PLANNING A

Aim:

The aim of this experiment is to investigate the effect of different light intensities on the rate of photosynthesis

Theory & Hypothesis:

The photosynthesis rate is often measured by the amount of carbon dioxide absorbed or oxygen evolved by a plant. With increase in light intensity, photosynthesis begins, and some carbon dioxide from respiration is utilized in photosynthesis. As light intensity increases, there is an increase in the rate of photosynthesis, and this light intensity can be increased or decreased by bringing the source of light closer to or further away from the plant.

Hypothesis:

Hence, we can predict that with increase in light intensity, the rate of photosynthesis would also increase.

Variables:

The variables in the experiment are light intensity and the rate of photosynthesis. The independent variable is light intensity, which is adjusted by modifying the position of the lamp. The dependent variable is the rate of photosynthesis or the rate of bubble production which is affected by the varying light intensity.

PLANNING B

Apparatus & Materials:

1. Water plant (Hydrilla)
2. dil.sodium hydrogen carbonate solution
3. Thermometer
4. Boiling test-tube
5. Beaker 500 ml
6. Retort stand
7. Lamp (60W bulb)
8. Ruler
9. Stop-watch

Procedure:

1. Place the hydrilla in a test-tube filled with dilute sodium hydrogen carbonate solution
2. Fix the test-tube on the retort stand
3. Placed the lamp at a distance of about 5cm from the test-tube
4. Start the stop-watch
5. Start counting the number of bubbles produced
6. Note the number of bubbles produced after 2 minutes in a table
7. Repeat the above steps with the lamp at distances of 10cm, 15cm, 20cm and 25cm

Data Collection (Observation):

No.	Distance between lamp and plant/cm	No. of bubbles/2 minutes
1	5	150

2	10	124
3	15	103
4	20	90
5	25	55

Discussion:

Thsu the above observations are according to our hypothesis. The closer the lamp to the plant (hydrilla), the more the light intensity, and thus more the rate of photosynthesis, which is seen by the increased number of bubbles (oxygen) produced by photosynthesis.

Light is needed for photosynthesis as is seen by the following reaction equation:

Carbon dioxide + Water Glucose + Oxygen gas

$CO_2(g) + H_2O(l)$ $C_6H_{12}O_6(s) + O_2(g)$

In order to break the molecules of water and carbon dioxide,light energy is required This is carried out through a series of reaction controlled by enzymes. Oxygen is released from the splitting of the water,that combines with carbon dioxide to from glucose.Therefore, more the light intensity, the more splitting of water molecules takes place, and thus more oxygen is produced, indicating an increase in the rate of photosynthesis. Thus at a close intensity of 5 cm, maximum number of bubbles is formed, and at the least intensity of 25 cm, least number of bubbles is formed.

Modification:

1. Use other types of plants.
2. Conduct the experiment various times ,in order to ensure accurate results.

Precaution

1. Start counting time only from the first bubble.
2. Ensure that the light intensity is not too high, because otherwise the hydrilla may die

Limitation:

1. The experiment was carried out once, and thus the result may be inaccurate

Conclusion:

Hence, we can conclude that light intensity is directly proportional to the rate of photosynthesis, and greater light intensity produces more bubbles.