



General Certificate of Secondary Education
2024

Centre Number

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Candidate Number

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Biology

Unit 3 Practical Skills

Booklet A

ML

Higher Tier

[GBL33]

TIME

2 hours, plus your additional time allowance.

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.

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

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 if the green pigment in a leaf is needed for photosynthesis.

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

A variegated plant was destarched.

The plant was then placed in bright light for at least 24 hours.

Instructions:

1. Remove one of the variegated leaves from the plant.
2. Place a 250 cm³ beaker on a heatproof mat on your bench and carefully half fill the beaker with hot water from the kettle.
3. Use forceps to place the leaf into the beaker of hot water for one minute.
4. Use forceps to remove the leaf from the hot water.
5. Use forceps to gently place the leaf into the ethanol in the boiling tube. Take care not to damage the leaf.
6. Immediately place the boiling tube containing the leaf and ethanol into the beaker of hot water and leave until the ethanol boils and the green pigment has been removed from the leaf.
7. Use forceps or a stirring rod to carefully remove the leaf from the boiling tube and dip it into the beaker of hot water for approximately 10 seconds.
8. Place the leaf in a Petri dish or on a white tile, making sure the leaf is spread out fully. Take care not to damage the leaf.
9. Cover the leaf with iodine solution.

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(Questions continue overleaf)

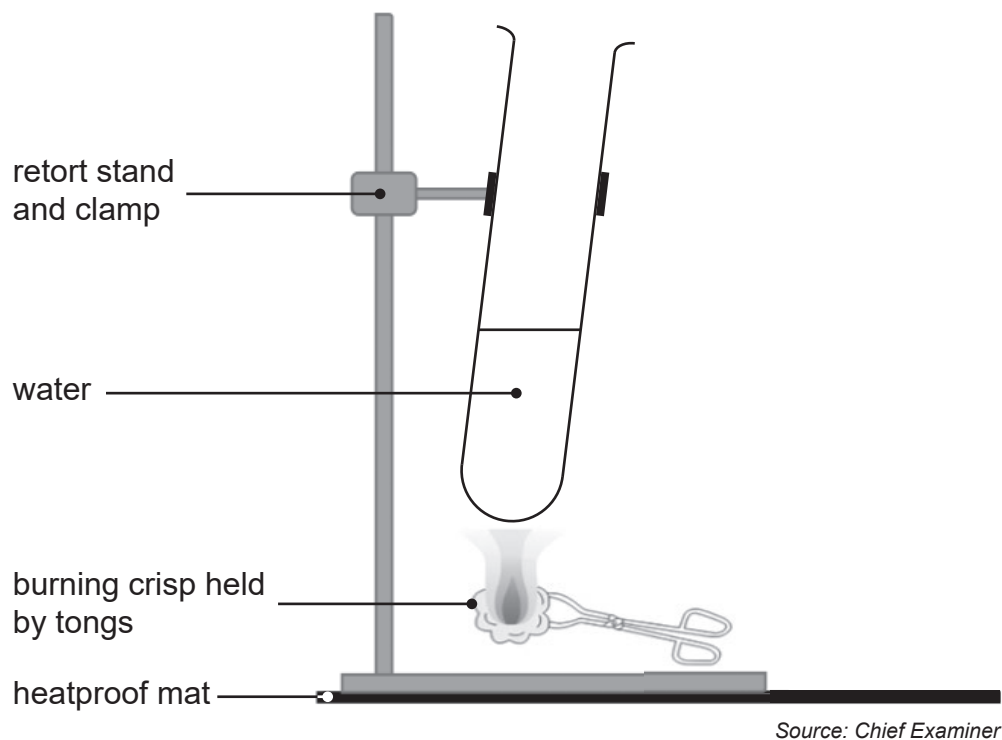
Task 2: Estimating the energy content of crisps.

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

Instructions:

1. Set up the apparatus as shown in the diagram.

Take care not to break the glass when clamping the boiling tube.



2. Use the measuring cylinder (or syringe) to add 20 cm³ of water to the boiling tube.
3. Stir the water in the boiling tube using the stirring rod.
4. Use the thermometer to measure the temperature of the water **at the start** and record this in **Table 1** on the next page.
5. Weigh your crisp and record its mass, **to one decimal place**, in the **box under Table 1** on the next page.
6. Light the Bunsen burner.
7. Use tongs to hold the crisp in the Bunsen flame until it starts to burn.

8. Immediately move the burning crisp under the boiling tube and hold it there until the crisp is completely burnt. If the crisp goes out, relight it in the Bunsen flame and quickly put it back under the boiling tube.
9. When the crisp is completely burnt, stir the water in the boiling tube using the stirring rod.
10. Use the thermometer to measure the temperature of the water and record this in **Table 1**.

Table 1

	Temperature /
At the start	
When the crisp is completely burnt	
Increase	

Mass of crisp = _____ g

For the remainder of Task 2 you must work alone.

Question 1

(a) Complete **Table 1** by:

- adding suitable units to the column heading.
- calculating the increase in temperature of the water. [2]

(b) Suggest why it was important to stir the water in **steps 3** and **9** before recording the temperature.

