

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

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General Certificate of Secondary Education  
June 2009



**ADDITIONAL SCIENCE**  
**Unit Biology B2**

**BLY2F**  
**F**

**BIOLOGY**  
**Unit Biology B2**

**Foundation Tier**

Wednesday 20 May 2009 1.30 pm to 2.15 pm

<p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>a ruler.</li> </ul> <p>You may use a calculator.</p>
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Time allowed: 45 minutes

**Instructions**

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

**Advice**

- In all calculations, show clearly how you work out your answer.

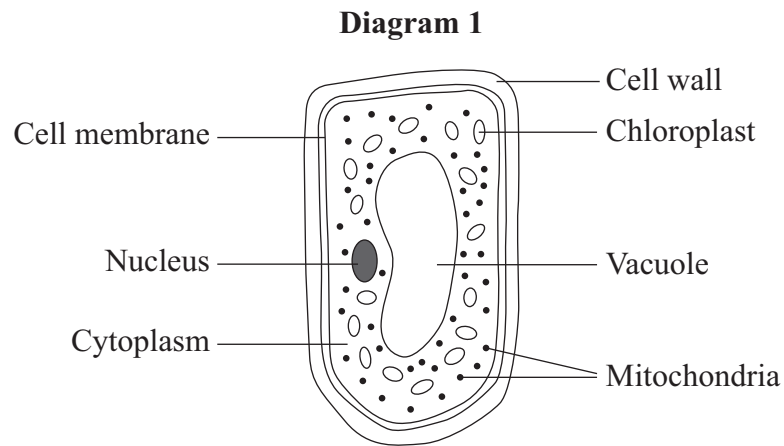
For Examiner's Use			
Question	Mark	Question	Mark
1		7	
2		8	
3			
4			
5			
6			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			



J U N 0 9 B L Y 2 F 0 1

Answer **all** questions in the spaces provided.

**1** **Diagram 1** shows a cell from a leaf.



**1** (a) How is the leaf cell specialised to carry out photosynthesis?

Tick (✓) **one** box.

It has a permanent vacuole.

It has many chloroplasts.

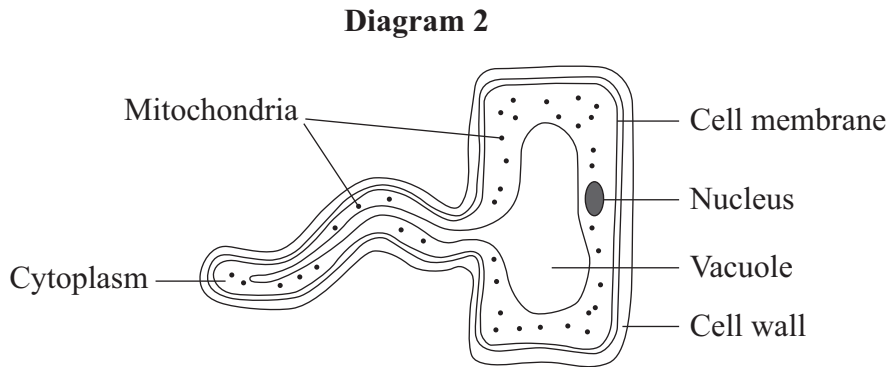
It has cytoplasm.

It has many mitochondria.

*(1 mark)*



1 (b) **Diagram 2** shows another type of plant cell.



Give **two** ways in which this cell is different from an animal cell.

- 1.....
- .....
- 2.....
- .....

(2 marks)

