# Edexcel IAL Biology A-Level

## Core Practical 10

Investigate the effects of light intensity, light wavelength, temperature and availability of carbon dioxide on the rate of photosynthesis using a suitable aquatic plant.

## Equipment

- Pondweed
- Beaker
- Sodium hydrogen carbonate
- Aluminum foil
- Spatula
- Light filters (pieces of coloured cellophane)
- Photosynthometer
- Paperclip
- Bench lamp
- Ruler
- Thermometer
- Stop clock

## Method

1. Place a piece of pondweed in a beaker of water.
2. Cover one side of the beaker with the aluminium foil to **block out the light.**
3. Cover the other side of the beaker with one of the light filters.
4. Add half a spatula of sodium hydrogencarbonate to the water to provide carbon dioxide.
5. Leave for 5 minutes.
6. Place the bench lamp a set distance from the beaker.
7. Set up the photosynthometer. Leave for 5 minutes.
8. Record the **volume of gas produced** during this time.
9. Replace the filter with another colour of filter and repeat the experiment.

## Risk Assessment

| Hazard | Risk | Safety Precaution | In emergency | Risk Level |
|---|---|---|---|---|
| Biohazard | Contamination | Use disinfectant<br>Wash hands with soap after handling | Seek assistance | Low |
| Lamps | Temporary damage to eyes | Do not look directly at lamp | Wait for afterimage to disappear; seek appropriate assistance if needed | Low |
| Sodium hydrogen carbonate | Low hazard, avoid inhalation/contact with eyes | Wear eye protection<br>Avoid contact with skin | Seek medical attention if necessary; flood eye/cuts with cold water | Low |

## Graph

- Plot a bar graph of colour of filter against volume of gas produced.

## Conclusion

- Volume of gas produced is proportional to rate of photosynthesis.
- The **greatest volume of gas will be produced when there is no filter used**, because **all wavelengths of light can be absorbed.**
- **All filters will decrease volume of gas**, but a **green filter will decrease it the most** because **chloroplasts don't absorb much green light** - it is mostly reflected, which is why chloroplasts appear to be green.