



Rewarding Learning

General Certificate of Secondary Education
2025

Centre Number

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Candidate Number

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Biology

Unit 3 Practical Skills

Booklet A



Foundation Tier

GBL31

[GBL31]

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete questions in black ink and use a dark HB pencil for drawings and graphs.

Do not write with a gel pen.

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **30**.

Task 1 is a practical exercise worth 15 marks.

Task 2 is a practical exercise worth 15 marks.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Follow all health and safety instructions.

You may use a ruler and calculator if required.

The apparatus and materials required to complete each task are provided.

You will not have access to notes or textbooks to assist you.

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16GBL3101

Task 1: Investigating the effect of temperature on the action of the enzyme amylase

You **must** wear eye protection when carrying out this task.

Instructions:

1. Set up a water bath (250 cm³ beaker half-filled with water) at 30 °C.
2. Label one boiling tube 'amylase' and another 'starch'.
3. Use a measuring cylinder or syringe to measure 5 cm³ of starch solution and place into the boiling tube labelled 'starch'.
4. Use a different measuring cylinder or syringe to measure 5 cm³ of amylase solution and place into the boiling tube labelled 'amylase'.
5. Leave both boiling tubes in the water bath for five minutes.
6. Place one drop of iodine solution into each of the wells of the spotting tile.
7. Pour the amylase solution into the boiling tube containing the starch solution.
8. Use a stirring rod to mix the sample and **immediately** start the stopwatch.
9. Immediately, use a dropper to add one drop of the starch-amylase mixture into the first well of the spotting tile. Replace any excess mixture in the dropper back into the boiling tube.
10. Repeat every minute until there is no colour change in the iodine solution.
11. In **Table 1**, record the time taken for **no colour change** in the iodine solution to take place.



For the remainder of Task 1 you must work alone.

Question 1

(a) Complete **Table 1** by

- adding units to each column heading.
- ensuring the time taken for **no colour change** in the iodine solution to take place during your experiment is recorded.

Table 1

Temperature /	Time taken for no colour change in the iodine solution to take place /
30	

[3]

(b) Explain why there was **no colour change** in the iodine solution at the time you recorded in **Table 1**.

[2]

[Turn over



The investigation was repeated using a range of temperatures from 10 °C to 60 °C.

The time taken for no colour change to take place in the iodine solution was used to calculate the rate of reaction for each temperature.

Table 2 shows the results.

Table 2

Temperature / °C	Rate of reaction / arbitrary units
10	0
20	10
30	18
40	30
50	20
60	15

(c) Give the type of variable which describes the temperature in this investigation.

Draw a **circle** around the correct answer from the list.

dependent controlled independent

[1]