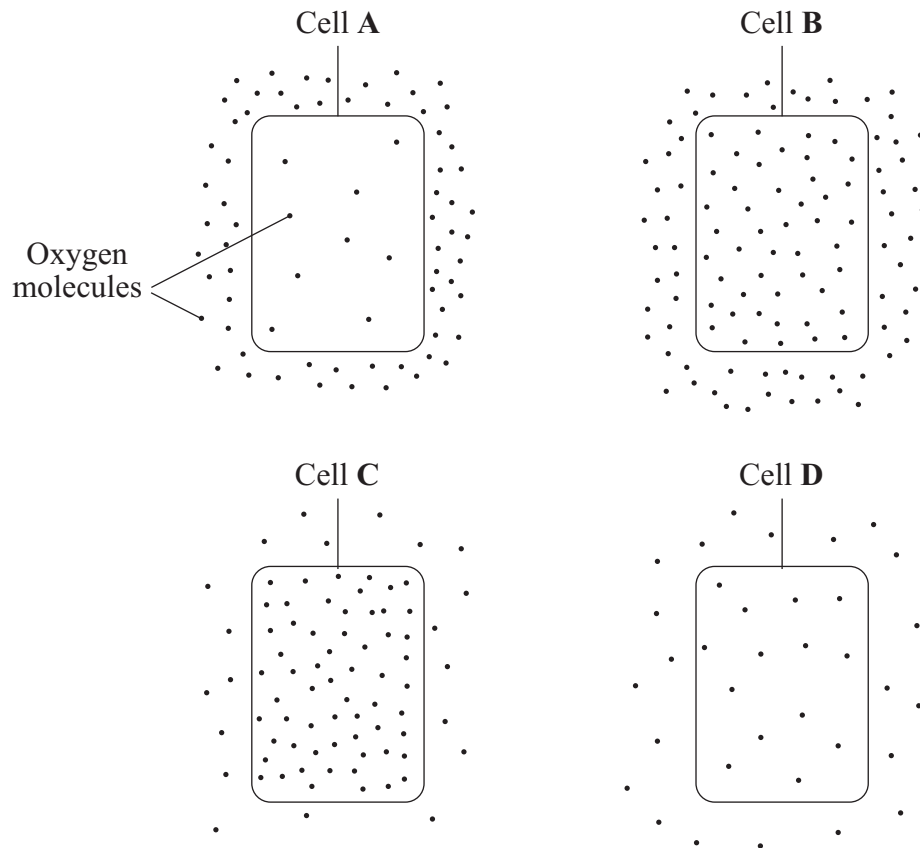
3
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**Turn over for the next question**

**Turn over ▶**



- 2 (a) The diagrams show cells containing and surrounded by oxygen molecules. Oxygen can move into cells or out of cells.



Into which cell, **A**, **B**, **C** or **D**, will oxygen move the fastest?

Write your answer, **A**, **B**, **C** or **D**, in the box.

(1 mark)



2 (b) Draw a ring around the correct word to complete each sentence.

2 (b) (i) Oxygen is taken into cells by the process of

diffusion  
osmosis  
respiration

(1 mark)

2 (b) (ii) Cells need oxygen for

breathing  
photosynthesis  
respiration

(1 mark)

2 (b) (iii) The parts of cells that use up the most oxygen are the

membranes  
mitochondria  
nuclei

(1 mark)

2 (b) (iv) Some cells produce oxygen in the process of

diffusion  
photosynthesis  
respiration

(1 mark)

5

Turn over ►



- 3 Water can be lost from the body in several ways.  
The table shows the volume of water lost by a man on a cold day.

Way in which water is lost	Volume of water lost in cm <sup>3</sup>
In urine	2000
Through skin	600
Breathed out	300
In faeces	100
<b>Total</b>	<b>3000</b>

- 3 (a) Calculate the proportion of water that the man lost through his skin.

Show clearly how you work out your answer.

.....  
.....

Proportion = .....  
(2 marks)

- 3 (b) More water is lost through the skin on a hot day than on a cold day.

- 3 (b) (i) Explain why.

.....  
.....

(1 mark)



- 3 (b) (ii) To maintain water balance in the body, the total volume of water taken in must equal the total volume of water lost.

Give **two** ways this is achieved on a hot day, when compared to a cold day.

Tick (✓) **two** boxes.

The volume of water in the urine decreases.

The volume of water in the faeces increases.

The volume of water taken as food or drink increases.

The volume of water breathed out decreases.

(2 marks)

- 3 (c) Use words from the box to complete the sentences.

<b>bladder</b>	<b>kidney</b>	<b>liver</b>	<b>stomach</b>
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The body cannot store amino acids.

The body converts the amino acids it cannot use into urea.

