

**ADVANCED GCE  
 BIOLOGY**

**2806/03/PLAN**

Practical Examination 2 (Part A – Planning Exercise)

**For issue on or after: 17 NOVEMBER 2007**

\* G C E / T 4 7 3 5 1 \*

Candidate Forename

Candidate Surname

Centre Number 

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Candidate Number 

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**TIME** This Plan must be handed in by the deadline given by your teacher.

**INSTRUCTIONS TO CANDIDATES**

- Write your name in the space above.
- Write your Centre Number and Candidate Number in the boxes above.
- Attach this booklet to the front of your Plan.

**INFORMATION FOR CANDIDATES**

- In this Planning Exercise, you will be assessed on the Experimental and Investigative Skill:  
Skill P: Planning
- You will be awarded marks for the quality of your written communication.
- Detailed notes for guidance are given overleaf.

**Authentication by teacher**

I declare that, to the best of my knowledge, the work submitted is that of the candidate concerned. I have provided details on my Report Form for the Practical Test of any assistance given.

Signature ..... Date .....

FOR EXAMINER'S USE		
Qu.	Max.	Mark
Planning	16	

This document consists of 4 printed pages.

## Notes for guidance

- 1 Your Plan should have a clear and helpful structure and should be illustrated by diagrams, tables, charts, graphs etc. as appropriate. Remember that these can often be used to replace words in the text. Diagrams should be relevant to the content of your Plan and positioned appropriately. Labels on diagrams, flow charts or tables should be clear and concise. Large blocks of text should be included in the word count.
- 2 You should take care to use technical and scientific terms correctly and to write in clear and correct English.
- 3 Your Plan should be handwritten or word-processed on A4 paper, which should have a hole punched at the top left-hand corner. Pages should be numbered and should have a clear margin on the right hand side. **You should write (or print) on one side of the paper only** and each sheet should be marked with your Centre number and Candidate number.
- 4 You should show that you have consulted an appropriate range and variety of sources. At the end of your Plan you should list clearly the sources you have used. You should refer to these references in your Plan where appropriate. Where you have incorporated material which has been copied directly from a source such as a book or the Internet, this must be acknowledged in your Plan and details included in the references at the end. However, it should be noted that the inclusion of copied material will not in itself gain credit. The list of references should not be included in the word count.
- 5 Your Plan should be based on the use of standard equipment, apparatus, chemicals and other materials available in a school or college science laboratory.
- 6 Your Plan should be between 500 and 1000 words. A Plan that is in excess of 1000 words is likely to have poor structure and unselective choice of material, so that full credit may not be available. You should indicate the number of words in the margin of the Plan at approximately 200 word intervals.
- 7 When you have finished, tie the pages together **loosely** (or use a treasury tag), with this sheet on the top, so that the pages turn over freely. Your Centre will give you the date by which your Plan must be handed in.

### NOTICE TO CANDIDATE

**The work you submit for assessment must be your own.**

**If you copy from someone else or allow another candidate to copy from you, or if you cheat in any other way, you may be disqualified from at least the subject concerned.**

- 1 Any help or information you have received from people other than your subject teacher(s) must be clearly identified in the work itself.
- 2 Any books, information leaflets or other material (e.g. videos, software packages or information from the Internet) which you have used to help you complete this work must be clearly acknowledged in the work itself. To present material copied from books or other sources without acknowledgement will be regarded as deliberate deception.

### Declaration by candidate

I have read and understood the **Notice to Candidate** (above). I have produced the work without any help from other people apart from that which I have declared in the work itself. I have acknowledged all source materials in the work itself.

Candidate's signature: ..... Date: .....

## Planning Exercise

In this Planning Exercise, two marks are available for the quality of your written communication.

**This Planning Exercise is about the effect of limiting factors on the rate of photosynthesis in sun and shade leaves.**

Leaves that make efficient use of relatively dim light are called shade leaves. They do not photosynthesise efficiently at relatively high light intensities. Leaves that make efficient use of relatively high light intensities are called sun leaves. They do not photosynthesise efficiently in dim light.

**You are required to plan an investigation to compare the effect of changing one limiting factor on the rate of photosynthesis in sun leaves and shade leaves.**

For your Plan, choose **one** species of plant that exhibits both sun and shade leaves. **Do not use variegated leaves.** Choose **one** of the following limiting factors:

- light intensity
- temperature
- carbon dioxide concentration.

Leaf discs can be used to determine the effect of a variable on the rate of photosynthesis. The discs can be cut from the leaves using a cork borer or a large plastic drinking straw. The discs are then placed in a syringe and the syringe slowly filled with water or very dilute sodium hydrogencarbonate ( $\text{NaHCO}_3$ ) solution. Air inside the syringe is expelled by pushing in the plunger. Air is then drawn out of the intercellular air spaces of the leaf discs by applying your finger firmly to the nozzle and attempting to withdraw the plunger. As the air is drawn out, the leaf discs sink and are then ready to use.

**Submerged leaf discs must be used in your Plan.**

Your planning must be based on the assumption that you have access to:

- sun and shade leaves of your chosen plant
- the apparatus and materials to produce submerged leaf discs
- school or college laboratory resources.

Give full details in your Plan to include:

- the apparatus and materials to be used
- a detailed method to include procedures that you would adopt to ensure that the results obtained would be as precise and reliable as possible
- a risk assessment and safety precautions.

Indicate briefly how you would present and analyse your data to draw your conclusions.

You are strongly recommended to consult the descriptors for Skill P in Appendix C of the Biology Specification.

[14]

Quality of Written Communication [2]

[Total: 16]

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