Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2019

Biology

Unit 3 Practical Skills
Booklet B
Foundation Tier

[GBL32]

GBL32

MONDAY 17 JUNE, AFTERNOON

TIME

1 hour.

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 in black ink only. **Do not write with a gel pen.**
Answer **all eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **8**.

12307

1 A class of 20 pupils measured their heights.

The heights in centimetres are shown below.

150 155 152 153 162 157 ~~145~~ ~~149~~ 154 158

151 ~~149~~ ~~146~~ 152 150 157 158 156 ~~148~~ 154

Look at the table.

(a) **Write the heading** in the last column of the table. [1]

Height category / cm	Tally	
145–149	~~IIII~~	5
150–154		
155–159		
160–164		

(b) Complete the tally and the results in the table.

The first height category has been completed for you. [3]

(c) Name the type of graph that could be used to present these results.

_____ [1]

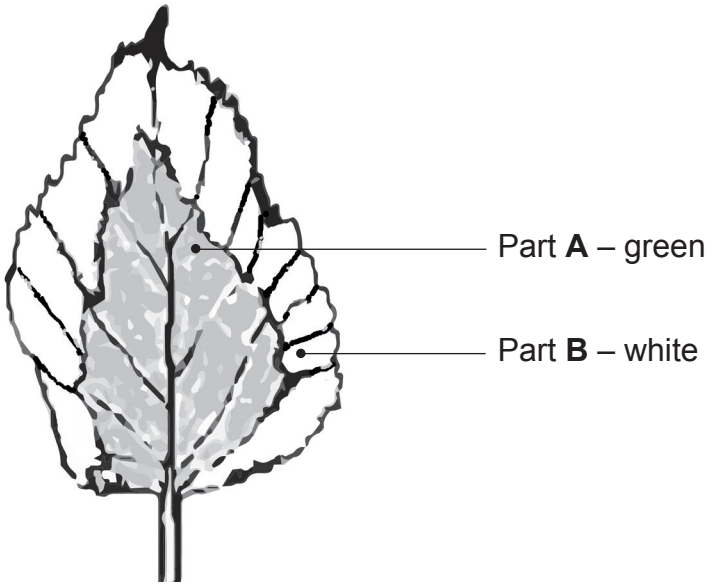
(d) Suggest why these results may not be reliable.

_____

_____ [1]

2 A student carried out an experiment to investigate factors needed for photosynthesis.

The diagram shows a variegated leaf from the plant used in the experiment.



Look at the diagram.

(a) What does the term variegated mean?

_____

_____ [1]

(b) The student destarched the plant before the experiment.

(i) Describe how he destarched the plant.

_____

_____

_____ [2]

[Turn over

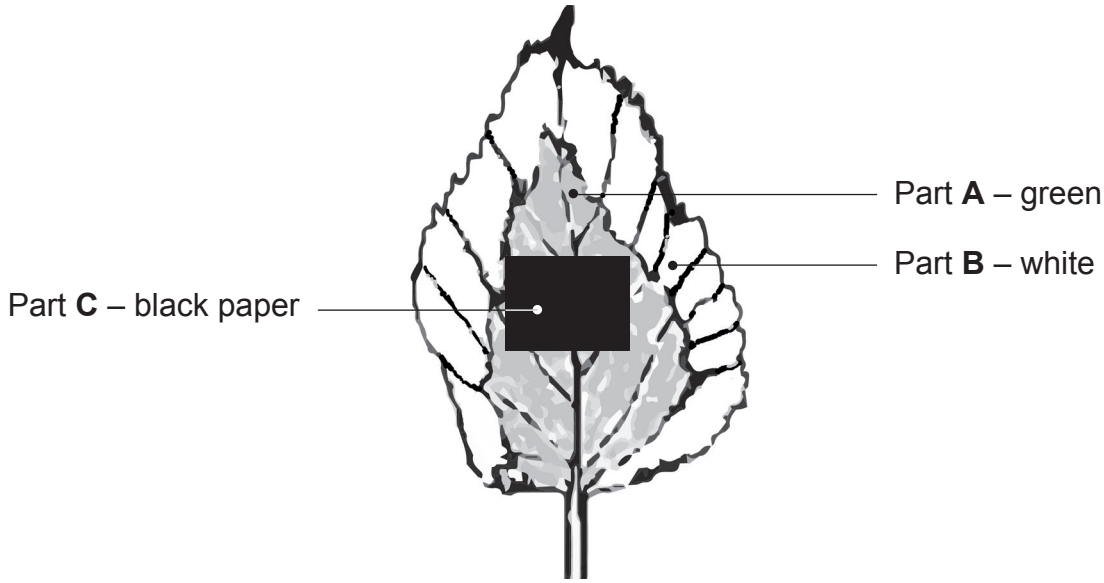
(ii) Why was it important to destarch the plant before the experiment?

