



Rewarding Learning

General Certificate of Secondary Education
2022

Centre Number

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Candidate Number

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Biology

Unit 3 Practical Skills

Booklet A

Higher Tier

[GBL33]



GBL33

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

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

Write your answers in the spaces provided in this question paper.

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.

You will have access to apparatus and materials required for the practical exercise and any data you recorded on the Practical Instructions Sheet.

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

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

Task 1: Investigating water loss in plants using a weight potometer

Weigh each boiling tube and shoot after 48 hours.

Question 1

(a) Complete **Table 1** by

- recording the mass of each boiling tube and shoot at the start and after 48 hours to **one** decimal place. **The mass of each boiling tube and shoot at the start was recorded in the table in your Confidential Candidate Set-up Instruction Sheet.** [1]
- calculating and recording the loss in mass of each boiling tube and shoot. [2]

Table 1

Shoot	Length of shoot remaining	Mass of boiling tube and shoot/g		Loss in mass of boiling tube and shoot/g
		At start	After 48 hours	
1	whole			
2	two thirds			
3	one third			

Examiner Only

Marks Remark

For the remainder of Task 1 you must work alone.

- (b) Explain why it would be better to measure the mass to an accuracy of two decimal places rather than one decimal place.

[1]

- (c) Give the function of the oil in **step 6** of the instructions and explain why the oil was necessary to give valid results.

[2]

Some pupils who carried out this investigation calculated the **percentage** loss in mass for each shoot.

Table 2 shows their results.

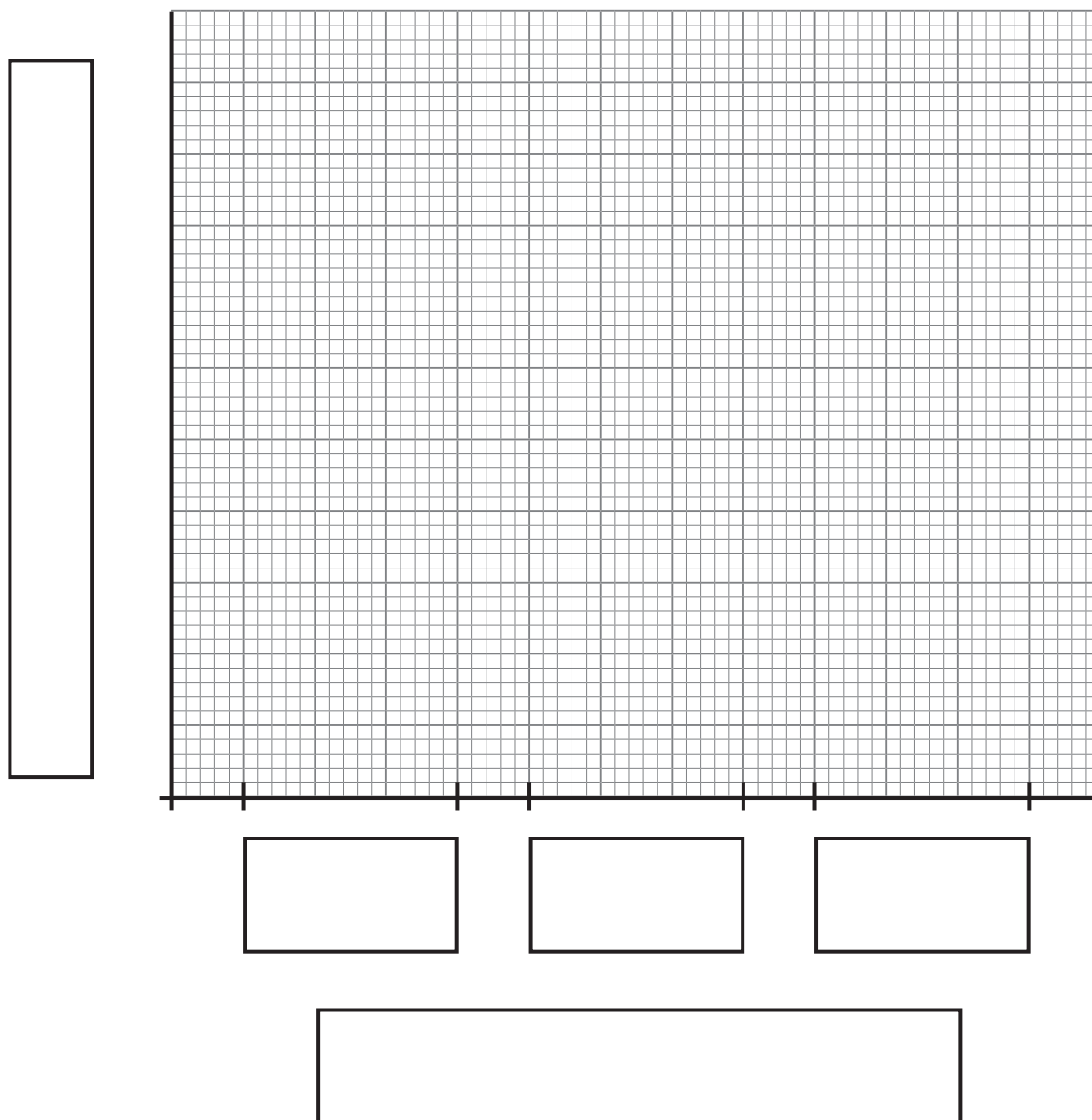
Table 2

Length of shoot remaining	Loss in mass/%
whole	2.50
two thirds	0.45
one third	0.25

Examiner Only	
Marks	Remark

(d) Use the results from **Table 2** to draw a **bar chart**, showing the percentage loss in mass of each shoot by

- labelling the x-axis and each of the bars in the boxes provided. [1]
- labelling the y-axis, including appropriate units, in the box provided. [1]
- selecting an appropriate scale for the y-axis, which uses **at least half of the grid**. [1]
- using a ruler to plot the bars accurately. [2]



Examiner Only	
Marks	Remark

(e) The investigation was repeated for the whole shoot.

