

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	



General Certificate of Secondary Education  
Foundation Tier  
June 2011

## Additional Science

Unit Biology B2

**BLY2F**

## Biology

Unit Biology B2

**F**

### Written Paper

Thursday 19 May 2011 1.30 pm to 2.15 pm

**For this paper you must have:**

- a ruler.
- You may use a calculator.

**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. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- 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.

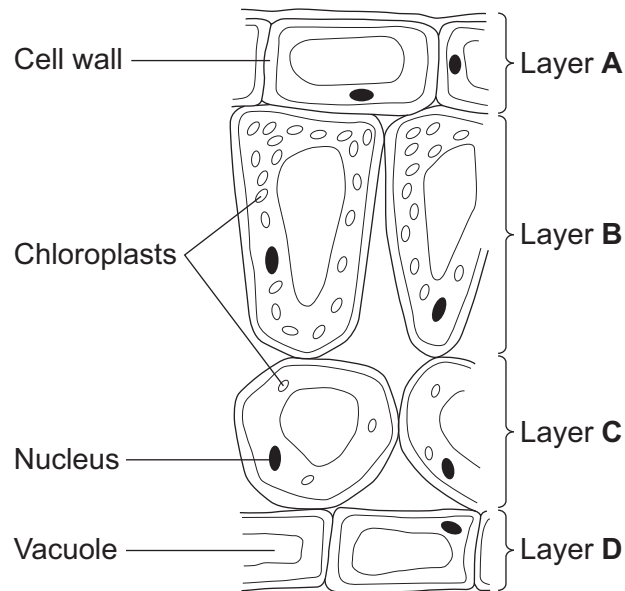


J U N 1 1 B L Y 2 F 0 1

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

**1** Leaves are made from layers of cells.

The diagram shows a section through part of a leaf.



**1 (a) (i)** Which word in the table describes layer **A**?

Tick (✓) **one** box.

Layer A	Tick (✓)
Tissue	
Organ	
Cell	

(1 mark)

**1 (a) (ii)** Which word describes a whole leaf?

Draw a ring around **one** answer.

**organ**

**tissue**

**organism**

(1 mark)



1 (b) (i) Which **two** layers of cells, **A**, **B**, **C** and **D**, can photosynthesise?

Use information from the diagram to help you.

Tick (✓) **two** boxes.

Layer **A**

Layer **B**

Layer **C**

Layer **D**

(2 marks)

1 (b) (ii) Give **one** reason for your answer.

.....  
.....

(1 mark)

1 (c) List **X** gives the names of two parts of a cell.  
List **Y** gives information about parts of a cell.

Draw **one** line between each part of the cell in list **X** and information about it in list **Y**.

**List X**  
**Part of a cell**

Vacuole

Nucleus

**List Y**  
**Information**

Controls the passage of substances into the cell

Contains the cell sap

Controls the activities of the whole cell

(2 marks)

7

Turn over ►



2 A gardener grows tomato plants.

The tomato plants develop yellow leaves.

2 (a) What would be the best way of improving the growth of these plants?

Tick (✓) **one** box.

Add mineral ions to the soil

Water the plants more

Add glucose to the soil

(1 mark)



2 (b) Most tomatoes are grown in greenhouses.



Tomato growers alter the conditions in greenhouses to make tomato plants grow faster.

Which changes in conditions will make tomato plants grow faster?

Tick (✓) **two** boxes.

Increasing the temperature

Increasing the oxygen concentration in the air

Increasing the nitrogen concentration in the air

Turning lights on at night

(2 marks)

3

Turn over for the next question

Turn over ►



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ANSWER IN THE SPACES PROVIDED**



**3** Our bodies control the concentration of glucose in the blood.

Draw a ring around the correct answer to complete each sentence.

**3 (a)** The concentration of glucose in the blood is controlled by a

hormone called

carbohydrase.  
insulin.  
protease.

(1 mark)

**3 (b)** This hormone is produced by the

intestine.  
stomach.  
pancreas.

(1 mark)

**3 (c)** If the body does not produce enough of this hormone,

the person develops

diabetes.  
cystic fibrosis.  
Huntington's disease.