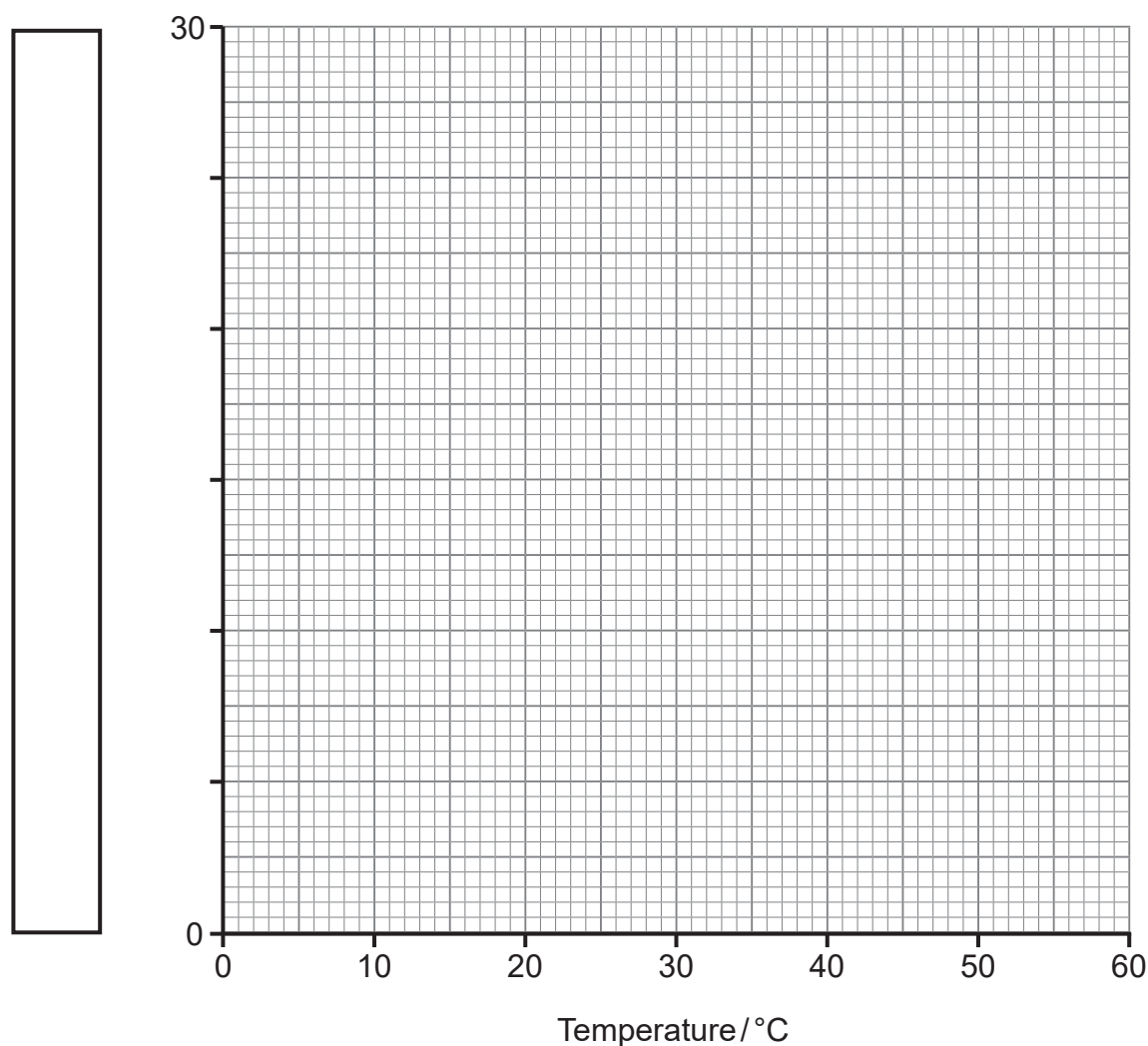
(d) On the grid, draw a line graph of the rate of reaction against temperature by:

(i) labelling the y-axis, including appropriate units, in the box provided. [2]

(ii) selecting the appropriate scale for the y-axis. [1]

(iii) plotting the points accurately. [2]

(iv) using a ruler to join the points. [1]



[Turn over]



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(e) (i) Use the graph to give the optimum temperature for amylase.

_____ °C [1]

(ii) Use your knowledge of enzyme action to describe and explain the trend in the graph between 40 °C and 60 °C.

No data is required in your answer.

[2]

[Turn over



Task 2: Investigating respiration in yeast

You **must** wear eye protection when carrying out this task.

Instructions:

1. Tie a knot in one end of the Visking tubing.
2. Use a syringe to place 10cm^3 of the yeast suspension and 10cm^3 of the glucose solution into the Visking tubing.
3. Carefully squeeze any air out of the Visking tubing and tie a knot at the **top** of the open end.
4. Gently turn the Visking tubing upside down to mix the contents.
5. Start the stopwatch. Do not stop the stopwatch until all measurements have been recorded (after 10 minutes).
6. Hold the Visking tubing up vertically by one of the knots and roll the Visking tubing (and the knot) down until any gas produced by the yeast is trapped above the solution.
7. Use a ruler to measure the height (in mm) of this gas column, including any foam, from the surface of the solution.
8. Record this as the height for 0 minutes in **Table 1**.
9. Carefully place the Visking tubing on your bench at room temperature.
10. Repeat **steps 6 and 7** and record these heights at 5 and 10 minutes in **Table 1**.



