



General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]



WEDNESDAY 12 NOVEMBER 2014, MORNING

TIME

1 hour.

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 seven** 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 **7(d)**.

Centre Number

71

Candidate Number

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

Total
Marks

1 (a) The diagram shows part of a food chain.



(i) Draw arrows in the boxes to complete this food chain. [1]

(ii) Name the producer in the food chain.

_____ [1]

(iii) What is the energy source for the producer?

_____ [1]

(iv) What would happen to the rabbit population if a disease killed all the foxes?

_____ [1]

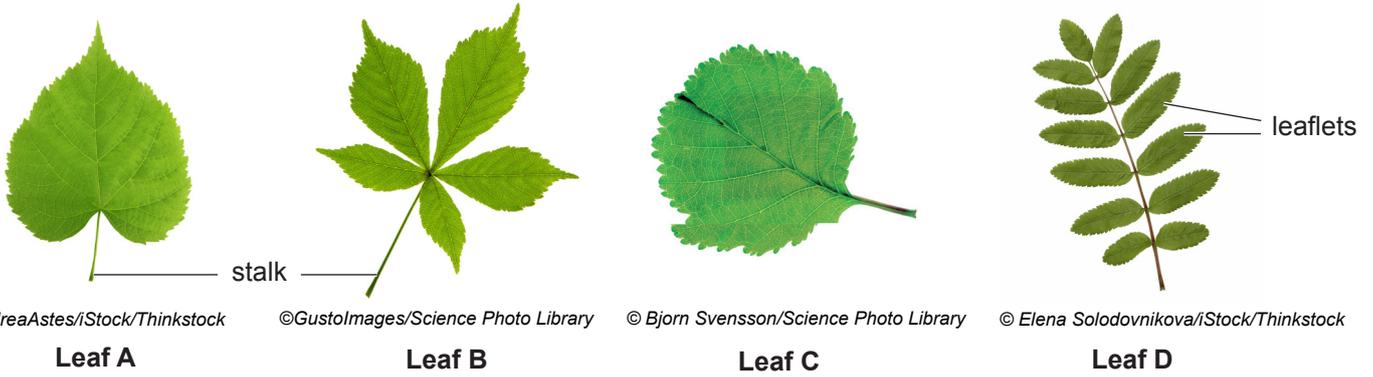
(b) Giant pandas eat only bamboo.

What is the danger to a population of animals like giant pandas that have only one food source?

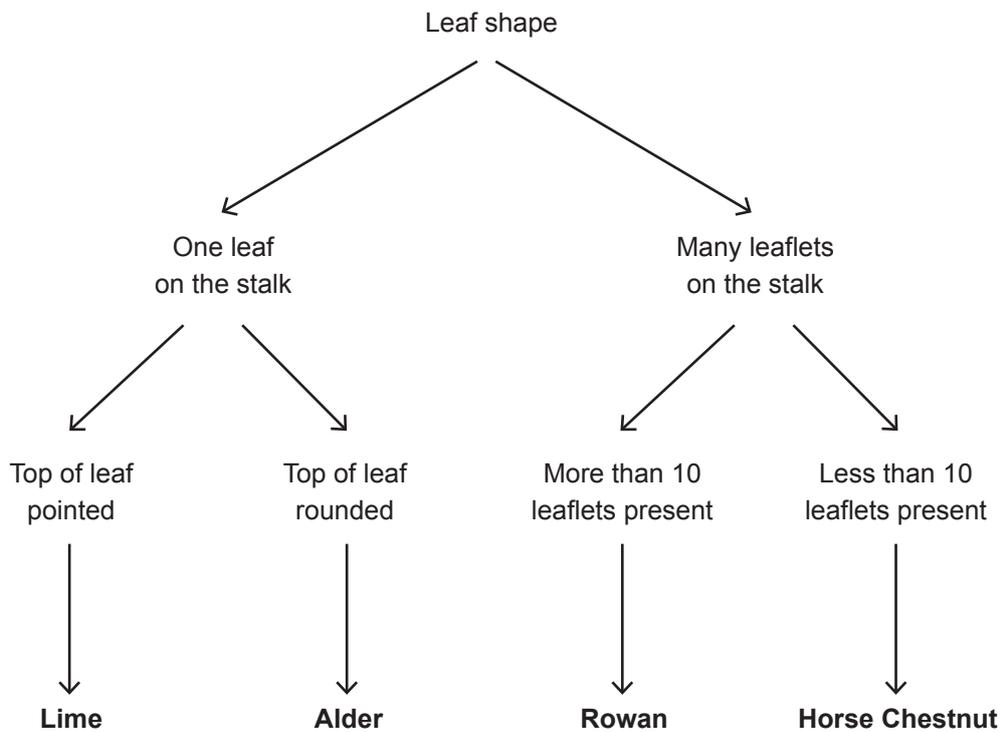
 _____ [2]

