

PHOTOSYNTHESIS INVESTIGATION

AIM: *To find out how the rate of photosynthesis is affected by changing the amount of light.*

APPARATUS:

PREDICTION:

In this experiment I am planning to change the amount of light I am panning to measure number of bubbles given off in a certain period of time.

I think changing the amount of light will affect the rate of photosynthesis, because plant photosynthesis faster on sunny day than on a dull day. So if you move the light away from plant it want photosynthesis. And also a plant may have lots of water and Carbon dioxide, but it will not photosynthesis very fast if there is not enough light, increasing the light intensity will make photosynthesis faster.

As less light gets to the plant the speed of photosynthesis will be less. The following equation summarizes what happens during photosynthesis.



Chlorophyll absorbs light energy and transfers it into chemical energy. This energy is used in a chemical reaction dioxide and water into glucose and oxygen. The glucose is either stored as starch, or used for respiration. The oxygen, released as a by-product of photosynthesis, is very important because it provides the main source of oxygen for animal respiration.

METHOD: *I am going set the apparatus as it is in the diagram. I am going to change the distance of the light from the plant by moving the lamp for a certain distance from the plant. The range of 5 different distances is follows:*

*15 cm,
20 cm,
35 cm,
40 cm and
55 cm.*

Then I am going to measure this by counting the number of oxygen bubbles given off over 1 minute from end of water. This is used as a measure of the rate of photosynthesis. Repeat the experiment two on three times and calculates an average number bubbles for each distance.

FAIR TEST: *The things that need to be kept the same are follows:*

- *Temperature*
- *Amount of water*
- *Amount of carbon dioxide*

By keeping the other factors it everyone get the equal result so that the experiment will be fair. The other factors, which affect the photosynthesis, are Carbon dioxide, temperature and water.

- *Carbon Dioxide: The more Carbon dioxide there is in the air surrounding a plant, the faster the plant photosynthesis. If they have less Carbon dioxide it will affect the rate of photosynthesis that the plant produced.*
- *Temperature: The warmer it is, the faster is the rate of photosynthesis. If the temperature gets much above 40C, photosynthesis slows down rapidly and then stops altogether. This is because the heat destroys the enzymes, which are responsible for working the chemical reactions work.*
- *Water: A plant, which is beginning to wilt through lack of water, may photosynthesis at only half the normal rate. Lack of water produce other effect, and these then slow down photosynthesis.*

RESULTS:

Distance (cm)	Bubbles given off over 1 minute (1st reading)	Bubbles given off over 1 minute (2nd reading)	Average number of bubbles given off over 1 minute

5	78	76	77
10	74	75	74.5
15	56	50	53
20	43	40	41.5
25	28	26	27
50	11	13	12
100	5	4	4.5

ANALYSIS: *The graph shows that the greater the light intensity, the higher the rate of photosynthesis. In the beginning of the graph there are lots of oxygen bubbles is produced because the lamp is placed near to the plant, when I place the lamp at different distances the plant produced little oxygen bubbles, this is because the light is the most important factor, changing the amount of light will affect the rate of photosynthesis.*

Once the plant is photosynthesizing as fast as it can, increased light ceases to have an effect. The light is the important factor is needed for making sugar. This is because very high lights intensities may bleach chlorophyll and so retard photosynthesis, but plants that naturally grow in these conditions have evolved protection devices such as thick cuticles and hairy leaves.

As I said in the prediction increasing the light intensity will make photosynthesis faster. Chlorophyll synthesis is checked in the absence of any of them. The green substance chlorophyll enables the plant to transfer energy from sunlight to sugar. Photosynthesis is not a single

reaction, it takes place in a series of small steps. The following equation shows how it works:



This equation summarizes what happens during photosynthesis.

EVALUATION: *In my graph I find three anomalous points. Because in 5cm distance there are 77 oxygen bubbles given off, but in 10cm distance it immediately reduces to 74, then in 15cm distance it reduces very quickly to 53, then in 20cm distance it reduces to 41, then in 25cm distance it reduces 27, then in 50cm distance it reduces to 12, then finally in 100cm that is 1m 4 oxygen bubbles are given off. This is because I place the lamp in different distance, in the beginning I only increased 5cm at each time, then I increased 20cm – 30cm. When I increased 5cm in the beginning it doesn't fit into a pattern. So, to improve this experiment I need to increase the range of distance by at least 20cm – 30cm, so that I'll get the line of best fit in my graph. This is the only way that I can improve my experiment.*