Question 1

(a) (i) Complete **Table 1**.

Table 1

Time / minutes	Height of gas column / mm
0	
5	
10	

[1]

For the remainder of Task 2 you must work alone.

The investigation was repeated by two other students.

Their results are given in **Table 2**.

(ii) Complete **Table 2** by calculating the average height of the gas column at 5 and 10 minutes.

Table 2

Time / minutes	Height of gas column / mm		
	Student 1 results	Student 2 results	Average
0	0	0	0
5	15	11	
10	18	16	

[2]

[Turn over



(b) Give **one** variable which was controlled in this investigation.

_____ [1]

(c) Name the gas collecting in the Visking tubing.

_____ [1]

(d) Give **two other** changes which take place in the contents of the Visking tubing during the investigation.

1. _____

2. _____

_____ [2]

A group of students carried out this investigation using four different carbohydrates.

Table 3 shows their results after 10 minutes.

Table 3

Carbohydrate	Height of gas column/mm
glucose	22
lactose	16
maltose	18
starch	2

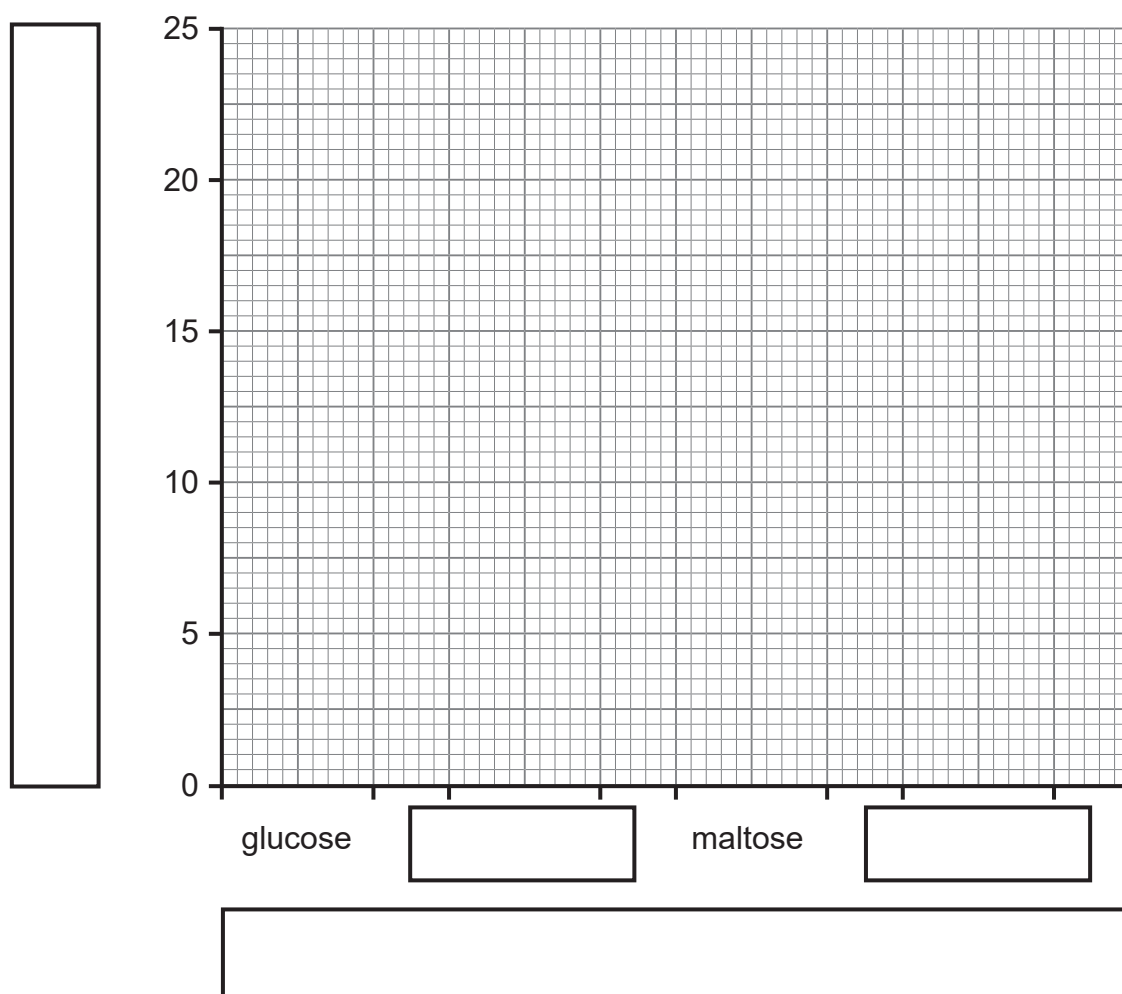


(e) On the grid, use the results from **Table 3** to draw a bar chart of the height of the gas column for each carbohydrate by:

(i) using a ruler to plot the bars accurately. [2]

(ii) labelling the x-axis and the bars in the boxes provided. [2]

(iii) labelling the y-axis, including appropriate units, in the box provided. [2]



[Turn over]



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(f) Which carbohydrate provides yeast with the most energy?

Use evidence from the graph to support your answer.

Carbohydrate _____

Evidence _____

[2]

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For Examiner's use only	
Question Number	Marks
Task 1	
1	
Task 2	
1	
Total Marks	

Examiner Number

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Biology

Unit 3: Practical Skills

Booklet A

Foundation Tier

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APPARATUS AND MATERIALS LIST AND CONFIDENTIAL INSTRUCTIONS

To be accessed by Head of Department only

It is the responsibility of the centre to ensure that appropriate risk assessments are carried out for all practical skills assessments.

Information for Centres

- The apparatus and materials listed is the minimum requirement per group of candidates. Candidates can only be provided with additional apparatus/chemicals that are listed in this document.
