



ADVANCED GCE BIOLOGY

2806/03/INST

Instructions for the Planning Exercise and Practical Test

To be opened immediately

Planning Exercise – for issue on or after:

Tuesday 17 November 2009

Practical Test:

**Tuesday 19 January 2010
Afternoon**

Duration: 1 hour 30 minutes



This document is for the **Head of Centre** and for the use of the **Biology teacher and/or technician** who prepares the apparatus and materials for the examination.

A packet containing **two** copies of the Biology Practical Test, 2806/03/TEST, accompanies the packet containing these Instructions.

These packets should be issued to the Biology teacher immediately they arrive at the Centre. These **must be kept in a secure place at all times**.

These documents are provided so that the Biology teacher and/or technician can ensure that the Centre's apparatus and materials are suitable for carrying out the Biology Practical Test.

Great care should be taken that any confidential information given here does not reach the candidates, either directly or indirectly.

- This document consists of **8** pages. Any blank pages are indicated.

PLANNING EXERCISE

The Planning Exercise should be issued to candidates on or after the date shown on the front of this document. The candidates' Plans must be collected in, on or before the date of the Practical Test. These arrangements may be made at the discretion and convenience of the Centre.

It should be recognised that each Planning Exercise makes only a small contribution to the overall assessment and candidates should therefore be guided to spend an appropriate amount of time on the work. Candidates should be given **between 7 and 10 days** to complete it.

The mark scheme for the Planning Exercise is based closely on the coursework mark descriptors for Skill P given in the Specification and a copy of these descriptors should be made available to candidates to assist them in their work.

Candidates may be given access, if they request it and at the discretion of the Centre, to laboratory space and facilities in order to be able to carry out preliminary work which will help in constructing their Plan. However, it should be noted that the responsibility for Health and Safety during this period rests with the Centre, and the attention of teachers is drawn to the Health and Safety section in the Specification. Access to suitable library and other resources may also be required and, while time at home or in private study will be necessary to complete the task to a high standard, sufficient work must be completed under direct supervision to allow the teacher to authenticate the work with confidence as that of the candidates concerned. Many Centres find that this can best be managed by allowing candidates a set period of time to research the topic but requiring the Plan to be written under supervision. The supervising teacher should complete the statement of authentication for each candidate on the front cover page of the Plan. Details should be provided on the Report Form for the Practical Test of any assistance given to candidates.

After candidates' work has been collected, it must be kept securely until the date of the Practical Test (or must be collected on the day of the Practical Test) and must be included with the scripts for the Practical Test when these are despatched to the Examiner. Please tie together **loosely** (or use a treasury tag) the Planning Exercise and Practical Test for each candidate **with the Practical Test on the top**.

Guidance for Teachers/Tutors on authenticating work

The Work submitted by candidates for assessment must be entirely their own.

Candidates may however:

- quote from books or any other source; this should be referenced in the work and all sources acknowledged;
- receive guidance from someone other than their teacher/tutor; the course teacher must be informed of the name of the person giving external guidance and the nature of the assistance given;
- produce work at a location away from the examination centre provided that the work remains under the supervision of the teacher/tutor.

In cases of privately entered candidates or distant tutored candidates, the centre must ensure that:

- the teacher/tutor has acquainted themselves thoroughly with the general standard of candidates' work before accepting work for assessment;
- sufficient on-going regular monitoring of candidates' work has taken place.

Before authenticating work, the teacher/tutor should ask themselves the following basic questions.

- Has the **Declaration by candidate** been signed by the candidate?
- Was at least part of the work done under your direct supervision?
- Did you check the work during its production?
- Is the standard of finished work consistent with your professional judgement of the candidate's ability?

If you have answered 'YES' to the above questions you may authenticate the work.

The following notes for guidance are issued to candidates

- 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 hand-written 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 loosely together (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.

PLANNING EXERCISE (continued)

Centres should be reminded that candidates only need to appreciate how to carry out an investigation in sufficient detail for them to write a plan. They do not need to carry out the investigation for themselves.