- 3 (c) (i) Urea is made in the..... (1 mark)

- 3 (c) (ii) Urea is removed from the blood by the ..... (1 mark)

- 3 (c) (iii) Urine is stored in the ..... (1 mark)

8
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**Turn over for the next question**

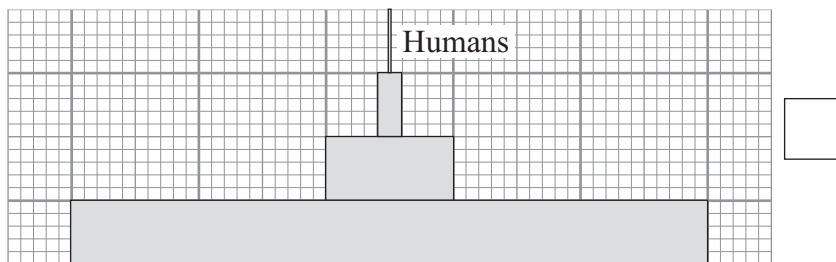
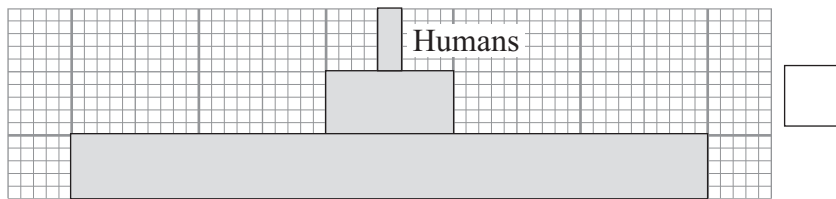
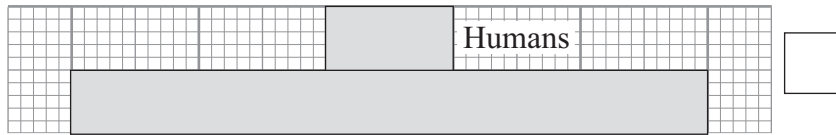
**Turn over ▶**



4 (a) The diagrams show three pyramids of biomass.

4 (a) (i) Which pyramid would be the most efficient in providing food for humans?

Tick (✓) **one** box.



(1 mark)

4 (a) (ii) Give **one** reason for your choice.

.....

.....

(1 mark)





4 (b) Pigs may be kept indoors or outdoors.

**Pigs kept indoors**



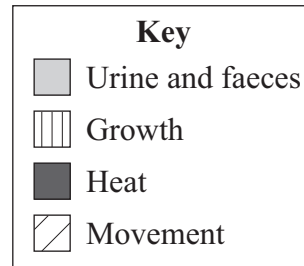
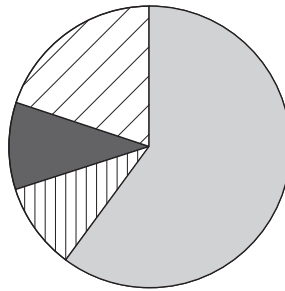
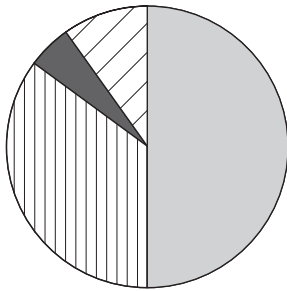
**Pigs kept outdoors**



The pie charts show what happens to the energy in the food eaten by pigs kept indoors and pigs kept outdoors.

**Pigs kept indoors**

**Pigs kept outdoors**



4 (b) (i) Farmers make more profit from keeping pigs indoors than from keeping pigs outdoors.

Use information from the pie charts to explain why.

.....

.....

.....

.....

(2 marks)

4 (b) (ii) Meat from pigs kept outdoors may cost more than meat from pigs kept indoors.

Some people prefer to buy meat from animals that have been kept outdoors.

Suggest **one** reason why.

.....

.....