Examiner Only	
Marks	Remark
○	○

2 The photographs show four different types of leaf.



The key below can be used to identify each leaf.



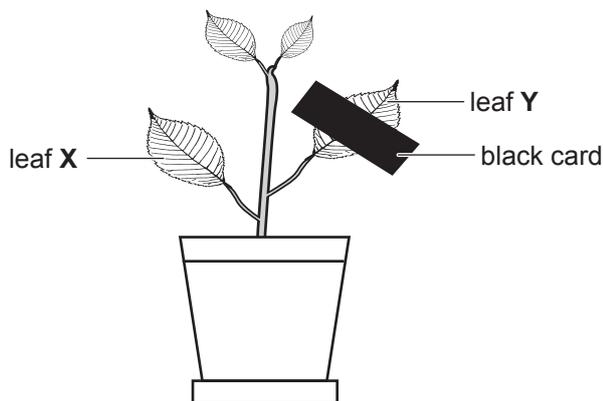
(a) Use the key to identify each leaf.

- A _____
- B _____
- C _____
- D _____

[3]

Examiner Only	
Marks	Remark
○	○

(b) The diagram shows an experiment to test if light is needed for photosynthesis.



(i) The plant had been left in the dark for 48 hours before the experiment.

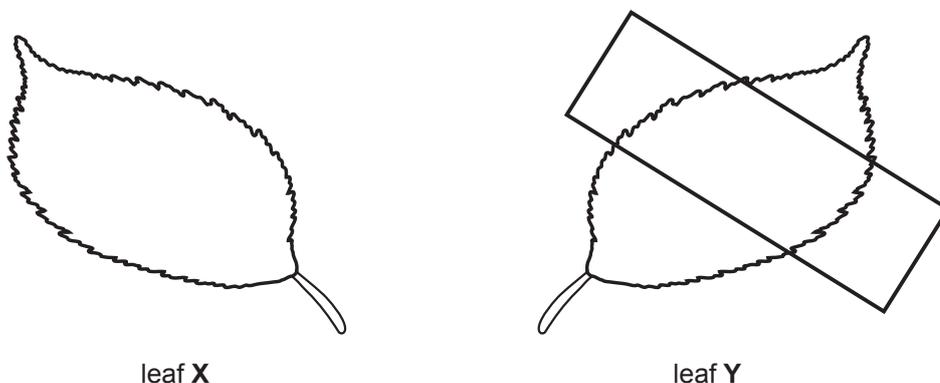
Why was this done?

_____ [1]

(ii) What is the function of the black card on leaf Y?

_____ [1]

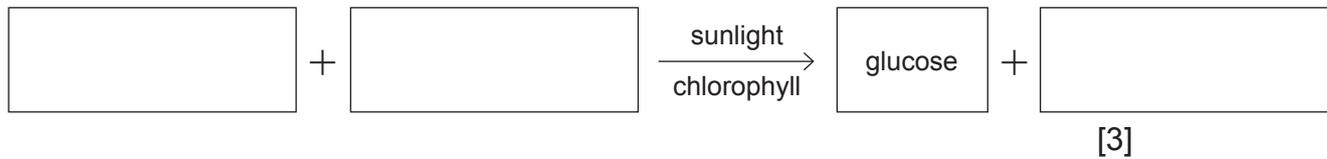
(iii) The plant was then left in light for four hours. Leaf X and leaf Y were tested for starch. Shade the areas on **both** drawings that will give a positive starch result.