If candidates wish to try out the procedure they may be provided with the following:

1 Simple respirometers may be prepared from the following:

- 5 cm³ or 10 cm³ syringe
- about 0.3 g of soda lime  wrapped in muslin and tied up with cotton thread

The 'bag' needs to be made loosely so it can be put in and taken out of the syringe easily

- a piece of gauze (or other suitable material) to separate maggots from the soda lime
- about 200 mm length of 0.4 mm internal diameter capillary tubing with a short length of rubber or plastic tubing to make an airtight seal with the syringe, as shown in Fig. 1.1.

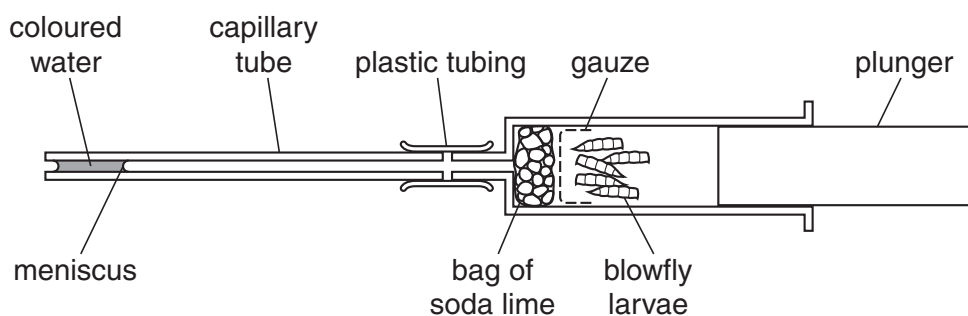


Fig. 1.1

- 2 Beaker of water containing food colouring and a drop of washing up liquid.
- 3 Larvae of the blowfly, *Calliphora vomitoria*.

These may be obtained from shops that supply bait to anglers or ordered from:

Blades Biological, Cowden, Edenbridge, Kent TN8 7DX.
Tel: 01342 850242. Fax: 01342 850924
Email: sales@blades-bio.co.uk
Web site: www.blades-bio.co.uk
Product: LZJ 23O

- 4 Marker pen, ruler, stop clock, stopwatch or bench timer.
- 5 Forceps; plastic boxes with perforated lids for keeping maggots in places with different temperatures.
- 6 Access to water baths and/or incubators and a refrigerator.

However, candidates may wish to use other apparatus not included in this list. If they make reasonable requests for other pieces of apparatus that can be provided by the centre, then they should have access to them.

PRACTICAL TEST

General Instructions

The attention of teachers is drawn to the details of this examination given in Appendix E of the specification.

The Biology teacher and/or technician must be granted access to the question paper in advance of the Practical Test in order to be satisfied that apparatus and materials are in accordance with these instructions and are fully suitable for the performance of the experiments. To this end, the Biology teacher and/or technician should perform Questions 1 and 2 of the Practical Test and be satisfied that the candidates will be able to collect suitable results with the apparatus and materials provided. **A sample set of results, clearly labelled, should be sent to the Examiner on top of the candidates' scripts.**

If the apparatus or materials that are provided to candidates differ significantly from these instructions, then full details of the changes must be given on the Report Form. Candidates will not be disadvantaged provided that the nature of the experiments has not been changed. The Biology teacher and/or technician is advised to contact OCR well before the date of the examination if, for example, there are difficulties with obtaining materials or particular pieces of apparatus.

Candidates should be informed that, if they find themselves in real difficulty, they may ask the Invigilator for assistance but the extent of this assistance will be reported to the Examiner, who may make a deduction of marks.

Where a candidate is unable to collect any results for an experiment, or the results obtained do not allow the candidate to proceed to answer the questions which follow on the examination paper, the invigilator may consider whether to issue sample results to the candidate. The sample results given should be those produced by the centre during the trialling of the experiment before the day of the examination and should not be formatted.

In such cases, the invigilator must be confident that:

- the difficulties experienced by the candidate are not due to the candidate's failure to follow the instructions given, or to carry out the procedures safely and skilfully;
- the candidate has been given an appropriate opportunity to collect his/her own results using the instructions on the examination paper before being given the sample results;
- the sample results provided will enable the candidate to proceed to answer the questions which follow on the examination paper.

