**Investigating the rate of oxygen production in pondweed STUDENT**

**Introduction**

Photosynthesis in plants is affected by a number of abiotic factors, for example light intensity. Species of pondweed contain specialised tissue (aerenchyma) that allows gases to diffuse inside the plant. By cutting the aerenchyma these gases will be released as bubbles.

You will design a short investigation of your own working independently or in a group to investigate the rate of oxygen produced from cut pondweed and link this to the rate of photosynthesis. Make sure you know what equipment and how much lab time are available to you and plan accordingly.

**Aim**

To plan and carry out an investigation into the rate of photosynthesis in pondweed.

**Intended class time**

* 1 -2 hours

**Chemicals**

Not applicable for this activity.

**Equipment**

* Computer and textbooks
* Pondweed samples such as *Elodea spp.* or *Cabomba spp.*
* Access to hot and cold water
* Ice
* Thermometer
* Forceps
* Boiling tubes and rack
* Beakers
* Plastic dropping pipettes
* Lamp
* Coloured acetate sheets (e.g. red, green and blue)
* Ruler/tape measure
* Stopwatch/timer
* Scissors

**Health and Safety**

* Be careful when working with water and electrical equipment.

**Procedure**

1. First, conduct some research on abiotic factors that can affect the rate of photosynthesis in pondweed. Use a variety of sources of information e.g. textbooks, websites and reviews. (This information can be used later to write a short introduction to your experiment).
2. Decide which abiotic factor you will investigate.
3. Working individually or in a small group, develop the method you will use to investigate the effect of your chosen factor on the rate of photosynthesis in pondweed.
4. Carry out your experiments using the apparatus available and record your data appropriately. Each student in a group should take turns to set up, measure and record readings.
5. Process and present your data appropriately.
6. Finally, write up your experiments as a short investigation. Include an introduction, aim, hypothesis, procedure, results, conclusion and evaluation. References should be clearly cited. This may be done using a word processor.

**Extension questions**

Your teacher will tell you whether you should answer these questions separately or include consideration of these issues within your investigation write up.

1. Was it possible to control all the variables in your investigation?
2. What assumptions did you make regarding the bubbles that were released from the cut pondweed stem?
3. Evaluate the method you developed. What worked well and what could be improved? If you were to repeat the experiment would you make any changes to the procedure?

**To submit**

For this piece of work to count towards Practical Activity Group 12 of the Practical Endorsement, you need to have evidence of the research you conducted and the raw data collected from your experiment. You also need to have written this experiment up as a short investigation, including an introduction, aim, hypothesis, procedure, results, conclusion and evaluation. References should be clearly cited. This may be done using a word processor. Consideration of the above questions will aid you in preparation for your written examinations.