



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:

Friday 13 March 2009

Practical Test:

Tuesday 19 May 2009

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, but they **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 **12** 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 Barley, wheat or maize grains.

Available 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.

- 2 1 g dm⁻³ solution of gibberellic acid.

This should be prepared as follows:

Put 1 g gibberellic acid into a volumetric flask and add 2 cm³ of 95% ethanol to help dissolve the gibberellic acid in water. Add sufficient water to make 1 dm³.

As candidates will probably make very dilute solutions from this stock solution, it may not be necessary to make as much as 1 dm³. If so, make 100 cm³ of this solution by using 0.1 g gibberellic acid and 1 cm³ of 95% ethanol and add sufficient water to make 100 cm³.

Candidates may use this solution to prepare their dilutions. A 1 g dm⁻³ solution is approximately 3 × 10⁻³ mol dm⁻³ (3 mmol dm⁻³) solution of gibberellic acid.

Gibberellic acid is available from:

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

and from:

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



- 3 1% sodium hypochlorite (sodium chlorate(I)) solution for surface sterilising the grains.

This should be prepared as follows:

Put 10 cm³ of sodium hypochlorite solution into a 100 cm³ measuring cylinder or volumetric flask and make up to 100 cm³ with water.

Sodium hypochlorite (sodium chlorate(I)) is available from:

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

and from:

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

4 Starch-agar plates may be prepared as follows using sterile apparatus:

- Take 100 cm³ of water.
- Use a small volume of this water to make a paste with 1 g soluble starch.
- Boil the rest of the water and add to the starch paste. Stir until dissolved.
- Add 2 g of agar powder until the agar is dissolved.
- Boil the starch-agar solution for several minutes.
- Allow the starch-agar to cool to about 60 °C and pour into sterile Petri dishes to a depth of approximately 3 mm.
- Leave the agar to set.
- Store the starch-agar plates in a refrigerator until required.

This quantity will make enough for approximately six Petri dishes.

Agar powder is available from:

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

and from:

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

5 10 g dm⁻³ starch solution prepared as follows:

Take 100 cm³ of water and use a small volume of this water to make a paste with 1 g soluble starch. Boil the rest of the water and add to the paste. Stir until dissolved.

6 Benedict's solution.

7 Iodine solution.

8 Beakers, pipettes, forceps, sharp scalpels or single-edged razor blades, tiles.

9 Pestles and mortars, sand, muslin or other similar material for filtering, test-tubes, water baths, colorimeter, stop watch, spotting tiles.

10 Bunsen burners, tripods, gauzes.

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.**

The Biology teacher and/or technician should also check **all** the slides supplied by OCR.

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.

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.

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

If microscopes are shared, some candidates must start with Question 2.

Question 1

- (i) About 30 cm³ of each of six yeast suspensions labelled **A** to **F**. Suspensions **A** to **E** each contain a different sugar. Suspension **F** is only made up with water.

Prepare these suspensions as follows:

Add 30 g of dried yeast (for baking) to 600 cm³ of water (at about 40 °C). Stir thoroughly.
This should be done about half an hour before it is to be used by the candidates.

Prepare 0.2 mol dm⁻³ sugar solutions.

- The solutions of monosaccharides (fructose, glucose and galactose) should be made as follows:

Dissolve 3.6 g of the monosaccharides in 3–4 cm³ water.

Make up to 100 cm³ water.

- The solutions of disaccharides (maltose and lactose) should be made as follows:

Dissolving 6.84 g in 3–4 cm³ water.

Make up to 100 cm³ in water.

This will give sufficient for six candidates.

About 15 minutes after making the yeast suspension in water, mix **equal volumes** of this suspension and:

- fructose solution to make yeast suspension **A**
- glucose solution to make yeast suspension **B**
- galactose solution to make yeast suspension **C**
- maltose solution to make yeast suspension **D**
- lactose solution to make yeast suspension **E**
- water to make yeast suspension **F**.

The suspensions should be maintained at about 40 °C until they are dispensed to candidates in beakers or other suitable containers labelled **A** to **F**.

Suspensions **A**, **B** and **D** will bubble in this time and may produce some froth. They should be kept in suitably large containers to allow for this.

This procedure should be carried out at a suitable time for those candidates who begin the examination with Question 2.

- (ii) About 20 cm³ of a 0.5% solution of triphenyltetrazolium chloride (TTC) in a specimen (sample) tube labelled **TTC**.

This should be prepared as follows:

Dissolve 0.5 g TTC in 3–4 cm³ water.
Make up to 100 cm³ in water.

This solution must be made up **immediately prior** to the examination.

The specimen tube must be covered, either with a bung or with Clingfilm or Parafilm.

- (iii) Six 10 cm³ syringes labelled **A** to **F**; one 5 cm³ syringe.
(iv) Six plastic tips to fix to the nozzles of the 10 cm³ syringes.

These are made by cutting off the ends of plastic disposable pipettes as shown in Fig. 1.1. The tips should all be made from the same design of plastic pipette and be about 35 mm in length.

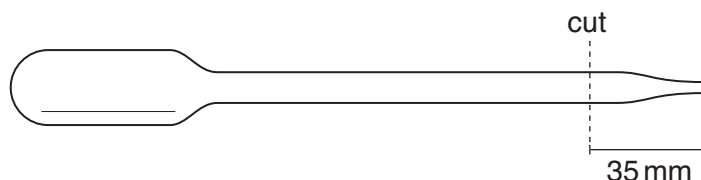


Fig. 1.1

- (v) Six boiling tubes (e.g. 15 × 2.5 cm); rack to take six boiling tubes; glass rod.
(vi) Stopclock, stop watch or bench timer.
(vii) Beaker of water labelled **washing water**.
(viii) Paper towels.

Suggested suppliers:

Fast action dried yeast for baking, for example supermarket 'own brand', is suitable.

All sugars (fructose, glucose, galactose, maltose and lactose) can be obtained from:

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

Tetrazolium salt (2,3,5-triphenyltetrazolium chloride (TTC)) is available from Timstar and also from:
Philip Harris Education, Findel Education Ltd., Hyde Buildings, Ashton Road, Hyde, Cheshire, K14 4SH.
Tel. 0845 120 4520. Fax 0800 138 8881.

e-mail: sales@philipharris.co.uk. web site: www.philipharris.co.uk

Question 2

Candidates must be provided with a microscope with low, medium and high power objectives e.g. $\times 4$, $\times 10$ and $\times 40$. Each candidate must have sole use of a microscope for at least 25 minutes.

- (i) Slide **K1** (to be supplied by OCR).

RETURN OF EXAMINATION MATERIALS TO OCR

Please read the following instructions carefully.

Immediately after the examination the slides must be returned to OCR in the containers in which they were received, using the self-adhesive labels for the parcel. They must not be included in parcels of scripts.

Please clearly indicate your Centre number when returning slides.

Slides and containers not returned in good condition will be charged at the rate of £3 per item.

The address for the return of slides is:

Ian Couchman,
Cambridge Assessment DC10,
Hill Farm Road,
Whittlesford,
CAMBRIDGE
CB22 4FZ.

On occasion, it may be possible for OCR to offer certain slides used in the examination for sale to Centres.

Please clearly indicate your Centre number when returning slides.

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