The invigilator must write to the Qualification Manager for Biology at OCR as soon as possible after the examination has taken place, detailing the circumstances and the candidate(s) concerned, enclosing the sample results provided and giving the above assurances. Centres are reminded that appropriate deductions of marks may be made in such cases.

In cases of faulty apparatus (not arising from a candidate's mishandling) that prevents the required readings from being taken, extra time must be allowed so that the candidate has a fair opportunity of performing the experiment as though the fault had not been present. Details of such cases of time compensation should be made on the Report Form.

Cases of individual hardship, e.g. illness, disability etc. should be reported direct to OCR using the 'Special Considerations' form and **not** included on the Report Form.

Each candidate must be provided with the following apparatus and materials.

It is recommended that all candidates start with Q.1. If candidates start with Q.2, they must be advised to leave Q.2(d) until they have completed Q.1.

Question 1

- (i) 100 cm³ of freshly bought 20 volume hydrogen peroxide solution supplied in a beaker labelled **20 vol hydrogen peroxide**.

Harmful



The beaker should be labelled with the appropriate hazard symbol.

If after trialling the procedure, the time taken to collect each 5 cm³ of gas is too short for candidates to determine the relative activity of the plant material, it may be necessary to dilute the 20 vol hydrogen peroxide in order to obtain suitable results. Candidates will not need to be informed of this dilution but it is important that **candidates are provided with hydrogen peroxide solution of the same concentration**.

- (ii) 5 g of each of the following plant materials provided in specimen (sample) tubes, labelled **A** to **F**.

- A** celery
- B** carrot
- C** potato
- D** lettuce
- E** (germinating) mung bean seeds
- F** apple

The plant materials should be cut into three or four pieces to fit into the tubes, but should be large enough for the candidates to chop into smaller pieces.

The tubes should be covered with cling film or Parafilm.

The mung bean seeds should be soaked for 24 hours and then left on damp blotting paper in a warm place for 24 to 72 hours to germinate. When tested with hydrogen peroxide they should give a high activity.

Any variety of the plant materials listed above may be used for this procedure.

Spares should be available in case candidates wish to repeat the procedure with any of the materials.

- (iii) One 10 cm³ syringe.
- (iv) Six boiling tubes (e.g. 15 × 2.5 cm); rack to take six boiling tubes.
- (v) Two-hole bung (No. 21) with delivery tube and short glass tube to fit the boiling tubes, as shown in Fig. 1.1. There should be spares available.

Ensure that the bung fits all of the boiling tubes.

A short piece of plastic tubing (e.g. PVC) of 3 mm bore is attached to the short glass tube. Ensure that when the syringe of hydrogen peroxide is inserted into this plastic tubing, it makes an airtight seal and remains firmly in place.

Prior to the start of the examination, candidates should be shown how to put the bungs into the boiling tubes and remove them to prevent breakage of the delivery tubes.

- (vi) A barrel from a 10 cm³ syringe with plastic tubing attached to the nozzle and sealed with a suitable clip (e.g. Hoffman clip), as shown in Fig. 1.1.
- (vii) 400 or 600 cm³ beaker (or other suitable clear container), three-quarters filled with tap water for the delivery tube, as shown in Fig. 1.1.