(1 mark)

3

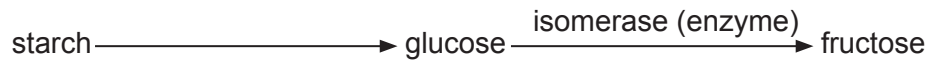
**Turn over for the next question**

**Turn over ►**



**4 (a)** Starch can be used to produce fructose for slimming foods.

The flow chart shows the process.



**4 (a) (i)** Isomerase is used to change glucose into fructose.

Which enzyme could be used to change the starch into glucose?

Draw a ring round **one** answer.

**carbohydrase**

**isomerase**

**protease**

(1 mark)

**4 (a) (ii)** What is the advantage of using fructose, instead of glucose, in slimming foods?

Tick (✓) **one** box.

Fructose is not as sweet as glucose so can be used in smaller amounts.

Fructose is sweeter than glucose so can be used in larger amounts.

Fructose is sweeter than glucose so can be used in smaller amounts.

(1 mark)





4 (b) Enzymes are used in industry.

These are some of the properties of industrial enzymes:

- enzymes work at low temperatures
- workers have to use face masks when working with enzymes
- enzymes work in a narrow range of pH values
- enzymes can be re-used many times
- enzymes are easily broken down by high temperature
- enzymes are very expensive to buy.

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

4 (b) (i) Give **two** advantages of using enzymes in industry.

1 .....

.....

2 .....

.....

(2 marks)

4 (b) (ii) Give **two** disadvantages of using enzymes in industry.

1 .....

.....

2 .....

.....

(2 marks)

6
---

Turn over for the next question

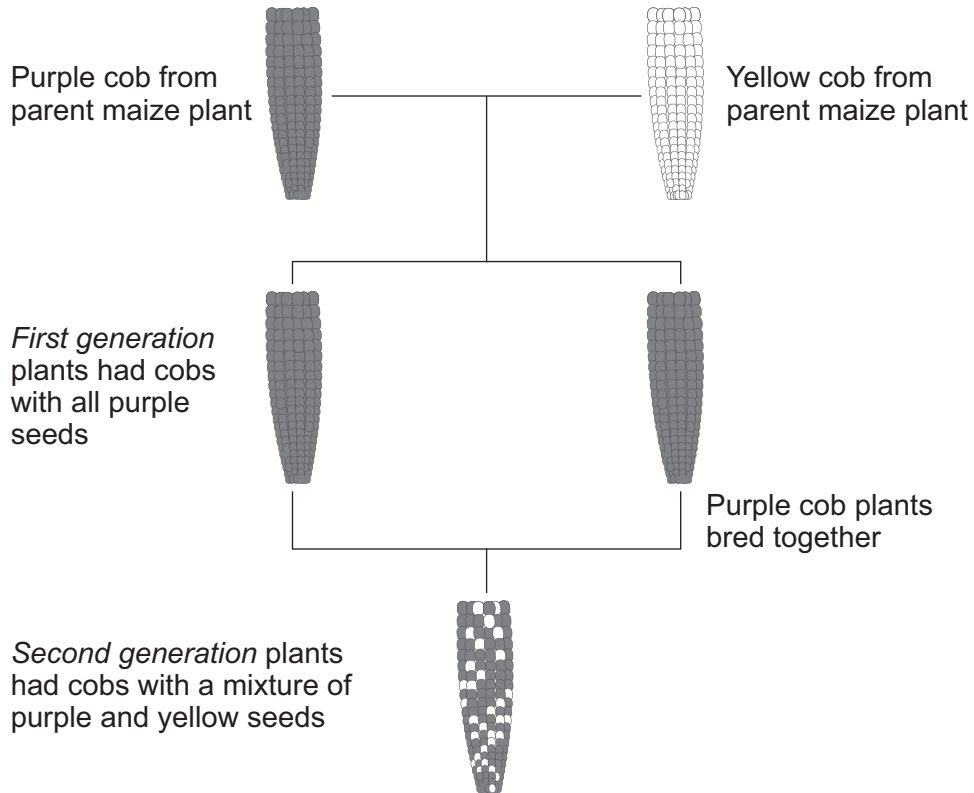
Turn over ►



**5** Maize plants reproduce sexually to form maize cobs.  
Each maize cob has many seeds.

The colour of the seeds is controlled by a gene.  
The gene has two alleles, purple and yellow.