_____

_____ [1]

(c) The student then placed a piece of black paper in the centre of the leaf.

The diagram shows the leaf.

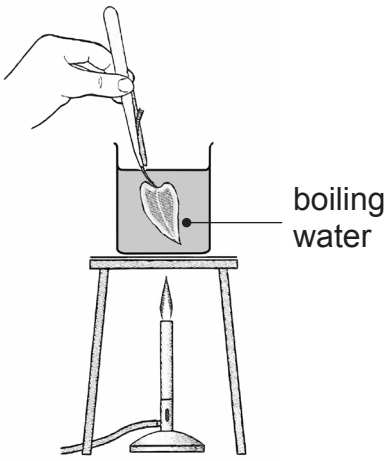


The student left the plant in bright light for 48 hours.

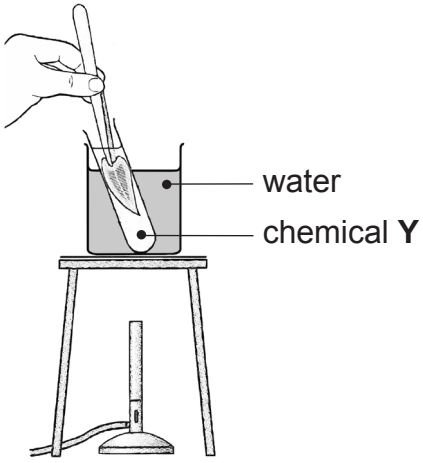
After 48 hours he cut the leaf from the plant and removed the black paper.

The student then tested the leaf for starch.

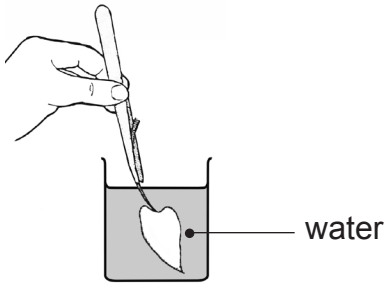
The diagrams show the steps he used.



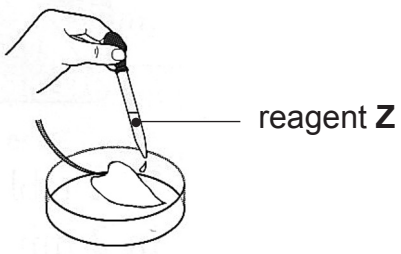
Step 1



Step 2



Step 3



Step 4

Look at the diagram.

(i) Name chemical **Y**.

_____ [1]

(ii) Name reagent **Z**.

_____ [1]

[Turn over

(iii) Describe and explain the safety precaution taken by the student in step 2.

Description _____

_____

Explanation _____

_____ [2]

(iv) Explain why the student had to carry out step 2 before adding reagent **Z**.

