Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use
Total Task 1

General Certificate of Education
Advanced Level Examination
June 2013

Biology BIO6X/PM1

Unit 6X A2 Externally Marked Practical Assignment
Task Sheet 1

To be completed before Task Sheet 2.

For submission by 15 May 2013

For this paper you must have
- a ruler with millimetre measurements
- a calculator.

Task 1

Introduction

If a piece is cut from an aquatic plant, placed in water and exposed to bright light, it will carry out photosynthesis. As a result, bubbles of gas are released from the cut end of the stem. The rate of bubbling can be used as a measure of the rate of photosynthesis.

In Task 1, you will investigate the rate of photosynthesis in an aquatic plant in white light.

Materials

You are provided with

- aquatic plant
- 1 % sodium hydrogencarbonate solution
- scissors
- glass rod
- forceps
- ruler
- boiling-tube rack
- 1 boiling tube
- large beaker
- lamp
- stopwatch or timer
- retort stand and clamp.

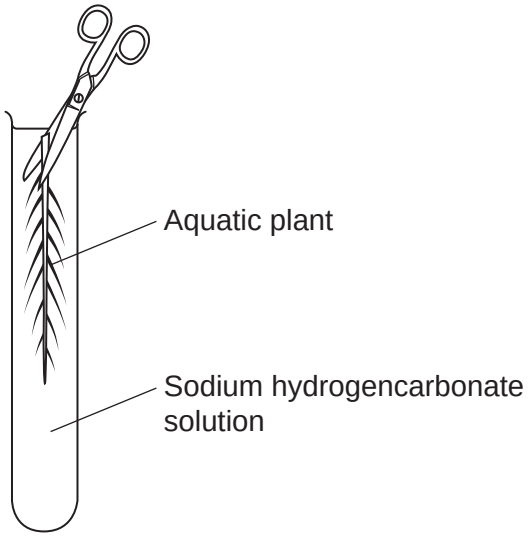
You may ask your teacher for any other apparatus you require.

Method

Read these instructions carefully before you start your investigation.

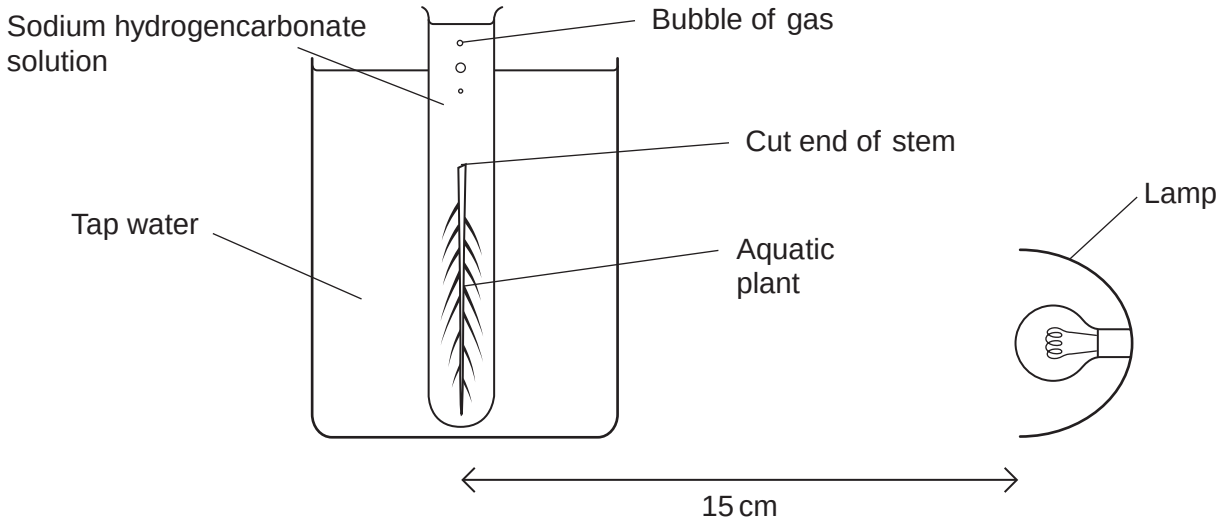
1. Fill the boiling tube to 2 cm below the top with 1 % sodium hydrogencarbonate solution.
2. Cut a piece from the aquatic plant, about 10 cm long, and push it into the tube until the cut end is just below the surface of the sodium hydrogencarbonate solution. Then use the scissors to cut the end of the stem at an angle, as shown in **Figure 1**. Use the glass rod to make sure the end of the stem stays below the surface of the sodium hydrogencarbonate solution.

Figure 1



3. Fill the beaker with tap water to the 500 cm^3 mark. Use the retort stand and clamp to support the boiling tube in the centre of this beaker.
4. Position the lamp so that light shines onto the aquatic plant and the centre of the boiling tube in the beaker is 15 cm away from the bulb of the lamp, as shown in **Figure 2**.

Figure 2



5. If your plant releases a continuous stream of bubbles, you will be unable to count them accurately. Cut approximately 1 cm from the cut end of the stem and then reposition the plant in the boiling tube. Repeat this until the rate of bubbling can be counted.
6. Leave the plant for 10 minutes. During this time, you may start answering the Task 1 questions.
7. After 10 minutes, make three separate 30-second counts of the number of bubbles rising from the cut end of the stem.

Recording your results

Record your results in the table.

Count	Number of bubbles released by aquatic plant in 30 seconds
1	
2	
3	

Do not write outside the box

Questions on Task 1

Answer **all** questions in the spaces provided.

1 (a) What gas makes up the biggest proportion in the bubbles produced by the aquatic plant?

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(1 mark)

1 (b) Rate of production of bubbles can be used for measuring the rate of photosynthesis. Explain why.

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(2 marks)

1 (c) The cells in the aquatic plant will also be carrying out respiration. Will this affect your results?
Explain your answer.

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(2 marks)

2 You placed the boiling tube containing the aquatic plant into a beaker of water.
Explain why.

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(1 mark)

Turn over ▶

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3 In step 6, you were told to leave the aquatic plant for 10 minutes before starting to count bubbles.
Suggest why.

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(1 mark)

4 You could use the apparatus in **Figure 2** to investigate the effect of light intensity on the rate of photosynthesis by positioning the lamp at different distances from the plant.

4 (a) Give **three** variables that would need to be controlled in an investigation into the effect of light intensity using the apparatus in **Figure 2**.
For **each** variable named, describe how it would be controlled.

Variable 1 .....

How controlled .....

.....

Variable 2 .....

How controlled .....

.....

Variable 3 .....

How controlled .....

.....

(3 marks)

4 (b) Explain why it is essential to control variables in this investigation.

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(1 mark)

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END OF TASK 1

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