Surname	Centre Number	Candidate Number
Other Names		0

WJEC CBAC

GCSE

4471/01

ADDITIONAL SCIENCE/BIOLOGY

BIOLOGY 2
FOUNDATION TIER

A.M. TUESDAY, 14 May 2013

1 hour

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**8**	
3.	**11**	
4.	**7**	
5.	**5**	
6.	**4**	
7.	**6**	
8.	**8**	
9.	**6**	
Total	**60**	

4471 010001

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication used in your answer to question **9**.

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Answer **all** *questions.*

1. Read the information about the palm trees.

Xaté Palm Tree

Preparing Xaté leaves for sale

Bouquet

- Xaté Palm trees grow in rain forests in Belize, Central America. Many trees are dying.
- Every year millions of palm leaves are cut and sold to florists, in Europe, for making bouquets.
- Palm trees grow slowly, producing only two leaves each year. If too many leaves are cut the tree cannot survive.
- The International Union for the Conservation of Nature (IUCN) is concerned about this endangered species and the animal species that feed on it.
- Conservationists at Bangor University have set up Project Darwin. Through this project, farmers in Belize will grow palm trees in special areas to provide leaves for the floral industry.

From this information.

(a) (i) Why are Xaté palm leaves sent to Europe? [1]

.....

(ii) Suggest why so many Xaté palm trees are dying. [1]

.....

(b) How will biodiversity in rainforests be affected in the future if palm trees continue to die? Give a reason for your answer. [1]

Answer .....

.....

Reason .....

.....

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(c) Why will it take many years for Project Darwin to be effective? [1]

.....

(d) The IUCN wants to ban the sale of Xaté leaves completely.
Suggest why people in Belize may not want this to happen. [1]

.....

5

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2. *(a)* (i) During digestion in the human body, large food molecules are broken down. Draw lines joining the large food molecules to the smaller molecules into which they are broken down. [2]

Large food molecules	**Smaller molecules**
protein	glucose
starch	fatty acids and glycerol
fats	amino acids

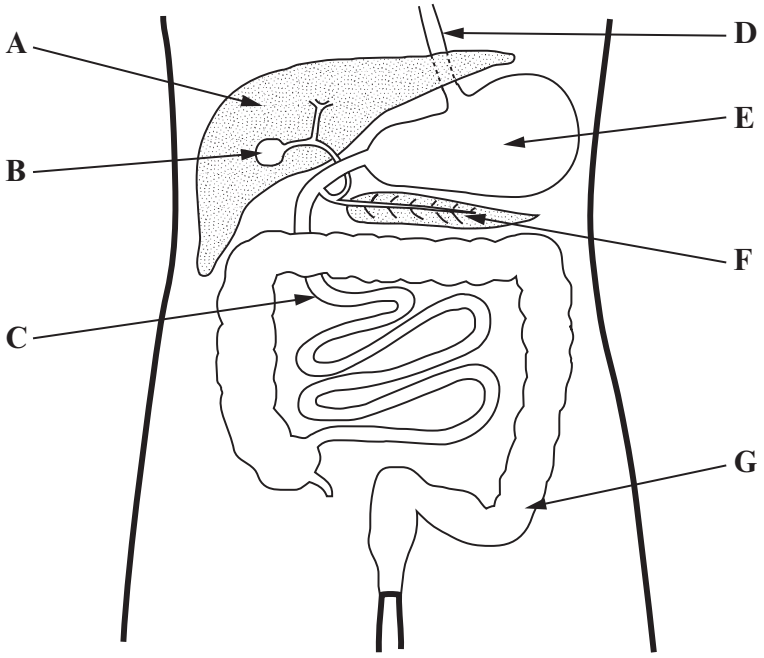
(ii) Why is it necessary for these large food molecules to be broken down? [1]

.....

(iii) State the function of carbohydrate foods in the human body. [1]

.....

(b) The diagram below shows part of the digestive system in the human body.