(1 mark)

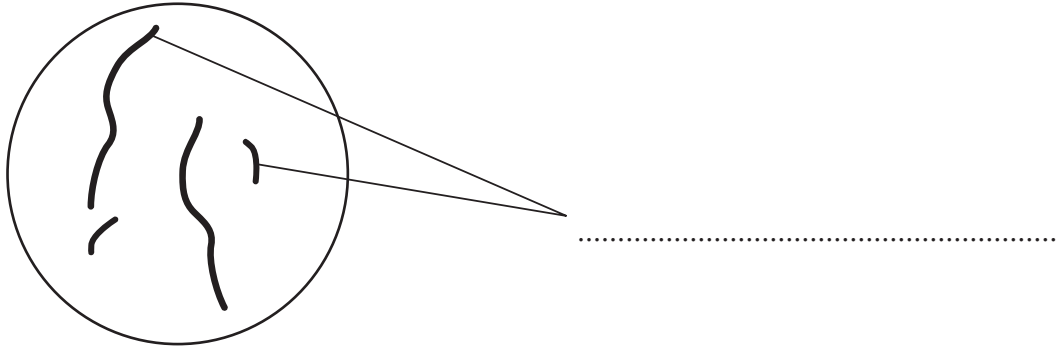
5
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Turn over ▶



5 **Diagram 1** shows the nucleus of a body cell as it begins to divide by mitosis.

**Diagram 1**



5 (a) Use a word from the box to label **Diagram 1**.

alleles

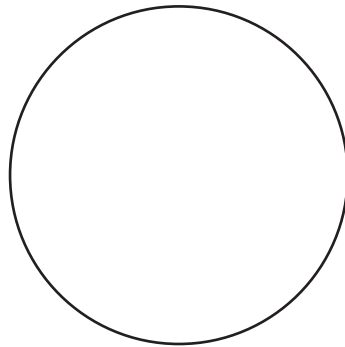
chromosomes

gametes

(1 mark)

5 (b) Complete **Diagram 2** to show what the nucleus of one of the cells produced by this mitosis would look like.

**Diagram 2**



(1 mark)



5 (c) Stem cells from a recently dead embryo can be grown in special solutions.

Some facts about stem cells are given below.

- Stem cells from an embryo can grow into any type of tissue.
- Stem cells may grow out of control, to form cancers.
- Large numbers of stem cells can be grown in the laboratory.
- Stem cells may be used in medical research or to treat some human diseases.
- Patients treated with stem cells need to take drugs for the rest of their life to prevent rejection.
- Collecting and growing stem cells is expensive.

Use **only** the information above to answer these questions.

5 (c) (i) Give **two** advantages of using stem cells.

1 .....

.....

2 .....

.....

(2 marks)

5 (c) (ii) Give **two** disadvantages of using stem cells.

1 .....

.....

2 .....

.....

(2 mark)