[2]

Examiner Only	
Marks	Remark

(c) (i) Write in the boxes to complete the word equation for photosynthesis.



(ii) Plants produce glucose during photosynthesis.

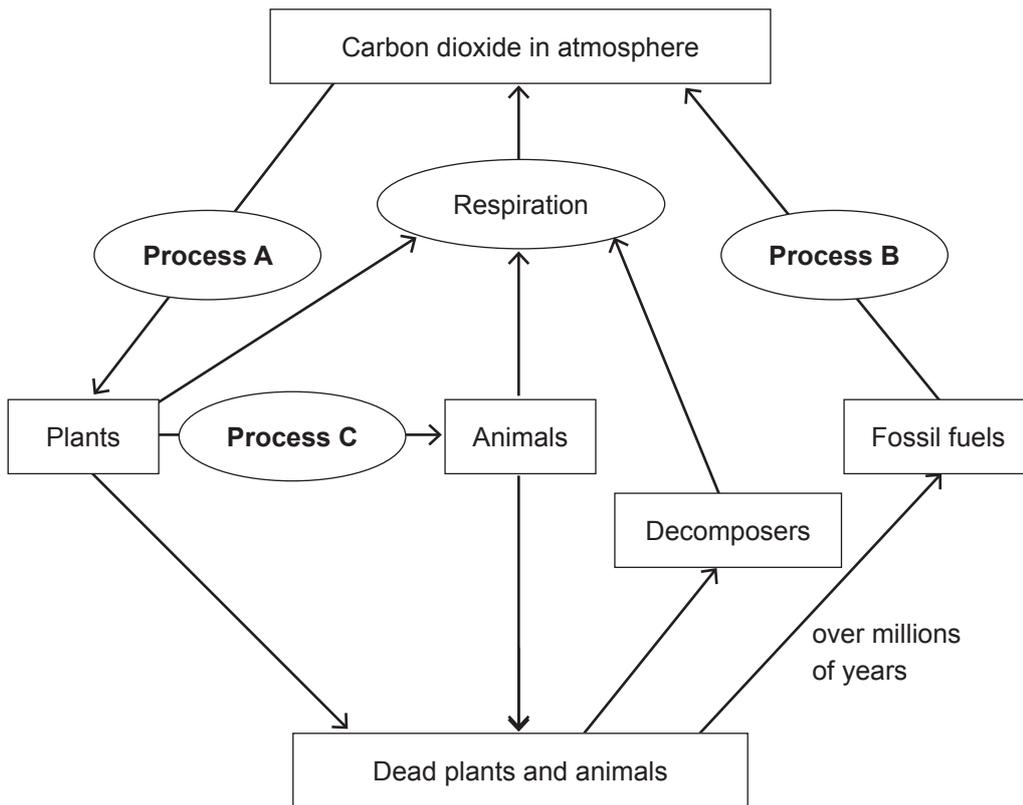
Give **two** ways plants use glucose.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

3 (a) The diagram shows the carbon cycle.



Name **Process A**, **Process B** and **Process C** in the diagram.

A _____

B _____

C _____ [3]

(b) (i) Respiration takes place in all living organisms.

What is the function of respiration?

_____ [1]

(ii) Name the **two** substances used in respiration.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark
○	○

- (c) The Maldives are a group of islands in the Indian Ocean. The highest point on the islands is only 2.4 metres above sea level. The photograph shows one of these islands.



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- (i) Use the information and your knowledge to explain how global warming may cause the islands to flood.

[3]

- (ii) International treaties help to reduce global warming. Give **one** way in which international treaties do this.

[1]

Examiner Only	
Marks	Remark

4 (a) A man trips on a footpath. He is immediately aware that he has tripped. About three seconds later his heart rate increases and he feels the shock of nearly falling.

(i) Name the organ system which is responsible for the man's **immediate** awareness of nearly falling.

[1]

(ii) A chemical messenger, called adrenaline, causes his heart rate to increase.

What type of chemical is adrenaline?

