

Advanced GCE

BIOLOGY

Unit F216: Practical Skills in Biology 2
Quantitative Task

Specimen Task

For use from September 2008 to June 2009

F216

All items required by teachers and candidates for this task are included in this pack.

INFORMATION FOR CANDIDATES

- Practical Skills in Biology 2: Quantitative Task

INFORMATION FOR TEACHERS

- Mark scheme.
- Instructions for Teachers and Technicians.

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Candidates answer on this task sheet.

F216

INSTRUCTIONS TO CANDIDATES

- Answer **all** parts of the task.

INFORMATION FOR CANDIDATES

- The total number of marks for this task is **10**.

ADVICE TO CANDIDATES

- Read each part carefully and make sure you know what you have to do before starting your answer.

FOR TEACHER'S USE		
	Max.	Mark
TOTAL	10	

	Max.	Mark
TOTAL	10	

This task consists of **4** printed pages.

The effect of type of substrate on fermentation in yeast

Brewers use yeast to ferment malt and hops into beer.

Yeast converts the carbohydrates present in malt to glucose. Yeast can metabolise a wide range of carbohydrates but the rate at which it metabolises them can differ.

Your task is to investigate the effect of using different carbohydrates on the rate of respiration of yeast. It is your responsibility to work safely and to organise your time effectively.

Read the procedure carefully before you start.

Procedure:

- 1 Set up an inverted burette in a water bath so that the burette is full of water and clamp into position.
- 2 Add 20 cm³ of water to **Tube 1**, which contains 1 g yeast and 0.5 g glucose and stir.
- 3 Place the rubber bung with delivery tube into the boiling tube and place the boiling tube in the water bath and wait for 5 minutes for the yeast to begin respiring at a constant rate.
- 4 Draw up a suitable results table in the space provided on the following page.
- 5 Bubbles should now be emerging from the end of the delivery tube. Place the end of the delivery tube under the open end of the burette and start the timer.
- 6 Record the volume of gas produced after **3** minutes.
- 7 Repeat steps **1** to **6** twice more.
- 8 Repeat steps **1** to **7** using the other yeast-carbohydrate mixtures.
- 9 Calculate the mean rate of production of gas for each carbohydrate.

(a) Explain **one** precaution you took when completing step **1 - 6** of the procedure.

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.....
.....

(b) State **one** uncontrolled variable that may have affected the precision and/or reliability of the data you collected **and** explain the effect this uncontrolled variable may have had.

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.....

Record your raw data here

SPECIMEN

Total [10]

END OF TASK

SPECIMEN

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Unit F216: Practical Skills in Biology 2: Quantitative Task

Specimen Mark Scheme

The maximum mark for this paper is 10.

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SPECIMEN

	Mark
all raw data presented in a single table with columns correctly labelled ;	1
carbohydrate recorded in column 1 ;	1
all volumes recorded to an accuracy of no more than 1 decimal place ;	1
all units correct and in column headings only ;	1
each rate calculated as $\text{cm}^3 \text{s}^{-1}$ and recorded with correct units ;	1
rates recorded to an accuracy of no more than 1 decimal place ;	1
trend in data is appropriate ;	1
precaution explained in terms of increasing precision/accuracy of data ;	1
effect of uncontrolled variable explained ;	1
link to reduced accuracy/precision of data given ;	1
Total	[10]

SPECIMEN

This task relates to Module 4, Unit F214. There is no time limit but it is expected that it can be completed within one timetabled lesson.

It is assumed that you will have completed the teaching of the above module before setting your students this task. This module has links to other modules which contain related learning experiences – please refer to your specification.

Candidates may attempt more than one quantitative task with the best mark from this type of task being used to make up the overall mark for Unit F216.

Preparing for the assessment

It is expected that before candidates attempt Practical Skills in Biology 2 (Unit F216) they will have had some general preparation in their lessons. They will be assessed on a number of qualities such as demonstration of skilful and safe practical techniques using suitable qualitative methods, the ability to make and record valid observations, and the ability to organise results suitably. It is therefore essential that they should have some advance practice in these areas so that they can maximise their attainment.

Preparing candidates

At the start of the task the candidates should be given the task sheet.

Candidates must work on the task individually under controlled conditions with the completed task being submitted to the teacher at the end of the lesson. Completed tasks should be kept under secure conditions until results are issued by OCR.

Candidates should not be given the opportunity to redraft their work, as this is likely to require an input of specific advice. If a teacher feels that a candidate has under-performed, the candidate may be given an alternative task. In such cases it is essential that the candidate be given detailed feedback on the completed assessment before undertaking another Quantitative Task. Candidates are permitted to take each task **once** only.

Assessing the candidate's work

The mark scheme supplied with this pack should be used to determine a candidate's mark out of a total of 10 marks. The cover sheet for the task contains a grid for ease of recording marks. To aid moderators it is preferable that teachers mark work using red ink, including any appropriate annotations to support the award of marks.

Notes to assist teachers with this task

Teachers must trial the task before candidates are given it, to ensure that the apparatus, materials, chemicals etc provided by the centre are appropriate. The teacher carrying out the trial must complete a candidate's task sheet showing the results attained, and retain this, clearly labelled, so that it can be provided to the candidates when requested.

Health and Safety

Attention is drawn to Appendix E of the specification.

Teacher / technician guide

Each student will require:

- Access to 40°C water bath
- 100 cm³ burette with burette clamp
- Boiling tubes with cork bungs fitted and with glass delivery tube
- 1 litre beaker for displacement of water from the burette
- Tubes containing 1g dried yeast and 0.5g of relevant carbohydrate labelled:
 - 1 glucose
 - 2 maltose
 - 3 starch
 - 4 sucrose
 - 5 fructose
- Thermometer to check water bath temperature
- Paper towel to dry apparatus
- Container to dispose of waste H₂O and yeast mixture
- Warning hazard card

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