_____ [1]

Examiner Only	
Marks	Remark

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- (c) Another student repeated the investigation and obtained an increase in temperature of 26 °C for a crisp of mass 1.2 g.

The energy content of a crisp can be calculated using the following equation.

$\text{Energy content} = \frac{\text{volume of water}}{\text{/J}} \times \frac{\text{increase in temperature}}{\text{/cm}^3} \times 4.2 \frac{\text{J}}{\text{/}^\circ\text{C}}$
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- (i) Calculate the energy content of this student's crisp.

Show your working out.

_____ J [2]

- (ii) Calculate the energy content per gram of the student's crisp.

Show your working out.

_____ Jg⁻¹ [2]

Examiner Only

Marks	Remark

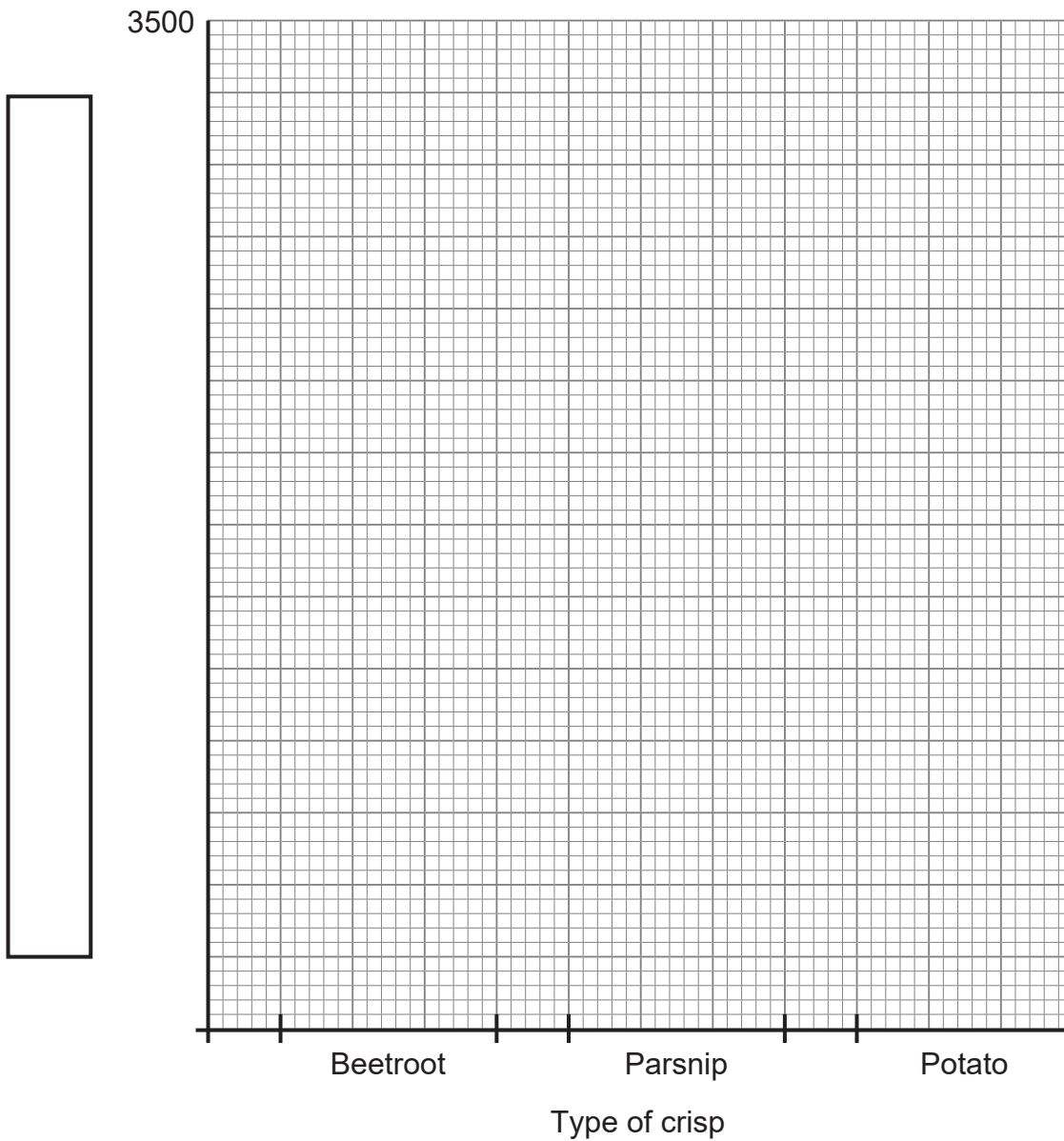
On the grid, use the results from **Table 2** to draw a bar chart of the energy content of the three types of crisp.

Examiner Only	
Marks	Remark

(f) Complete the scale given for the y-axis. [1]

(g) In the box provided, label the y-axis and include appropriate units. [2]

(h) Plot the bars accurately. [2]



THIS IS THE END OF THE QUESTION PAPER

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