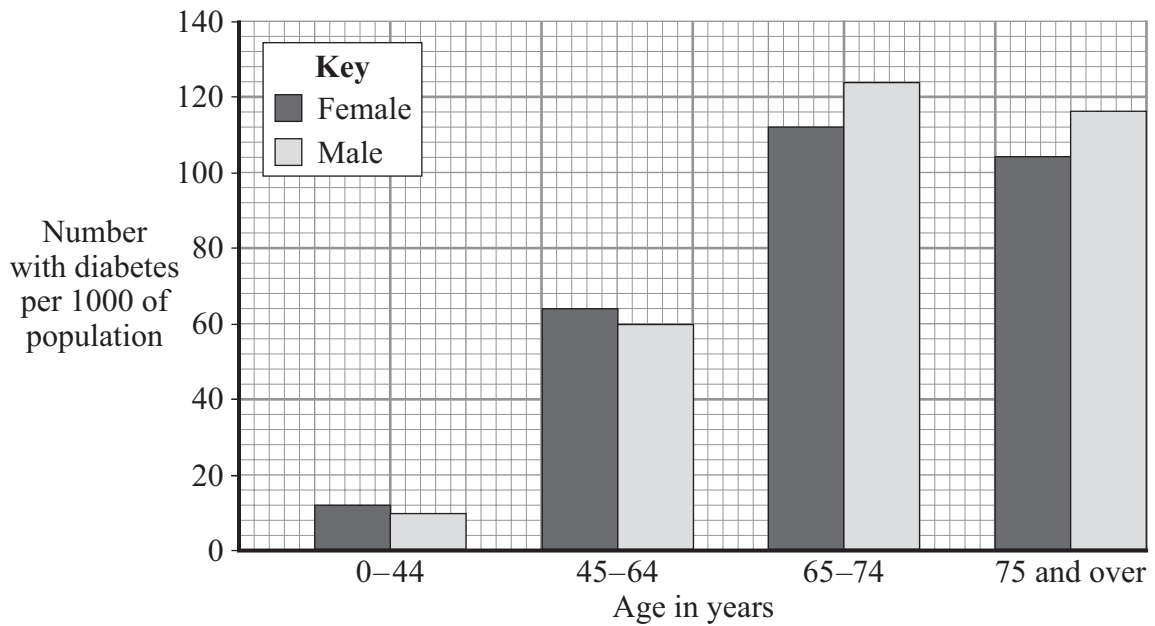
6

Turn over ►



6 Diabetes is caused when the body does not produce enough insulin.

6 (a) The bar graph shows the number of people with diabetes per 1000 of population.



6 (a) (i) How many more males aged between 45 and 64 years of age have diabetes than males under 45 years of age?

Show clearly how you work out your answer.

.....

.....

Answer ..... per 1000 of population  
(2 marks)

6 (a) (ii) Describe the way in which the number of females with diabetes changes with age.

.....

.....

.....

.....

.....

(2 marks)



- 6 (b) One way of treating diabetes is by injecting insulin.

Insulin is a protein.

- 6 (b) (i) If insulin is taken by mouth, it is broken down in the digestive system.

Where in the digestive system would insulin be broken down?

Draw a ring around your answer.

**liver**

**mouth**

**stomach**

(1 mark)

- 6 (b) (ii) Give **one** way of treating diabetes instead of using insulin.

.....

.....

(1 mark)

<b>6</b>

**Turn over for the next question**

**Turn over ►**



7 (a) (i) Complete the word equation for photosynthesis.

carbon dioxide + ..... (+ light energy) → glucose + .....  
(2 marks)

7 (a) (ii) Most of the carbon dioxide that a plant uses during photosynthesis is absorbed from the air.

Give **one** other source of carbon dioxide for a plant.

Draw a ring around your answer.

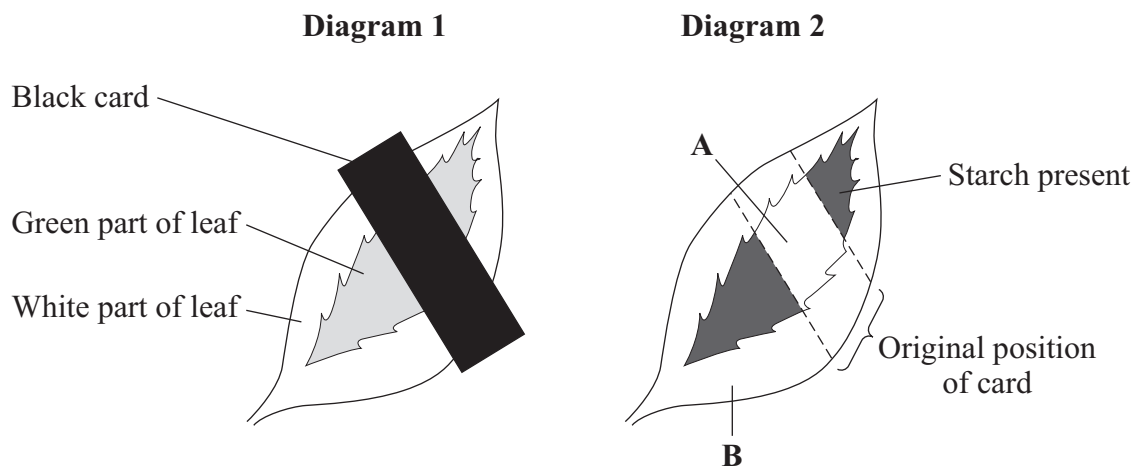
**the soil**      **respiration in the plant**      **osmosis in the plant**      **water**

(1 mark)

A student investigated the conditions that plants need for photosynthesis. The leaves of the plant he used had green and white parts.

**Diagram 1** shows how part of one leaf was covered in black (opaque) card. The plant was placed in a warm, sunny area and was watered well. Eight hours later the leaf was removed from the plant and was tested for starch.

The results of the test are shown in **Diagram 2**, the shaded parts show where starch was present.



