

**David**

**Experiment: An experiment to investigate the effect of light intensity on the rate of photosynthesis.**

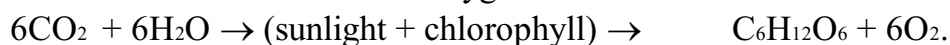
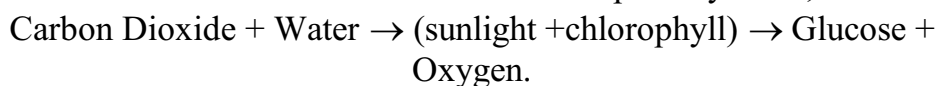
**Aim:** We will be trying to see if light intensity has an effect on the rate of photosynthesis.

**Introduction:** Photosynthesis is the process that produces 'food' for plants, this 'food' is called glucose. The process takes place in the leaves of green plants, this is what the leaves are for. There are four things that are required by the plant before it can carry out photosynthesis, they are light, chlorophyll, carbon dioxide and water. Chlorophyll is the green substance found in chloroplasts and this is why leaves look green. The chlorophyll is very important because it makes the whole process occur. It absorbs the energy from the sunlight and uses it to combine CO<sub>2</sub> and water to produce glucose. Oxygen is given off as a by-product. The structure of a leaf is also very important as it is designed to obtain as much CO<sub>2</sub> as possible.

There are three features that makes the structure of the leaf unique.

1. They are very thin and flat to provide a large surface so it can soak up lots of sunlight.
2. The palisade cells are arranged near the top of the leaf and are full of chloroplasts, essential for photosynthesis.
3. The guard cells, on the bottom layer, control the amount of gas movement in and out of the leaf.

There is a formula that lets us know the rate of photosynthesis, it is:



The rate of photosynthesis can be altered by three factors which are the amount of light, carbon dioxide and the temperature. The reason why the amount of light is important is because the chlorophyll uses light energy so it can only produce glucose as fast as it is receiving sunlight. Carbon dioxide is always in short supply because only 0.03% of it is in the air, so it is usually the limiting factor in the rate of photosynthesis. Chlorophyll is like an enzyme and works when it is warm, but if it gets too hot the enzyme will be destroyed and the rate of photosynthesis will slow down and eventually stop.

**Preliminary Work:** In preparation for this experiment we made sure that the plant had been cut cleanly and straight along the top of the stalk. My reasons for doing this, was this made it easier for the oxygen, that is the by-product of photosynthesis, to escape from the plant. Also we made sure that the lamp was at the right distance from the plant to ensure that it can produce photosynthesis.

**Apparatus:** In this experiment the apparatus we used was a meter ruler, lamp, stop watch, test tube, test tube rack, plant and sodium hydrocarbonate.

**Method:** We first took a test tube and filled it with sodium hydrocarbonate and then placed the plant inside the tube. We then placed the test tube into the rack, then we slid the metre ruler under the rack allowing the test tube to be above 0cm. Next we placed the lamp beside the ruler at 5cm and switched it on making sure that the plant received direct light from the lamp. Then for 1 minute we counted the number of bubbles coming out of the stalk for three minutes. We repeated this exercise five more times, each time moving the lamp 5cm from the plant.