

TOMBAILEY

BIOLOGY COURSEWORK

INVESTIGATE THE LIMITING FACTORS OF PHOTOSYNTHESIS

AIM: The aim of this investigation is to explore how light intensity effects photosynthesis. We will be looking at the light factor and changing it. This will be to increase or decrease the intensity of the light.

DIAGRAM:

METHOD:

- Collect all of the apparatus needed for the experiment
- Fill trough and collection tube with water
- (Make sure that you are wearing an apron and safety goggles)
- Set up apparatus as shown on the above diagram
- Place the pondweed in the test tube and add sodium hydroxide
- Put lamp in front of the test tube and observe gas produced
- Decrease the distance of the lamp from the test tube three times at 10cm changes each time
- Do the test three times for each distance

We have decided that it is not appropriate to use a gas collection tube in this experiment because not enough gas will be produced. So we will count the amount of bubbles produced, then record this in a table.

- We put a piece of pondweed 4.5cm tall into 6cm's of sodium hydroxide into a boiling tube
- We weighed it down with a piece of plastercine so there was enough room to see the bubbles coming up
- We turned the lamp on 10cm's away from the test tube so that the pondweed could equilibrate to the light
- We then put on a timer and counted the amount of bubbles which came off in two minutes
- We did this at 10, 20, 30 and 40 cm's 3 times each and recorded our results

PREDICTION: I predict that as we decrease light intensity, it will affect the rate at which photosynthesis occurs and make it less effective. So as we move away the light, the rate at which photosynthesis occurs will decrease. This is because photosynthesis is most effective when there is light which will make more gas be produced. We can also see this because plants can't photosynthesise at night.

RESULTS TABLE TO SHOW THE AMOUNT OF BUBBLES PRODUCED THE MORE LIGHT THERE IS

	10cm	20cm	30cm	40cm
TEST 1	23	9	3	1
TEST 2	20	8	4	1
TEST 3	25	8	3	2
AVERAGE	22.7	8.3	3.3	1.3

CONCLUSION: In my experiment, I found that increasing the temperature of the acid did speed up the rate of reaction between the hydrochloric acid and magnesium. As the temperature increased, the reaction became quicker. So my hottest experiment at 60 °C was my fastest, and my coolest experiment at 21 °C was my slowest. The graphs show that each experiment gave off gas for a start and also that each test began quickly and then levelled off. The two tests, which were out of line on the graph the most, were the 42 °C one and the 51 °C one. When the temperature was increased, the rate of reaction also increased. This is because of the collision theory.

EVALUATION: In this experiment we had to measure the amount of bubbles produced from a piece of pondweed through photosynthesis. My experiment did go as planned but in general terms this experiment as a whole in the first place is not a very good one to do. It was hard to count the bubbles and it was really easy to miss a bubble which came up fast if you looked a way for a second. I think that I should have used my original plan and method because the gas collection tube would show me exactly how much gas is produced. We did four distances from the pondweed with the lamp during my experiment and I think that it would have been better to do five maybe. I do not think that four was a sufficient amount. The repeat results that we got were all accurate and the range of results was no too far above or below the others.

My plan was well done but I had to change it because I was told that the gas collection tube would be too big and there would not be enough gas collected to show up which was correct in the end. We didn't have any serious problems really and it was all well thought out and well done. If I was to do this experiment again, then I would definitely use a gas collection tube and make it last a lot longer so there would be more gas produced. I may also use a wider range of distances so it would be a more accurate graph.