[1]

(iii) Suggest how adrenaline is transported around the body.

[1]

(b) Insulin is a chemical messenger used to control blood glucose levels.

(i) Where is insulin made in the body?

[1]

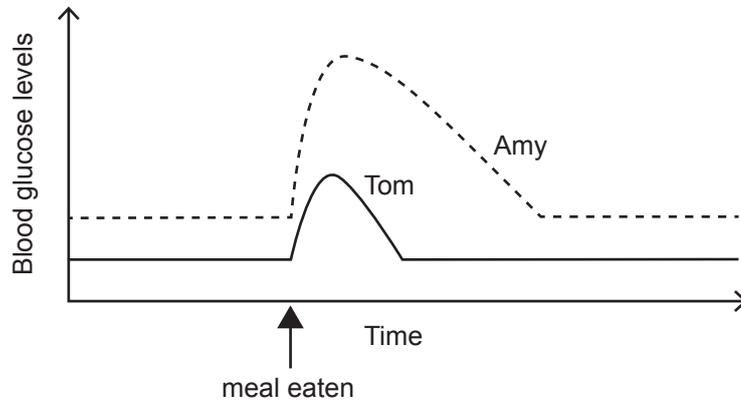
(ii) Describe how insulin lowers blood glucose levels.

[2]

Examiner Only	
Marks	Remark
○	○

- (c) Diabetes is a condition in which the blood glucose control mechanism fails.

The graph shows how blood glucose levels change for Tom and Amy, after they have eaten an identical meal. Tom does not have diabetes.



Give **two** pieces of evidence from the graph which suggest Amy may have diabetes.

1. _____

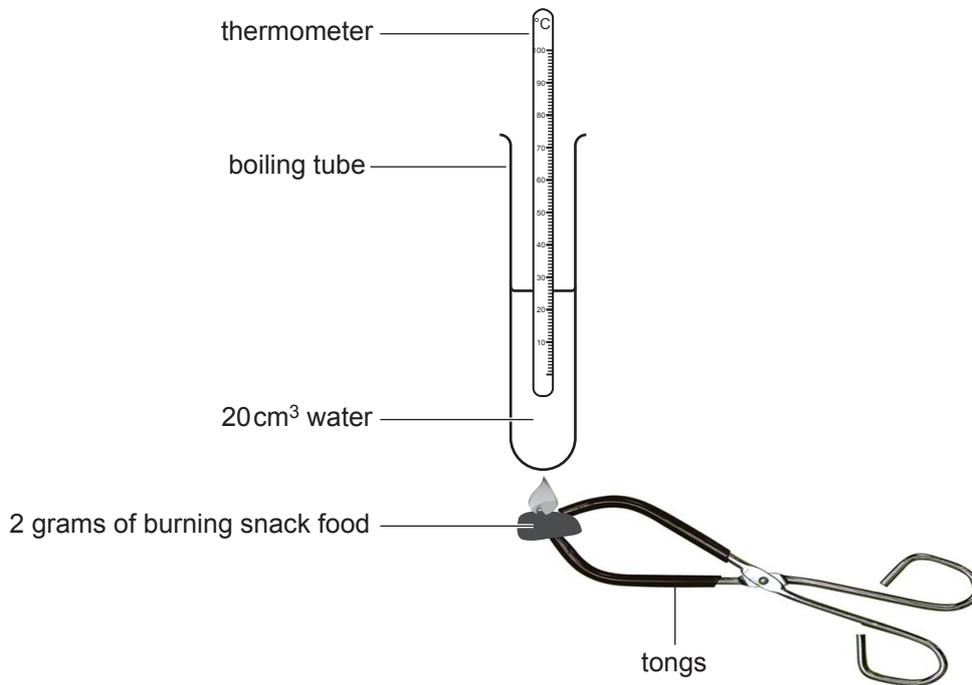
2. _____

_____ [2]

Examiner Only	
Marks	Remark

- 5 Harry and James investigated the energy content of four different snack foods.

The diagram shows how they carried out their investigation.



They measured the temperature of 20 cm³ of water before and after **completely** burning **2 grams** of each snack food. They calculated the rise in temperature for each snack food.

