

## Pondweed Investigation

### Aim

To investigate how light affects the rate of photosynthesis.

### Prediction

I predict that the closer the lamp is to the pondweed the faster the rate of photosynthesis, the further away the lamp gets the slower the rate of reaction. I predict this as photosynthesis happens mainly during the daytime where there is strong light; photosynthesis slows down/stops at night because there is no main light source. For my experiment I predict that more oxygen bubbles will occur as the lamp is closer to the pondweed. This is because the more light there is, the more excited chlorophyll there will be photosynthesising producing O<sub>2</sub> bubbles; therefore more photosynthesis happens the more oxygen bubbles will be released, so I will be able to see more O<sub>2</sub> bubbles.

### Equation

Carbon dioxide + water – light & chlorophyll ➡ sugar + oxygen



### Equipment

- Pondweed
- Stopwatch
- Ruler
- Beaker
- Funnel
- Boiling tube
- Water
- Lamp

### Fair test

- Keep the same piece of pondweed for all tests.
- Time the rate of photosynthesis for the same amount of time.
- Measure the rate of photosynthesis only when the lamp is at the exact measurement.
- Give the pondweed time to adjust to its new surroundings each time the lamp is moved.
- Make sure there is no natural light affecting the experiment.
- Do the tests on the same day so that the weather doesn't affect the experiment.

## Variables

- 1) The length of time you measure the rate of photosynthesis for.
- 2) The measurements on which you place the lamp.

## My Variables

- 1) I measured the rate of photosynthesis for 3 minutes.
- 2) I placed the lamp at 10cm intervals.

## Method

- 1) Get all the equipment together.
- 2) Set up the equipment as shown in the diagram.
- 3) Put the lamp at 10cm and count the number of bubbles released from the piece of pondweed.
- 4) Repeat the last step but put the lamp at 10cm intervals each time getting further away for the beaker.
- 5) Repeat test for 2<sup>nd</sup> set of results.
- 6) Calculate average.
- 7) Draw graph.

## Results table

### Test 1

Distance from pondweed (cm)	Number of bubbles per 3 minutes.
0	89
10	75
20	49
30	45
40	37
50	27

### Test 2

Distance from pondweed (cm)	Number of bubbles per 3 minutes.
0	41
10	28
20	26
30	16
40	14
50	12

### Average

Distance from pondweed (cm)	Number of bubbles per 3 minutes.
0	65
10	51.5
20	37.5
30	30.5
40	25.5
50	19.5

## Conclusion

I predicted that the further away the lamp got from the beaker the slower the rate of photosynthesis would be. I also predicted that the closer the lamp got the more excited chlorophyll there would be producing more oxygen bubbles, from my graph I can see that this is correct because the closer the lamp is to pondweed the more bubbles were produced. This proves that more light there is, the more oxygen bubbles are produced so the rate of photosynthesis increased also.

From my results I can see that my prediction was correct.

As my graph shows the lower the number of bubbles the further away the lamp was, and the higher the bubble count the closer the lamp was.

This is because as the lamp gets closer to the pondweed the rate of photosynthesis increases therefore releasing more oxygen bubbles for me to count.

Both tests show a negative line of best fit showing that both tests prove my conclusion.

## Evaluation

My investigation went well because my pondweed reacted well to the light intensity and produced many oxygen bubbles.

My investigation shows that in the 2<sup>nd</sup> test the rate of reaction was less as there were fewer bubbles produced. The two tests do relate to each other, I think the 2<sup>nd</sup> test was slower because it was getting old by then as we had run out of time and had to spread the experiment over two days so something could have happened to the pondweed while I was absent. I didn't have any major anomalies in my investigation only a few that was slightly out of line than other results.

If I was to do this investigation again I would create enough time to do my experiment on one day so that the pondweed didn't get affected by the time delay. I would also take more results to get a more accurate reading. Mainly if I was to do this test again I would change the way we counted how much oxygen was being produced. Instead of counting bubbles produced I could put a tube over the funnel to count how much gas is produced over 3 minutes, I believe that this would be more accurate and get better results.