

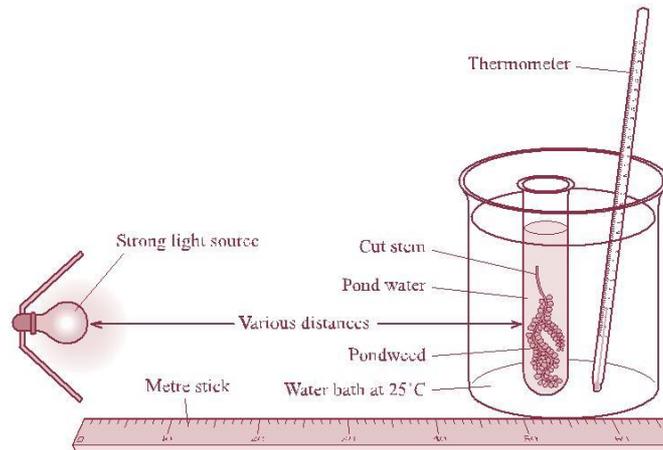


# **Investigate The Influence of Light Intensity on The Rate of Photosynthesis**

**Biology – Leaving Cert Experiments**

## Materials/Equipment

Fresh Elodea	Thermometer
Boiling Tube	Scissors
Large beaker of Water at 25 °C	Forceps
Strong Light source	Light meter (optional)
Metre stick	Pond water
Timer	



## Procedure

1. Familiarise yourself with all procedures before starting.
2. Obtain a fresh shoot of *Elodea*.
3. Cut the stem at an angle. Remove several leaves from around the cut end of the stem.
4. Fill a boiling tube with pond water.
5. Place the plant into the boiling tube, cut end pointing upwards.
6. Place this tube into the water bath.
7. Switch on the light source.
8. Place the boiling tube containing the pondweed at a measured distance from the light source e.g. 15 cm.
9. Allow the plant to adjust for at least 5 minutes and observe bubbles being released from the cut end of the stem.
10. Count and record the number of bubbles released per minute. Repeat twice.
11. Calculate and record the average number of bubbles released per minute.
12. Measure the light intensity at this distance using the light meter or calculate the light intensity by using the formula:  $\text{light intensity} = 1/d^2$ , where 'd' represents the distance from the light source. Record result.
13. Repeat the procedure from step 9 at other measured distances e.g. at 30 cm, 45 cm, 60 cm, 75 cm.
14. A graph should be drawn of rate of bubble production against light intensity. Put light intensity on the horizontal axis.

### Note:

**During this investigation only one factor (light intensity) should be varied – temperature and carbon dioxide concentration must be kept constant.**

**To keep the temperature constant, use a water bath at 25 °C.**

**To keep the carbon dioxide concentration constant use pond water and complete the investigation over a short period of time.**

## Result

<b>Distance from light source (cm)</b>	<b>Light intensity or <math>1/d^2</math></b>	<b>Trial 1 (No. of bubbles/min)</b>	<b>Trial 2 (No. of bubbles/min)</b>	<b>Trial 3 (No. of bubbles/min)</b>	<b>Average (No. of bubbles/min)</b>

## Conclusion/Comment

## SKILL ATTAINMENT

### INVESTIGATE THE INFLUENCE OF LIGHT INTENSITY ON THE RATE OF PHOTOSYNTHESIS

#### Following instructions

Familiarise yourself with all procedures before starting

Follow instructions step by step

Listen to the teacher's instructions

#### Correct manipulation of apparatus

Carefully use the scissors to cut the end of the plant

Place the plant in the boiling tube, cut end pointing upwards

Use the metre stick to measure distances of plant from light source

Use the thermometer

Use the timer

Use the light meter (optional)

#### Observation

Observe bubbles being released

After allowing the plant to adjust, observe a steady stream of bubbles

Observe the number of bubbles being released per minute at each distance

#### Recording

Write up the procedure

Record the distance of the plant from the light source

Record the number of bubbles being liberated per minute at each distance

Record the average number of bubbles being liberated per minute at each of the given distances

Record the light intensity or  $1/d^2$

Draw a graph with labelled axis

#### Interpretation

Draw reasonable conclusions from your observations and results

#### Application

Become aware of any other application(s) of what you learned in this activity

#### Organisation

Exercise caution for your personal safety and for the safety of others

Work in an organised and efficient manner

Label as appropriate

Work as part of a group or team

Clean up after the practical activity

