

Photosynthesis- year 10 Investigation.
Investigate the relationship between light intensity and the rate of photosynthesis.

Photosynthesis is important because animals eat food, as it is a source of energy. All living things need a constant supply of energy if they are to grow, reproduce or move. Plants do not eat food but they do have some in the form of starch in their leaves.

The symbol equation for photosynthesis is:



There are four substances needed for photosynthesis to take place:

- Carbon dioxide.
- Chlorophyll.
- Oxygen.
- Sunlight.

Photosynthesis cannot take place without all four of these substances being present.

As light is the factor I am exploring in this investigation, that is the main factor I am looking at.

Plants need light for photosynthesis to take place; photosynthesis will not take place in the dark.

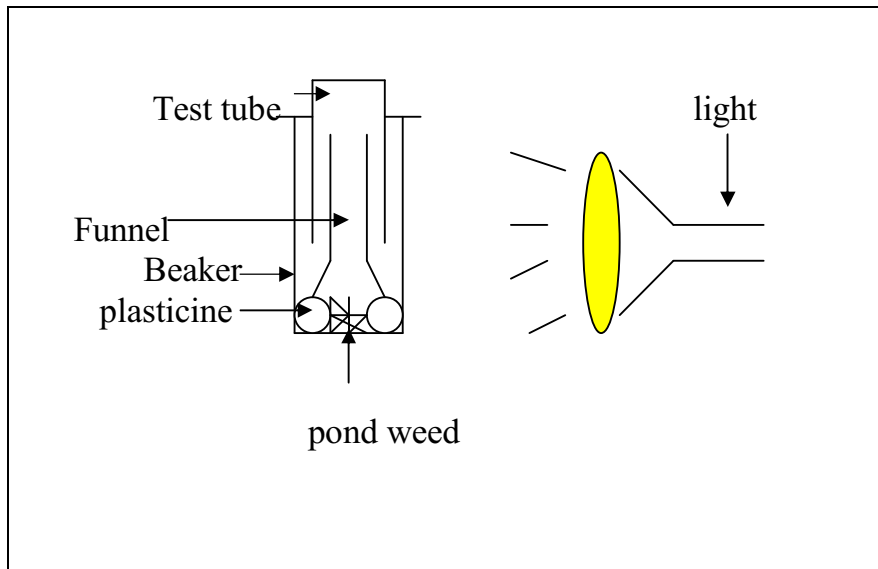
It is true that the brighter the light, the greater the rate of photosynthesis.

Many plants have their leaves spread out in such a way that each leaf has as much light as possible and the lower leaves are not shaded by the ones above.

I am investigating the effects of light on the rate of photosynthesis.

It is possible to do this by measuring the rate of photosynthesis at different light intensities by counting the number of bubbles of gas given off by the plant in a given time.

To make the test fair I will use the same amount of water and the leaf from the same plant.



Method.

I can do this by setting up the diagram above. You need to get a beaker and place two pieces of plasticine inside to hold down the funnel. Then place the plant weed inside the funnel. Put a test tube over the mouth of the funnel and then put water into the beaker.

You are varying the light intensity so you need to keep the temperature controlled because enzymes, which take part in the chemical reactions of photosynthesis, are destroyed at the higher temperatures. So you don't want the water in the beaker to warm up, which could happen as the light gets closer to the beaker. You can keep the temperature controlled by checking the temperature of the water at every light intensity before and during. If the temperature gets higher then you will need to empty out that water and use the same temperature water that you began with at the first intensity of light. To make sure that you get the same temperature at the beginning and during each experiment you will need to record the temperatures with a thermometer and write them down.

To measure the distance from the beaker to be sure that the light intensity is at each distance from the beaker that I have chosen, 10cm to 90cm, I will use a metre ruler.

I will need these readings at each distance so that I can get an average amount of bubbles. Then round up that number to the nearest whole number.

I predict that the results will show that, as the light gets further away, the amount of bubbles becomes less.

Analysis and conclusion.

After carrying out the experiment to investigate the effect of light intensity on the rate of photosynthesis of a pond plant.

The experiment was repeated for different distances and the results are below:

<u>Distance</u> (cm)	<u>Bubbles in 5 mins</u>			<u>Average</u> (cm³)
10cm	14	15	15	15
20cm	12	11	11	11
30cm	9	7	7	8
40cm	6	6	5	6
50cm	5	4	4	4
60cm	4	5	5	5
70cm	3	2	2	2
80cm	2	1	1	1
90cm	1	0	0	0

The results show that the closer the light the more bubbles there are in 5 minutes. As the light gets further away the amount of bubbles becomes less.

There is a pattern in the results of the light intensity. You can see this by looking at the results table and graph.

It shows that as the distance of the light moves further away the less bubbles there are. There is less light intensity.

From these results you can understand the relationship between the rate of photosynthesis and the amount of light received by a plant.

Evaluation.

After completing the analysis of the data obtained from the photosynthesis experiment, I am going to evaluate it.

I think that the method was sensible and my plan and method worked well, I think this because as I moved the lamp away from the beaker it produced fewer bubbles.

So it agreed with what I had thought and planned. I chose the correct equipment and distances, which worked to make the experiment correct and fair.

The experiment is a very safe one s there is not really any safety precautions to take when carrying out this experiment. To make it fairer you would need to look at the mass of the bubbles because not every bubble will be the same size and could have a different volume, which would make the test unfair. That is how you would have to improve it to make the test more reliable. There is a difference in the graph, if you look at the results then you will notice that the average amount of bubbles gets less and less as the distance gets further and further away. It is going down in a pattern until lot gets to 60 cm away then it goes back up to 5cm ³, from 4cm ³, this is odd and after checking the results and averages again and again it is the correct average.

I think to make the test fairer and more accurate we would of had to of done the test for ourselves to change certain points of the experiment.