From the diagram opposite.

(i) Give the letters which show [1]

I. the pancreas, ...

II. the large intestine. .....

(ii) Give the **two** letters which show where protein is digested. [1]

....

(c) Complete the table below to show the test solutions used to identify food substances. [2]

Food Substance	**Test solution**
glucose	.....
.....	biuret

8

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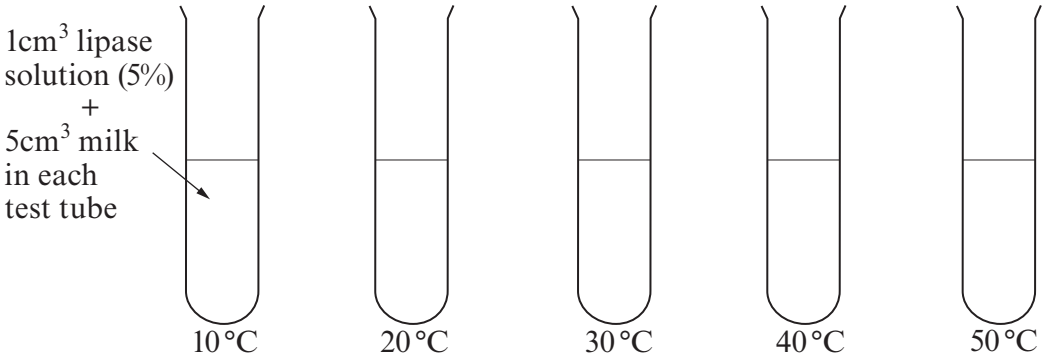
3. Students investigated the activity of the enzyme lipase, in milk at different temperatures.

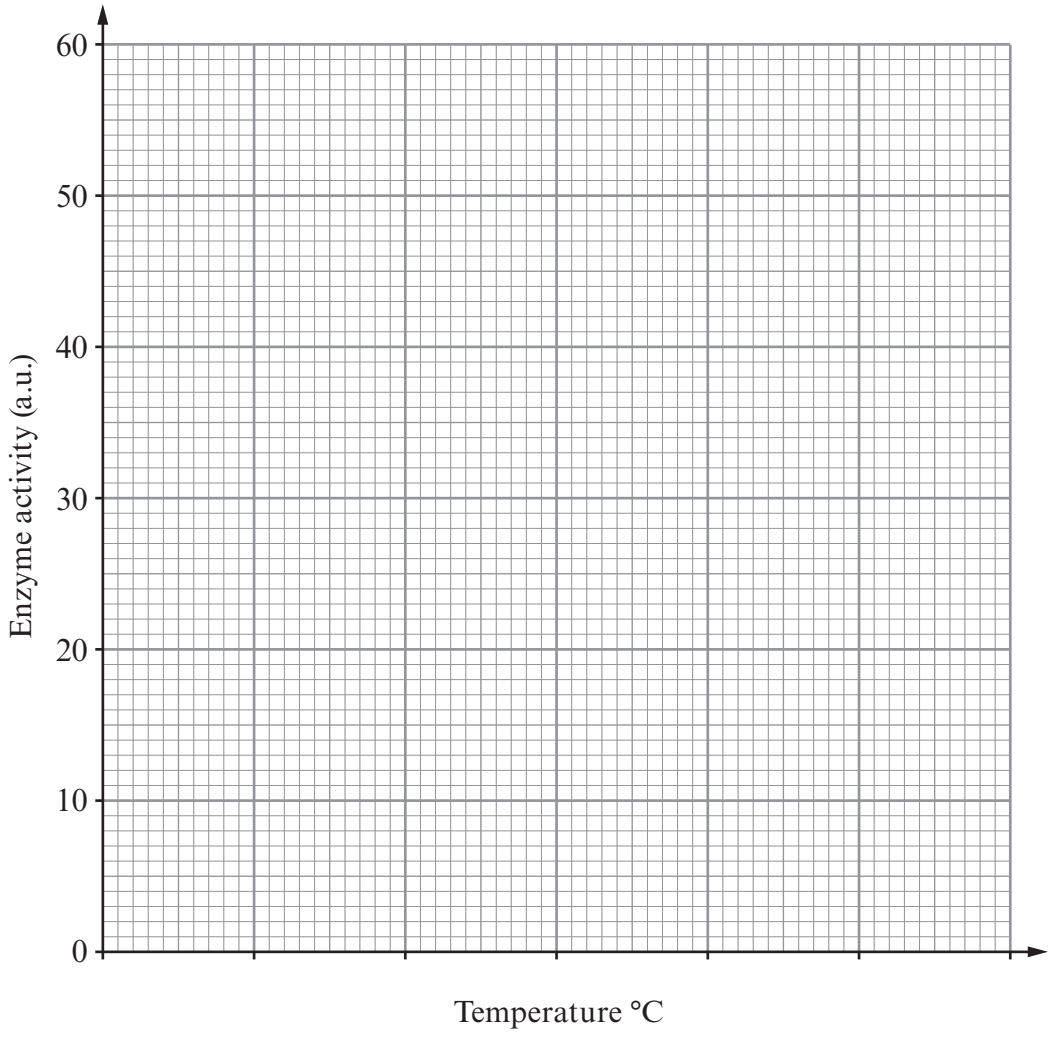
They set up a test tube for each temperature as shown in the diagram below.