_____

_____

_____

_____ [2]

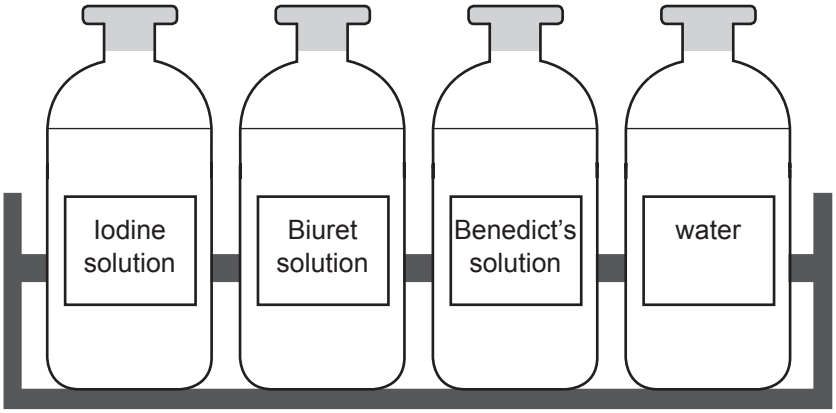
The table shows some of the results the student obtained after testing the leaf for starch.

Part of leaf	Colour of reagent Z before test	Colour of reagent Z after test
A	yellow-brown	
B	yellow-brown	yellow-brown
C	yellow-brown	

(v) Complete the table to show the results for leaf parts **A** and **C**. [2]

3 Students tested a piece of food for protein and reducing sugar.

They were given the following reagents.



(a) (i) Describe how the students tested the piece of food for protein.

_____

_____

_____ [2]

(ii) Describe the colour change if protein is present.

From _____ to _____ [2]

(b) (i) Describe how the students tested the piece of food for reducing sugar.

_____

_____

_____ [2]

(ii) Describe the colour change if reducing sugar is present.

From _____ to _____ [2]

[Turn over

4 A student set up an experiment to investigate diffusion.

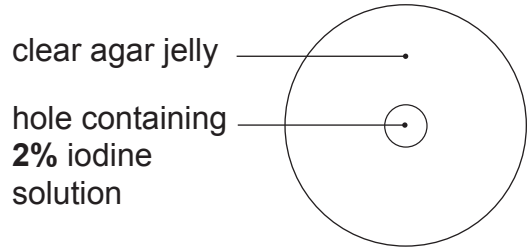
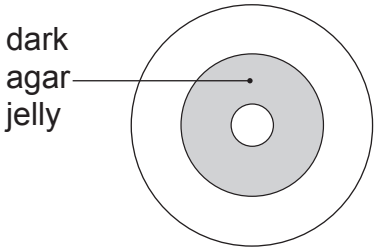
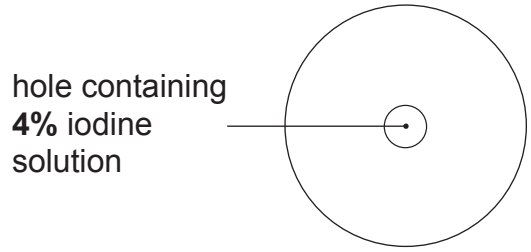
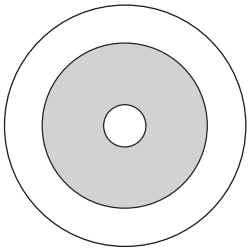
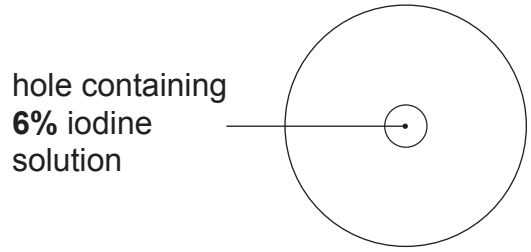
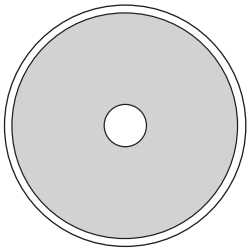
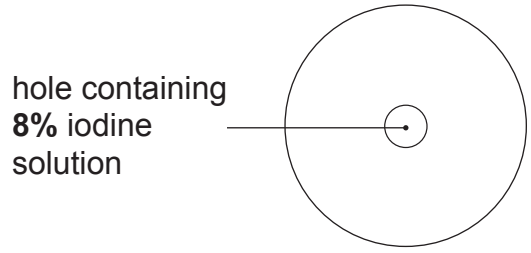
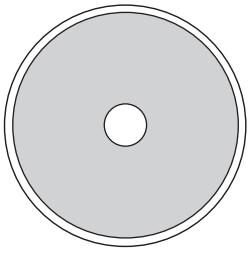
She filled four Petri dishes with agar jelly containing starch.