The diagram shows the cobs produced by breeding maize plants.



**5 (a)** Use words from the box to complete the sentences.

**dominant                      environmental                      recessive**

**5 (a) (i)** The first generation plants show that the purple allele is

.....

(1 mark)

**5 (a) (ii)** The second generation plants show that the yellow allele is

.....

(1 mark)



**5 (b)** The allele for purple can be represented by the letter **A**.  
The allele for yellow can be represented by the letter **a**.

**5 (b) (i)** What alleles does a yellow seed have?

Draw a ring around **one** answer.

**AA**

**Aa**

**aa**

(1 mark)

**5 (b) (ii)** What alleles does a purple seed from a *first generation* plant have?

Draw a ring around **one** answer.

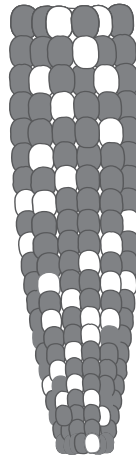
**AA**

**Aa**

**aa**

(1 mark)

**5 (c)** The drawing shows a cob from one of the *second generation* plants.



A student counted 334 purple seeds and 110 yellow seeds on this maize cob.

What is the approximate ratio of purple seeds to yellow seeds on the cob?

Tick (✓) **one** box.

3 purple : 1 yellow

1 purple : 3 yellow

1 purple : 1 yellow

(1 mark)

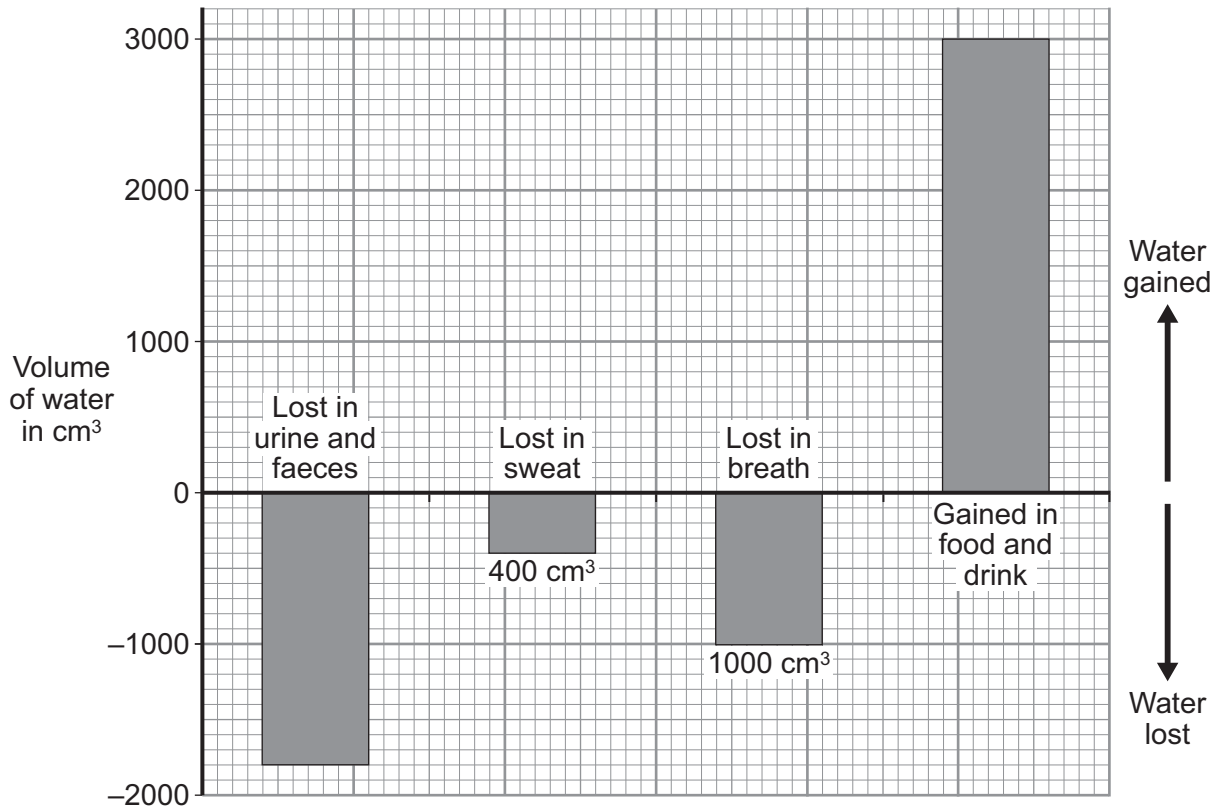
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**6** The bar chart shows different ways in which water is lost from and gained by the body on one day.