Results of investigation

Temperature (°C)	Enzyme activity (a.u.)
10	15
20	32
30	48
40	54
50	36

Graph of results



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(a) Plot the results onto the grid opposite by:

(i) choosing a scale for the temperature axis; [1]

(ii) plotting the results for enzyme activity shown in the table opposite; [2]

(iii) joining your plots with a ruler. [1]

(b) From your graph.

(i) Describe how the activity of the enzyme changes between the temperatures of 25 °C and 45 °C. [1]

.....

.....

(ii) Calculate the change in enzyme activity between 15 °C and 35 °C.
Show your working. [2]

..... a.u.

(c) The students set up a control test tube using boiled lipase.

(i) State the volumes of boiled lipase solution and milk which should be used in this tube. Give a reason for your answer. [2]

boiled lipase solution ..... cm^3

milk ..... cm^3

Reason .....

.....

(ii) Give the reason why there was no enzyme activity in the control tube. [1]

.....

.....

(d) On which substance in milk does lipase act? Underline your answer. [1]

protein sugar fat calcium

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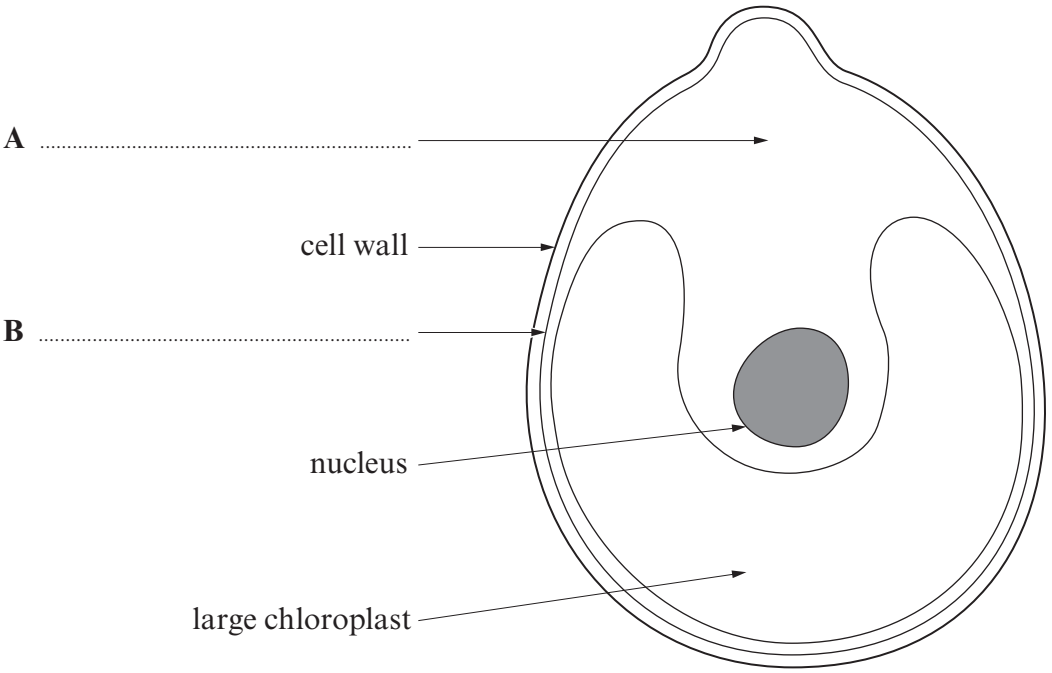
4. The diagram below shows an algal cell.