The boiling tube and whole shoot were placed in a clear plastic bag which was then sealed.

The percentage loss in mass after 48 hours was calculated.

(i) Name the independent variable in **this investigation**.

[1]

(ii) Suggest how the loss in mass would differ for the boiling tube and whole shoot in the plastic bag compared to the same boiling tube and whole shoot without a plastic bag.

Explain your answer.

_____ [3]

Examiner Only	
Marks	Remark

Task 2: Investigating the action of amylase on starch

You **must** wear eye protection during this investigation.

Instructions:

1. Set up a water bath at 20°C.
2. Use a syringe to add 5 cm³ of starch solution (1%) into a boiling tube and label it 'starch'.
3. Use the other syringe to add 5 cm³ of amylase solution (2%) into a boiling tube and label it 'amylase'.
4. Leave both boiling tubes in the water bath for five minutes.
5. Place one drop of iodine solution in each of the wells in the spotting tile.
6. Pour the amylase solution into the starch solution, stir the mixture and start the stopwatch.
7. Immediately add one drop of the mixture into a well of the spotting tile using a dropper.
8. Repeat every minute until there is no colour change.
9. Record the time taken for no colour change to occur.

Question 1

(a) Complete **Table 1**.

Table 1

Amylase concentration /%	Time taken for no colour change /minutes
2	

[1]

For the remainder of Task 2 you must work alone.

(b) Name the dependent variable in this investigation.

_____ [1]

(c) Why were the amylase and starch solutions placed in a water bath for five minutes before being mixed?

_____ [1]

Examiner Only	
Marks	Remark

Pupils repeated this investigation using a **range** of amylase concentrations.

They used the time taken for no colour change to occur to calculate the rate of reaction.

Table 2 shows their results.

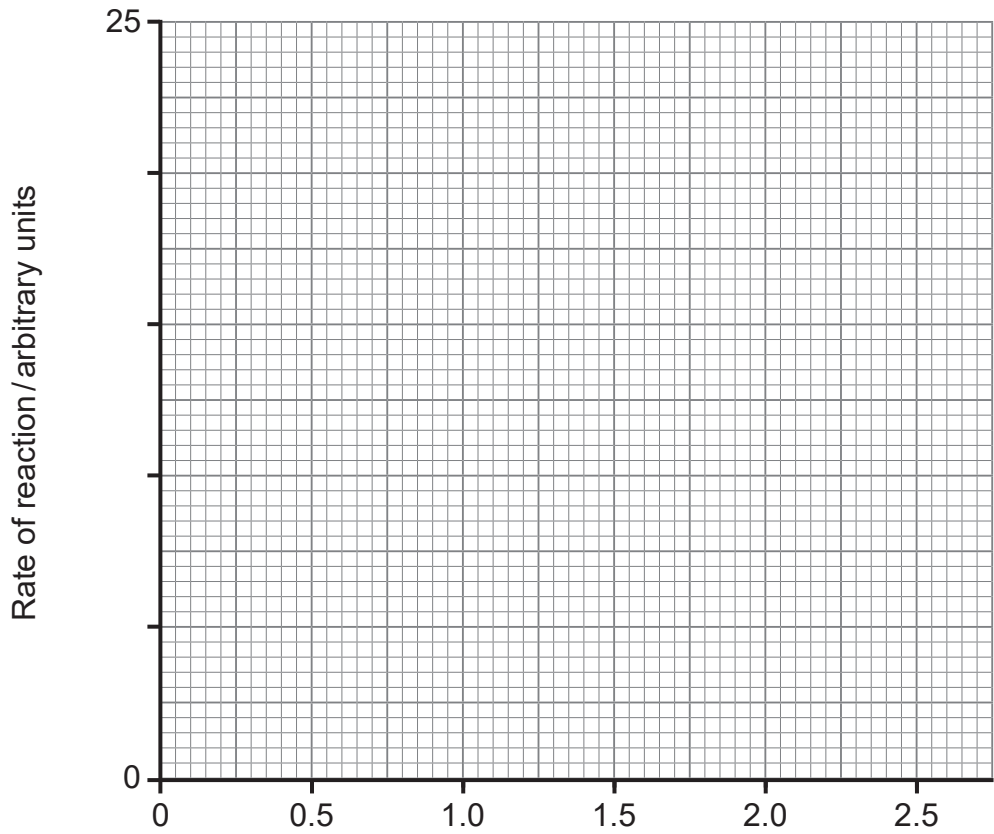
Table 2

Amylase concentration/%	Rate of reaction/ arbitrary units
0	0
0.5	10
1.0	15
1.5	24
2.0	24
2.5	24

(d) Use the results from **Table 2** to draw a **line graph** of the rate of reaction against amylase concentration by

- labelling the x-axis, including appropriate units, in the box provided. [2]
- completing the scale for the y-axis. [1]
- plotting the points accurately. [2]
- using a ruler to join the points with straight lines. [1]

Examiner Only	
Marks	Remark



Examiner Only	
Marks	Remark

- (e) Suggest how the rate of reaction for the 0.5% amylase concentration would differ if the investigation was carried out at 30°C instead of 20°C.

Explain your answer.

[3]

- (f) Amylase is an important enzyme in the brewing industry.

It is used to break down starch into sugars, which yeast can use to make alcohol.

Use evidence from your graph to suggest which concentration of this amylase brewers should use in the **commercial** production of alcohol.

Explain your answer.

Concentration of amylase _____ [1]

Explanation _____

[2]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only

Marks

Remark

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