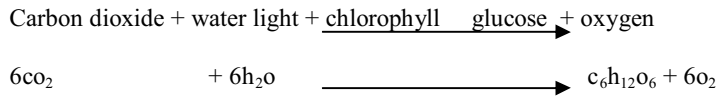


# An investigation to find out the effect of light on photosynthesis

Aim: to find out if light affects the rate of photosynthesis.

## Theory



Photosynthesis is a chemical reaction in which plants use carbon dioxide, water, light energy and chlorophyll to create glucose and oxygen for their food.

## Limiting factors

- Low temperature
- Shortage of carbon dioxide
- Shortage of light
- Chlorophyll
- Water

## Temperature

Temperature is a limiting factor; as the temperature increases the particles move faster which makes them collide more. Thus causing more successful reactions and the rate is made faster.

## Carbon dioxide

Carbon dioxide is needed for the equation to work and is needed to create glucose.

## Light

Light is needed in photosynthesis to provide the initial energy to start the equation off.

### Chlorophyll

Chlorophyll is needed as it is a green pigment which traps the sunlight to help the photosynthesis occur.

### Water

Water is needed in this equation to create the glucose.

<u>Apparatus</u>	<u>Reason for choice</u>
Boiling tube	This is used to hold the pond weed in.
Lamp	This is needed to change the light intensity
Sodium hydrogen carbonate	This is needed to create CO <sub>2</sub>
Spatula	This is needed to measure out the sodium hydrogen carbonate
Meter ruler	To do accurate measurements
Pond weed	To view the effect of photosynthesis
Stop clock	To help with reliability of time checking
Test tube tack	This will hold the boiling tubes in
50cm <sup>3</sup> measuring cylinder	To keep the experiment accurate
Paper clip	This will weigh the pond weed to the bottom of the boiling tube
Water	To view oxygen - photosynthesis

### Controlled variables

We are going to keep all of the variables the same apart from light. We are going to do this by using the same volume of water the same piece of pond weed and use 1 spatula of sodium hydrogen carbonate each time.

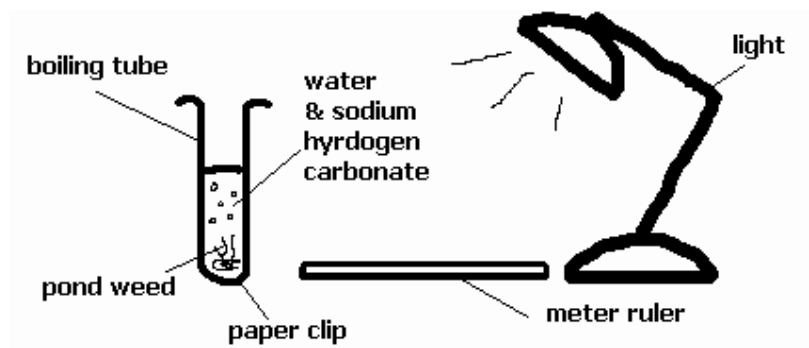
### Key variables

The one thing I am going to change is light intensity. I will change it by moving a lamp different distances away from the experiment. I will measure the rate of reaction by counting the number of oxygen bubbles given off.

### Prediction

I predict that as I move the lamp away from the pondweed the rate of reaction will decrease. This is because light is needed in photosynthesis.

### Diagram



### Method

Set apparatus up as show in diagram. Put sufficient amount of water into the boiling tube and one spatula of sodium hydrogen carbonate and place the lamp 0cm away from the experiment. Record the amount of oxygen bubbles for 1 minute (use stop clock for accuracy) and repeat this three times. Next move the lamp 10cm away from the experiment and repeat what you did at 0cm away. Do this at the distances; 0cm, 10cm, 20cm, 30cm, 40cm and 50 cm and record result in a table.

<u>Distance from lamp</u>	Test 1: number of bubbles	Test 2: number of bubbles	Test 3: number of bubbles	Average
0	80	71	70	73.6
10	73	67	62	67.3
20	46	49	45	46.6
30	33	25	39	29.3
40	12	17	15	14.6
50	8	9	5	7.3

### Analysis

As the light is moved closer to the experiment the rate of reaction increases and more bubbles are created. This shows that as there is an increase in light the reaction of photosynthesis will be faster. My results prove to me that light is needed to make photosynthesis and the reaction will be speeded up with a higher light intensity.

### Evaluation

My results did not show any noticeable anomalous data, which shows it was quite an accurate test.

<b>Main errors</b>	<b>How this might of effected my results</b>	<b>How I could put this error right</b>
Different sized bubbles	If the bubbles where larger they could contain more oxygen	Collect oxygen and measure the volume
Cant count all bubbles	May have missed a few bubbles which could change my results	Collect the oxygen and measure volume
Heat from sun could effect heat of experimnt	More heat could create make photosynthesis occur faster	Use water bath for experiment

There are a fair amount of things I could of changed to make the experiment more effective however with no anomalous results and the fact my prediction was correct it seems that my experiment was accurate enough. I did many things to keep my test reliable and all in all it was a success.