She cut a hole of the same diameter out of the centre of the agar jelly in each Petri dish.

She filled the holes with 1cm^3 of **different concentrations** of iodine solution and left the Petri dishes for 30 minutes at room temperature (20°C).

Table 1 shows the appearance of the agar jelly at the start of the student's experiment and after 30 minutes.

Table 1

Petri dish	Start of experiment	After 30 minutes
1		
2		
3		
4		

(a) Complete the results table by:

- adding a suitable column heading with units.
- measuring and recording the diameter of the dark area in Petri dish 2.

Part of the table has been completed for you.

Results table

Petri dish		Diameter of dark area after 30 minutes/mm
1	2	19
2	4	
3	6	30
4	8	30

[3]

(b) Describe the trend shown by the results.

_____

_____

_____

_____ [2]

(c) The student repeated the Petri dish 1 experiment at 5°C for 30 minutes.

Describe and explain the results she would expect.

_____

_____

_____

_____ [2]

[Turn over

5 Pupils investigated the effect of light on the number of bluebells in two different areas of parkland.

They compared the number of bluebells growing under trees in a shaded area with the number growing in an open area.

They used quadrats to sample the bluebells in each of the two different areas of parkland.

(a) Describe how the pupils carried out this investigation.

[4]

The table shows the results the pupils obtained.

Area of parkland	Total number of bluebells
Shaded	211
Open	162

(b) What can the pupils conclude about the **effect of light** on the number of bluebells?

_____

_____

_____ [1]

Light is one abiotic factor which affects the number of bluebells.

(c) Suggest **two other** abiotic factors which may affect the number of bluebells.

Describe how you would measure each factor.

Factor 1 _____

How measured _____ [2]

Factor 2 _____

How measured _____ [2]

(d) Suggest **one biotic** factor which may affect the number of bluebells.

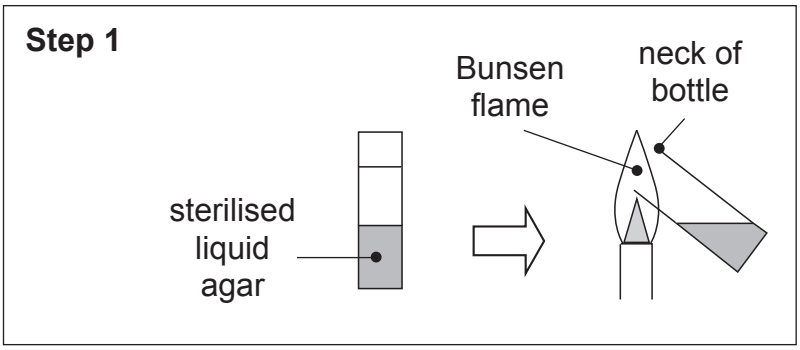
_____ [1]