The volumes of water lost in the sweat and in the breath are labelled on the bars.



**6 (a)** How much water was lost in the urine and faeces? ..... cm<sup>3</sup>  
(1 mark)

**6 (b)** Water is lost from the body in urine, faeces, sweat and breath.  
What was the total volume of water lost from the body on this day?  
Show clearly how you work out your answer.

.....  
.....

Answer = ..... cm<sup>3</sup>  
(2 marks)



**6 (c)** The volume of water lost should balance the volume of water gained.

What should the person do to balance the water gained with the water lost?

.....

.....

.....

.....

(2 marks)

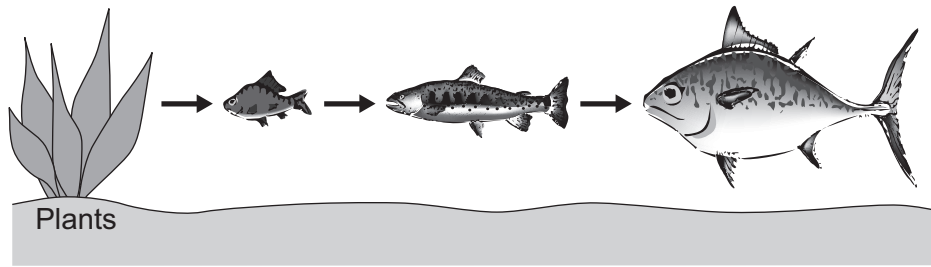
5

**Turn over for the next question**

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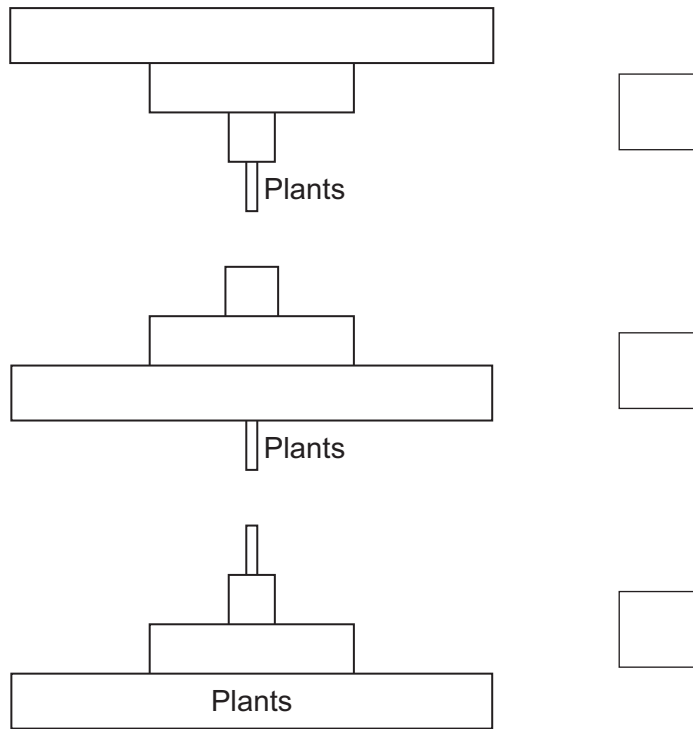


7 The picture shows a food chain.



7 (a) Which diagram shows a pyramid of biomass for the food chain in the picture?

Tick (✓) **one** box.



(1 mark)

7 (b) The plants at the start of the food chain absorb energy.

Where does this energy come from?