- It is the responsibility of the centre to ensure that appropriate risk assessments are carried out for all Practical Skills Assessments.
- CCEA will not provide chemicals or apparatus for the practical assessments.
- Centres should keep a set of results from their trials that should be available to CCEA upon request.

Additional Notes for Centres

- When teachers have trialled the experiments in advance of their scheduled sessions, they can exchange basic apparatus to accommodate centre availability, e.g. size of glassware.
- Teachers should keep trialled results which can be used if suitable results are not obtained by candidates.
- Hazard labelling advised in this document represents the minimum requirement for the chemicals used. It is also the responsibility of the centre to ensure hazard labelling is appropriate for their facilities and resources and all suitable safety precautions are in place.
- Each candidate must wear eye protection for the duration of the investigation.
- Normal precautions with hot water, water baths and chemicals should be observed.
- In trials for Task 1, no colour change was observed after two minutes using 1% starch solution and 0.05% bacterial amylase solution when the investigation was carried out at 30°C.
- In trials for Task 2, it was found that 1 g of fast acting baker's yeast in 10 cm³ water at 50°C and 10 cm³ of 10% glucose solution at 50°C worked well.
- Teachers will need to trial their yeast and glucose solution to ensure that gas is being produced.
- In Task 2, teachers may tie the knots in the Visking tubing during the practical if candidates are unable to tie them themselves.

Task 1: Investigating the effect of temperature on the action of the enzyme amylase

Each group of candidates will require:

- 10 cm³ starch solution (1%)
- 10 cm³ amylase solution (0.05%)
- Iodine solution (0.1 M) in a dropping bottle
- Water bath (250 cm³ beaker half-filled with water) at 30°C
- 2 boiling tubes
- 2 measuring cylinders/syringes (to measure 5 cm³ capacity)
- Spotting tile
- Dropper
- Stirring rod
- Boiling tube rack
- Stopwatch
- Thermometer
- Labels/pens for labelling boiling tubes
- Eye protection

Task 2: Investigating respiration in yeast

Each group of candidates will require:

- 20 cm³ of 10% glucose solution (at 50°C) in a small beaker
- 20 cm³ of yeast suspension (at 50°C) in a small beaker
- 30 cm of Visking tubing soaked in water to soften it
- Syringe (to measure 10 cm³)
- Ruler – mm scale
- Stopwatch
- Eye protection