lamp and the amount average amount of bubbles produced in 30 seconds is nil.When the Elodea was 10cm away from the lamp there was an anomolie on the second attempt which was 46 bubbles per 30 seconds and the first being 67 bubbles and the third being 61 bubbles per 30 seconds.

If I compare my results to my prediction. I can see that I was correct because as you can see from my results, the amount of bubbles produced per 30 seconds decreased as the Elodea was moved further from the lamp. In other words, the rate of photosynthesis decreased as the light intensity was less.

Evaluation

If I repeated my experiment I could change it by taking more readings for each distance to make my results and average more reliable. I could also change it seeing if my results change much if a bigger piece of Elodea is used for the experiment. My experiment because I experimented the variable I chose to investigate thoroughly, I used 10 different distaces and tested each one three times to gain an accurate set of results. My experiment was nreliable because for each reading the temperature of the water was not exactly the same so this would have affected the rate of photosynthesis and affected my results. My experiment was also unreliable because the distances I measured from the lamp may not have been exact so this may have not made my results precise. Overall I think my experiment was successful because I found out what it was that I wanted to find out, how does light intensity affect the rate of photosynthesis.

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