Draw a ring around **one** answer.

the water

the sun

minerals

(1 mark)



**7 (c)** Some energy is lost at each stage of the food chain.

Give **two** ways in which energy may be lost from the food chain.

1 .....

.....

2 .....

.....

(2 marks)

4

**Turn over for the next question**

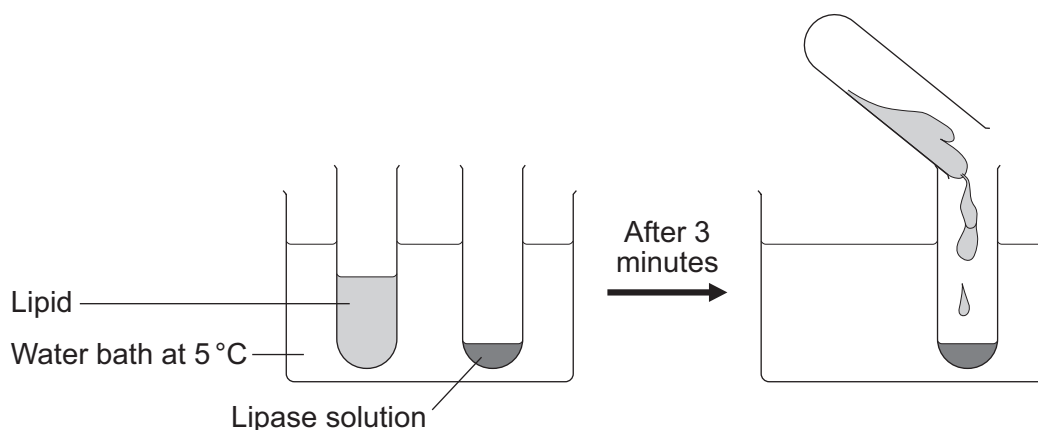
**Turn over ►**



8 A group of students investigated the effect of temperature on the action of the enzyme lipase.

The students:

- put 1 cm<sup>3</sup> of lipase solution into a test tube
- put 5 cm<sup>3</sup> of lipid into a different test tube
- put both tubes in a water bath at 5°C for 3 minutes
- mixed the lipid with the lipase solution.



Every five minutes the students tested a sample of the mixture for lipid, until no lipid remained.

The students repeated the experiment at different temperatures.

8 (a) To make their investigation fair the students needed to control some variables.

Give **one** variable the students controlled in their investigation.

.....  
(1 mark)

8 (b) The tubes of lipase solution and lipid were kept separately in the water bath for 3 minutes before mixing. Why?

Tick (✓) **one** box.

So that the lipase broke down the lipid quickly

So that the lipase and the lipid reached the right temperature

To give enough time for the lipase to break down the lipid

To give enough time for the water bath to heat up

(1 mark)





The table shows the students' results.

Temperature in °C	Time taken until no lipid remained in minutes
5	40
20	15
35	5
50	30
95	lipid still there after 120 minutes

**8 (c)** Describe the effect on the breakdown of the lipid of increasing the temperature from 5°C to 50°C.

.....

.....

.....

.....

(2 marks)

**8 (d)** Suggest **two** ways in which the students could have improved their investigation.

Use information from the students' method and the results table to help you.

1 .....

.....

.....

2 .....

.....

.....

(2 marks)

**Question 8 continues on the next page**

**Turn over ►**



**8 (e) (i)** The lipase did **not** break down the lipid at 95°C.

Why?

.....  
.....

(1 mark)

**8 (e) (ii)** At 35°C the lipase broke down the lipid after 5 minutes.

What new substances will be in the tube?

Draw a ring around **one** answer.

**amino acids**

**fatty acids and glycerol**

**sugars**

(1 mark)

<b>8</b>



9 Cells contain a solution of salts and sugars.

A student is investigating how cells change when they are put into water.

9 (a) The student:

- looks at a plant cell using a microscope
- adds water to the cell.

The plant cell swells up.

Explain why, as fully as you can.

.....

.....

.....

.....

.....

.....

(3 marks)

9 (b) When **animal** cells are put in water, they swell up, and then burst. When **plant** cells are put in water, they swell up, but do **not** burst.

How does the structure of plant cells prevent them from bursting?

.....

.....

(1 mark)

4

END OF QUESTIONS



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