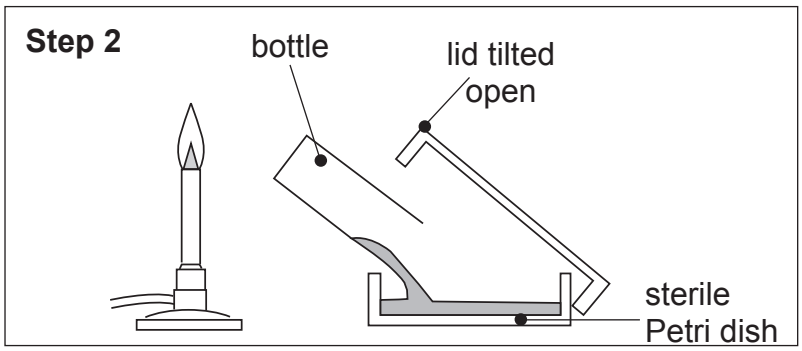
[Turn over

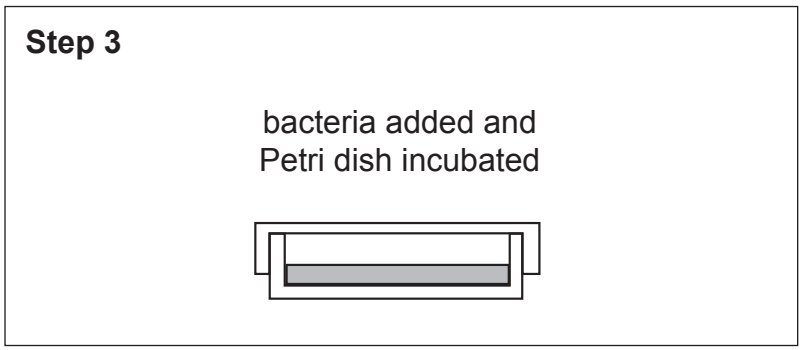
6 Students poured a nutrient agar plate using aseptic technique.

They inoculated the agar plate with one type of bacterium.

The diagram shows the steps involved.







Look at the diagram opposite.

(a) **(i)** Draw a (circle) around the substance present in nutrient agar which allows the bacteria to grow.

hormone enzyme glucose [1]

(ii) Describe how the liquid agar was sterilised before **Step 1**.

_____

_____ [1]

(iii) Explain why **Step 1** was necessary.

_____

_____

_____

_____ [2]

(b) Explain why **Step 2** was carried out beside a lit Bunsen.

_____

_____

_____ [2]

[Turn over

(c) Describe and explain **two** precautions which the student should take in order to **incubate** the agar plate safely.

1. _____

_____

_____ [2]

2. _____

_____

_____ [2]

(d) Describe **two** safety precautions which the student should carry out after working with bacteria in a school laboratory.

1. _____

_____ [1]

2. _____

_____ [1]

7 Pupils investigated the energy content of plain digestive biscuits and chocolate digestive biscuits.

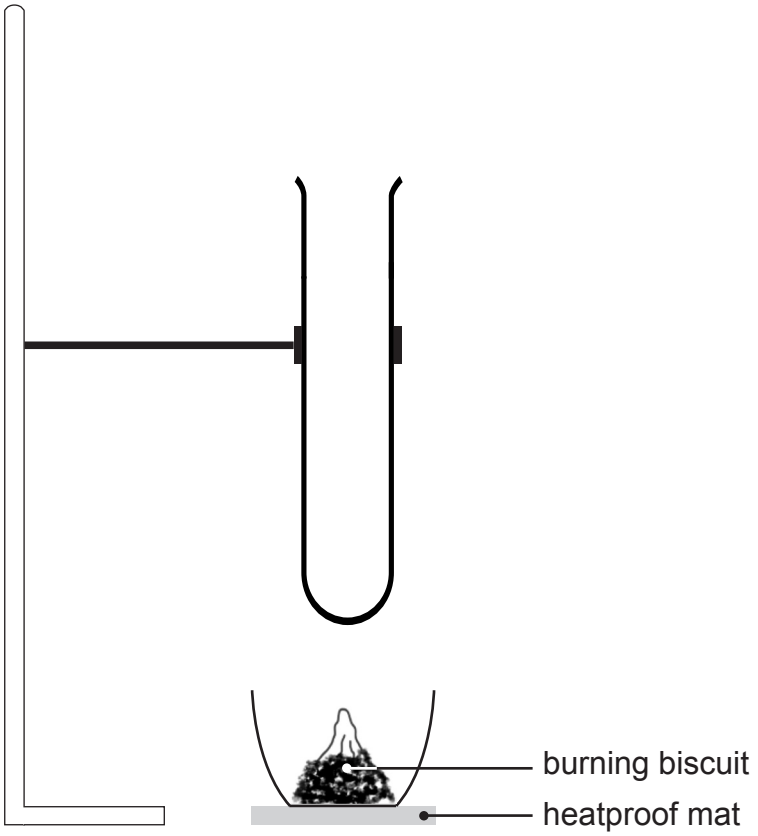
They placed 20 cm^3 of water in a boiling tube and recorded its temperature.

They then placed a sample of biscuit into a crucible.

They set the biscuit alight and placed the crucible under the boiling tube.

When the biscuit had completely burned, the pupils recorded the temperature of the water again.