7 (b) Name the **two** independent variables in this investigation.

1 .....

.....

2 .....

.....

(2 marks)

7 (c) Why was no starch found in:

7 (c) (i) the part of the leaf labelled **A**

.....

.....

(1 mark)

7 (c) (ii) the part of the leaf labelled **B**?

.....

.....

(1 mark)

7

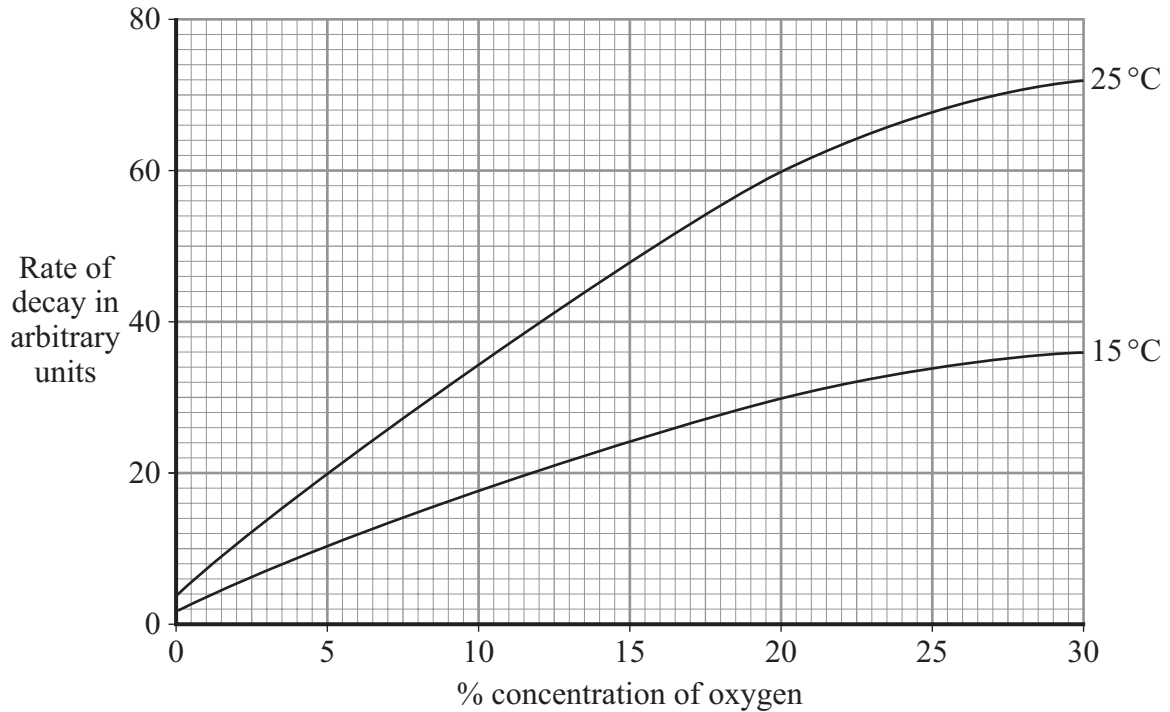
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8 Gardeners often put waste materials onto compost heaps.

The graph shows how the conditions in a compost heap affect how quickly waste materials in the heap decay.



8 (a) (i) Describe the effect of increasing the temperature from 15 °C to 25 °C on the rate of decay at 20% oxygen concentration.

.....

.....

.....

.....

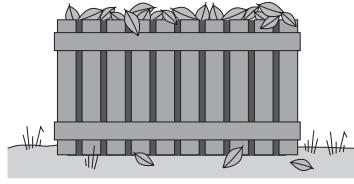
.....

(2 marks)





- 8 (a) (ii) Gardeners are advised to put waste materials into special compost bins. These bins have holes in their sides.



Holes in the sides of the compost bin help the waste materials to decay faster.

Explain why.

.....  
.....  
.....  
.....  
.....

(2 marks)

- 8 (b) A gardener noticed that some of his plants were growing poorly.

He put some decayed compost onto the soil, around the plants.  
Six months later the plants were growing well.

Explain why.

.....  
.....

(1 mark)

<b>5</b>

**END OF QUESTIONS**



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