The table shows the results obtained.

Snack food	Temperature of 20 cm ³ of water/°C		Rise in Temperature/°C
	Before burning	After burning	
Cheesy crackers	19	47	28
Potato crisps	19	40	21
Plain biscuit	19	37	
Chocolate biscuit	19	54	35

- (a) (i) Complete the table to show the rise in water temperature for the plain biscuit. [1]

Examiner Only	
Marks	Remark
○	○

- (ii) The equation below is used to calculate how much energy 1 gram of each snack food contains.

$$\text{Energy in food} = \frac{\text{Rise in water temperature}/^{\circ}\text{C} \times \text{Volume of water}/\text{cm}^3 \times 4.2}{\text{Mass of food burned in grams}}$$

Use this equation to calculate the energy content in **1 gram of the potato crisps**.

Show your working.

_____ J [3]

- (iii) Before Harry and James calculated the energy content of the snack foods, Harry looked at the table of results and said "I think the chocolate biscuit has the highest energy content."

What information from the table of results supports Harry's statement?

 _____ [1]

- (iv) James suggested repeating the chocolate biscuit experiment three times.

What is the advantage of doing this?

 _____ [1]

- (b) The energy content of 1 gram of potato crisps is much higher than the value calculated by Harry and James.

Suggest a reason why the experimental result is lower.

 _____ [1]

- (c) Give **one** health problem that could result from eating too many snack foods.

_____ [1]

Examiner Only

Marks Remark

6 (a) The photograph shows an oak tree.



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Read the following passage.

Scientists in North America are concerned that mature oak trees are not being replaced by oak seedlings but by seedlings of other types of trees.

Line

1

3

One reason suggested for this is competition from the seedlings of other types of trees. These seedlings are better adapted than the oak seedlings to grow in the shady conditions on the forest floor.

5

Another suggestion is that oak seedling roots are eaten by voles, which are small animals living in the forest.

7

Any decrease in the size of oak forests will cause a problem for the timber industry, which uses the oak wood. It will also affect biodiversity, as a large wildlife population lives in oak forests.

9

11

(i) Read lines 1–6 of the passage.

Use **only** the information in the passage to suggest what the oak seedlings and seedlings of other types of tree are competing for.

[1]

Examiner Only	
Marks	Remark
○	○

7 A student carried out an experiment to find out which food groups are in a cheese sandwich.

(a) Complete the table by writing in the missing information.

Food group	Test reagent	Colour of test reagent at start	Colour of test reagent if food group present
Starch		Yellow/brown	
Protein	Biuret solution		Purple

[3]

(b) Describe how the student would test for fat in a sample of the cheese sandwich. Give the positive result for a fat test.

[3]

(c) Amylase is the enzyme that breaks down starch.

Another student investigated how pH affects the breakdown of starch.

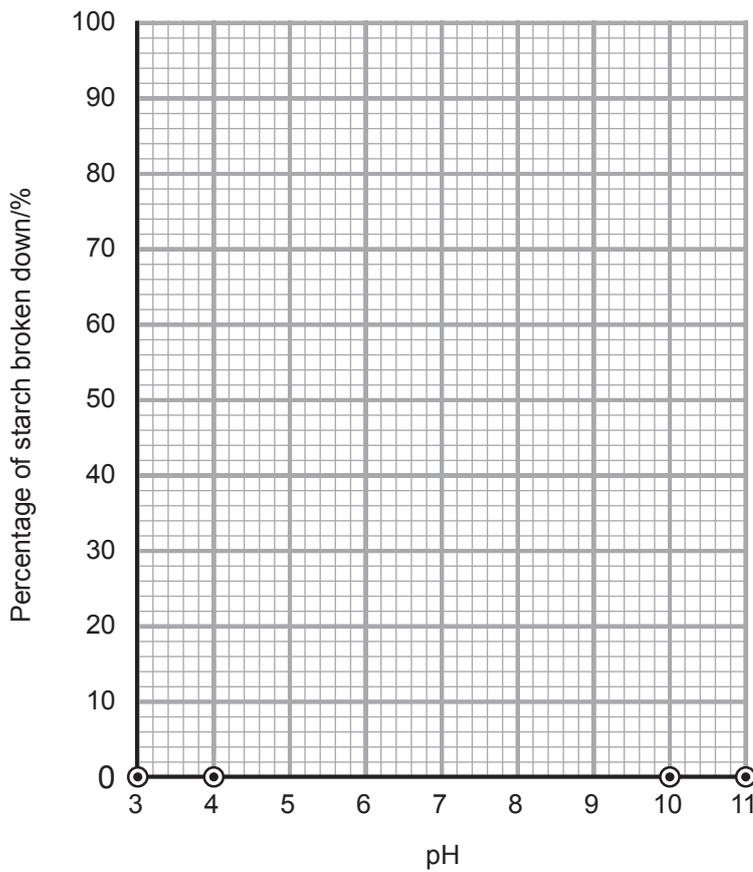
The table shows the results of this investigation.