The diagram shows some of the apparatus they used.



(a) Complete the diagram to show the set-up of the boiling tube at the start of the investigation. [2]

[Turn over

The table shows the results the pupils obtained.

Type of biscuit	Mass of biscuit / g	Temperature of 20 cm^3 of water / °C		Rise in water temperature / °C
		Before burning	After burning	
plain digestive	2.7	18	37	
chocolate digestive	2.4	18	52	34

(b) Complete the table to show the rise in temperature of the water for the plain digestive biscuit. [1]

The equation below is used to calculate the energy content of a food sample.

Energy content = volume of water × rise in water temperature × 4.2
/ J / cm^3 / °C

(c) Use the equation to calculate the energy content of the **chocolate** digestive biscuit.

Show your working.

_____ J [2]

(d) The pupils then calculated the energy content per gram for each biscuit.

(i) Explain why this was necessary in this experiment.

_____

_____ [1]

The calculated energy content for the plain digestive biscuit was 591 J per gram.

The value given on the packet is 20710 J per gram.

(ii) Suggest **two** reasons why the result obtained by the pupils was lower than the value given on the packet.

1. _____

_____

2. _____

_____ [2]

(iii) The energy content per gram is higher for a chocolate digestive than a plain digestive biscuit.

Suggest why.

_____

_____ [1]

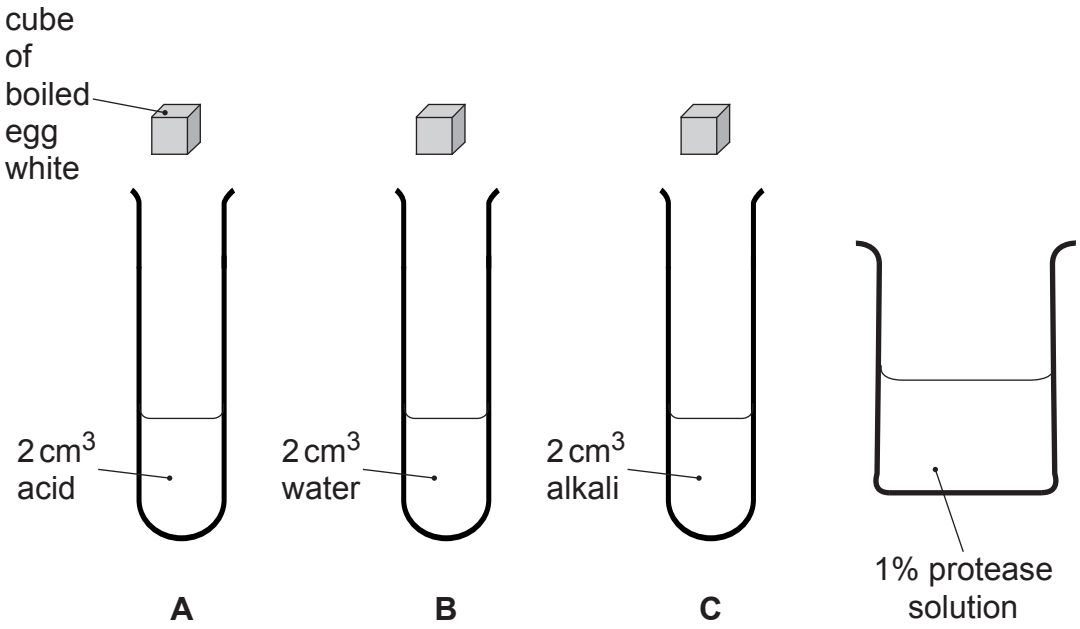
[Turn over

8 Pupils were asked to investigate the effect of pH on the action of the enzyme protease.

They were provided with cubes of boiled egg white, each weighing 3 g.

When added to a 1% concentration of protease solution, the protein in the boiled egg white is broken down and completely disappears over 10 minutes at optimum pH.

The diagram shows some of the apparatus and materials the pupils were given.



Describe:

- how the pupils would set up the experiment to obtain results in **five** minutes.
- what they would measure as the result.
- the **other** variables they would control.

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Number