(a) Complete labels **A** and **B** on the diagram above. [2]

(b) (i) Complete the table. [3]

Part of algal cell	Function
nucleus	.....
.....	photosynthesis
cell wall	.....

(ii) I. Name **one** part of the algal cell, shown in the diagram above which is **not** present in an animal cell. [1]

.....

II. Name **one** part of the algal cell, shown in the diagram above which is **not** present in a bacterial cell. [1]

.....

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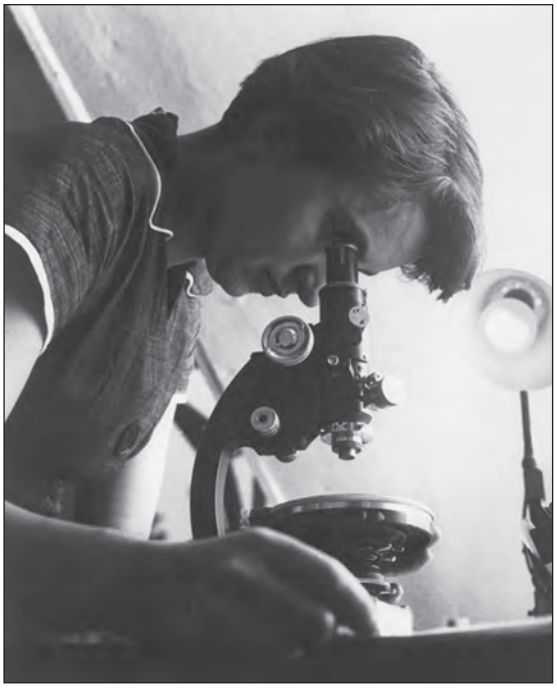
5. *(a)* The photograph below shows a scientist who worked on the structure of DNA in the 1950s.



Rosalind Franklin

How was the structure of DNA discovered?
Choose one of the following statements to answer the question. [1]

A by one scientist using a number of different techniques

B by many scientists using a number of different techniques

C by many scientists using the same technique

D by one scientist using one technique

Letter .....

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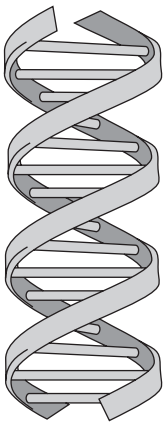
The diagram below shows part of a DNA molecule.



DNA

(b) Complete the sentences about DNA using some of the words below. [3]

phosphate bases amino acids helix sugar

DNA is made up of two long chains of alternating ..... and ..... molecules which are joined by the ..... A, T, C and G. DNA is twisted to form a double ..... .

(c) Why is the order of the molecules A, T, C and G in DNA important in the production of proteins? [1]

.....

.....

5

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6. Barack Obama, the President of the United States of America, supports research into the use of embryonic stem cells. However Newt Gingrich, who was hoping to become President, said in February 2012, that he would ***'ban embryonic stem cell research if he became President'***.