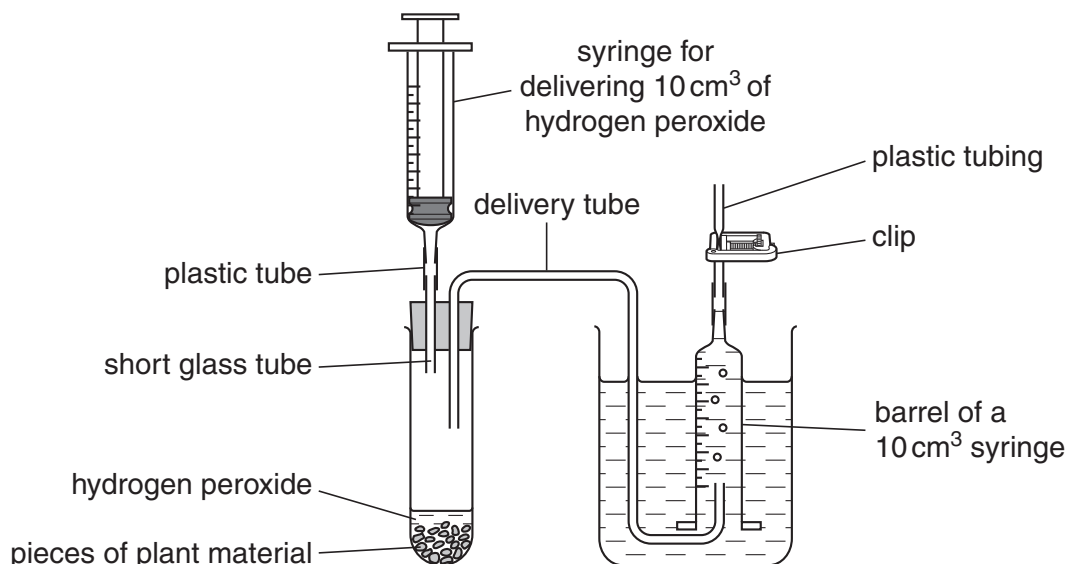


Fig. 1.1

The apparatus shown in Fig. 1.1 may be set up as a demonstration using tap water in place of hydrogen peroxide solution.

- (viii) A large beaker (or other suitable clear container) of tap water for filling the syringe barrel.
- (ix) Glass rod, large spatula, scalpel, white tile.
- (x) Stopclock, stop watch or bench timer.
- (xi) Eye protection.
- (xii) Paper towels.
- (xiii) Clamp(s) and stand (for support of apparatus).

Question 2

- (i) Two boiling tubes (e.g. 15 × 2.5 cm) labelled **G** and **H**.
- (ii) Eight soaked maize grains OR eight grains removed carefully from a fresh sweetcorn cob supplied in a suitable container. Do not use tinned or frozen sweetcorn.

Dried maize grains should be soaked long enough for the endosperm to be softened. It may be necessary to leave the grains soaking for up to 24 hours. This **must** be trialled before the practical.
- (iii) A scalpel or a single edged razor blade and a hand lens (×10).
- (iv) Approximately 10 cm³ of 1% iodine solution in a suitable container.

- (v) 10 cm³ of Sudan III solution in a beaker labelled **Sudan III**. **Highly flammable**



This can be made up by dissolving 0.5 g of Sudan III powder in 70 cm³ of ethanol and 30 cm³ of distilled water in a warm water bath. Filter the mixture.

- (vi) A small beaker of water for washing labelled **washing water**.
- (vii) A container labelled **waste**.
- (viii) 10 cm³ of 5 vol hydrogen peroxide in a suitable container labelled **5 vol hydrogen peroxide**.
- (ix) One disposable pipette.
- (x) Three Petri dishes.
- (xi) A white tile.
- (xii) Forceps.
- (xiii) Paper towels.
- (xiv) Eye protection.

Suggested suppliers:

Sudan III

Scientific & Chemical Supplies Ltd., Carlton House, Livingstone Road, Bilston, West Midlands. W14 0QZ. Tel 0845 1650845. Fax 01902 402343
e-mail customerservices@scichem.co.uk; web site www.scichem.co.uk

OR

Timstar Laboratory Suppliers Ltd., Timstar House, Marshfield Bank, Crewe, Cheshire, CW2 8UY.
Tel 01270 250459. Fax 01270 250601.
e-mail sales@timstar.co.uk; web site www.timstar.co.uk.

HEALTH AND SAFETY

Attention is drawn to the section on Health and Safety in Appendix B of the Specification. This section covers Practical Tests as well as coursework. Centres are reminded that, in UK law, the responsibility for Health and Safety lies with the employer.

Materials used in the examination should display their appropriate hazard symbols.



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