pH	Percentage of starch broken down/%
3	0
4	0
5	10
6	64
7	96
8	68
9	12
10	0
11	0

Examiner Only	
Marks	Remark
○	○

(i) Plot a line graph on the grid, using the data in the table opposite.

Four plots have been done for you.



[3]

(ii) What is the best pH for amylase to break down starch?

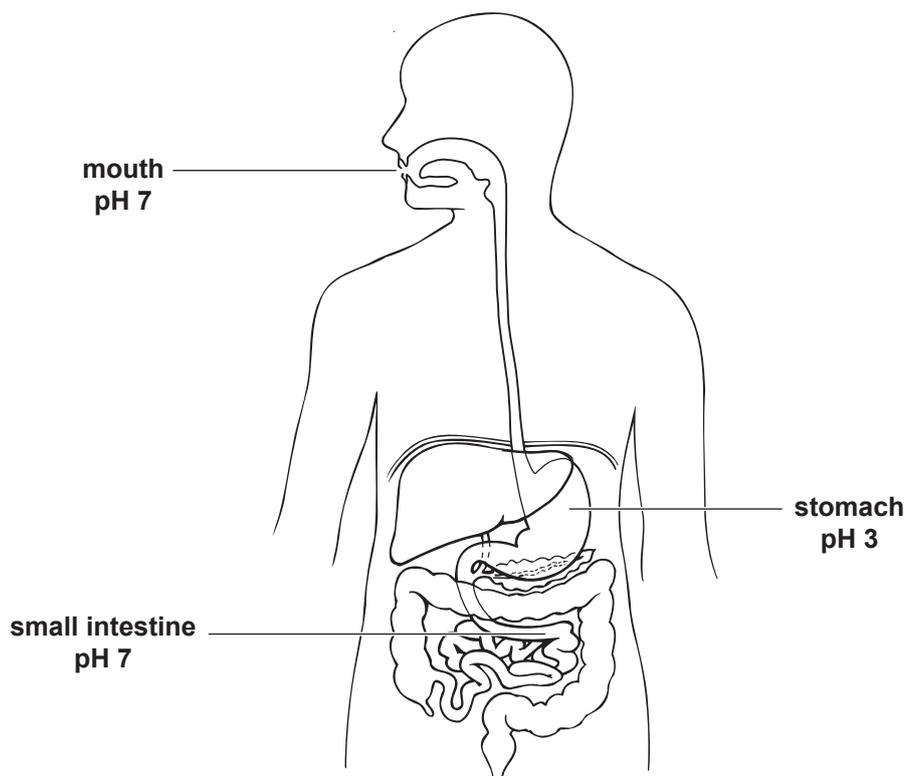
[1]

(iii) Use **data** from the graph to describe the trend shown.

[2]

Examiner Only	
Marks	Remark

- (d) The diagram shows part of the human digestive system. The pH of some parts is shown. Food stays only a very short time in the mouth.



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Use the graph on page 15, the diagram above and your knowledge of enzymes to:

- Describe the activity of amylase in the
 - mouth
 - stomach
 - small intestine
- Explain why it is important that amylase is made in the small intestine as well as in the mouth.

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