Barack Obama

Newt Gingrich

(a) Suggest why some people support embryonic stem cell research, whereas others do not. [2]

.....

.....

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.....

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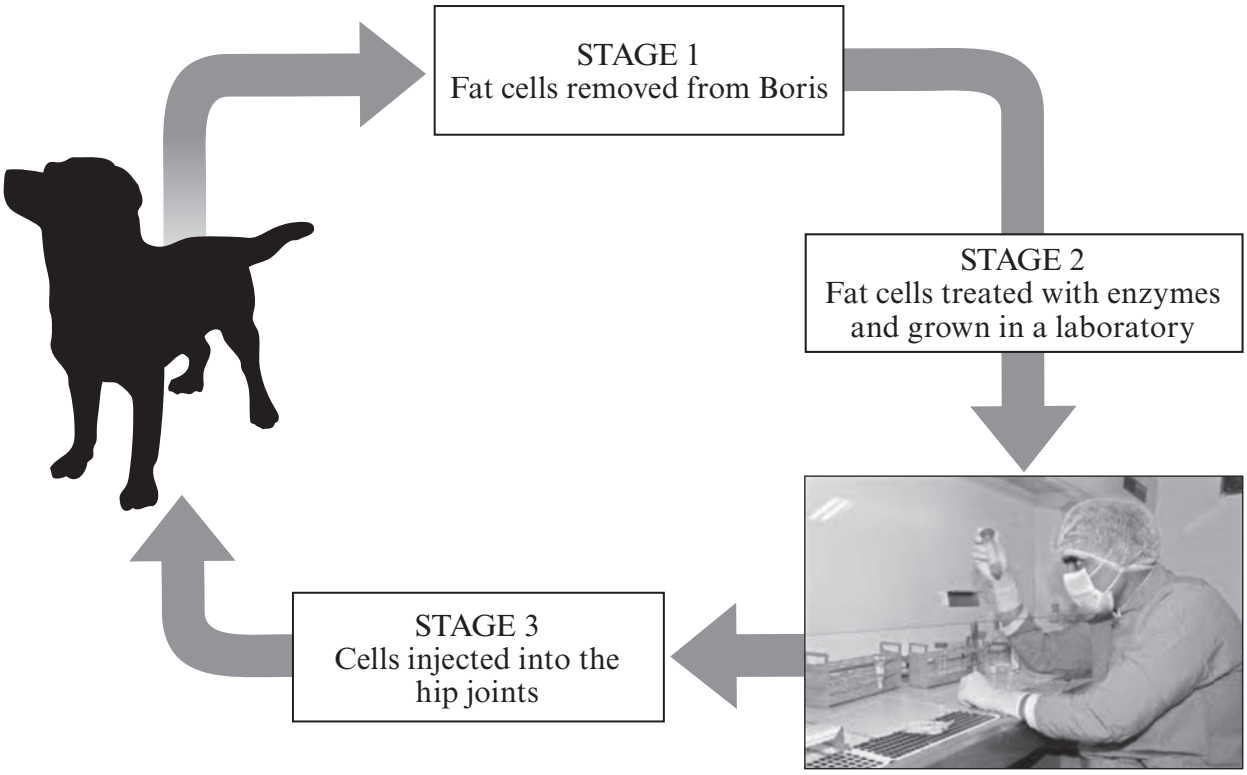
(b) In December 2010, a dog named Boris was treated for severe arthritis of the hip joints in a veterinary clinic in West Michigan, USA. Some of the stages in the treatment are shown below.



Three months after treatment Boris was examined at the veterinary centre. His hips were found to have greatly improved and X-rays of the hip joints showed evidence of repair of the joint tissues.

(i) State what type of cells are injected in STAGE 3 in the diagram above. [1]

.....

(ii) State **one** advantage of this method of treatment over the use of embryonic stem cells. [1]

.....

.....

4

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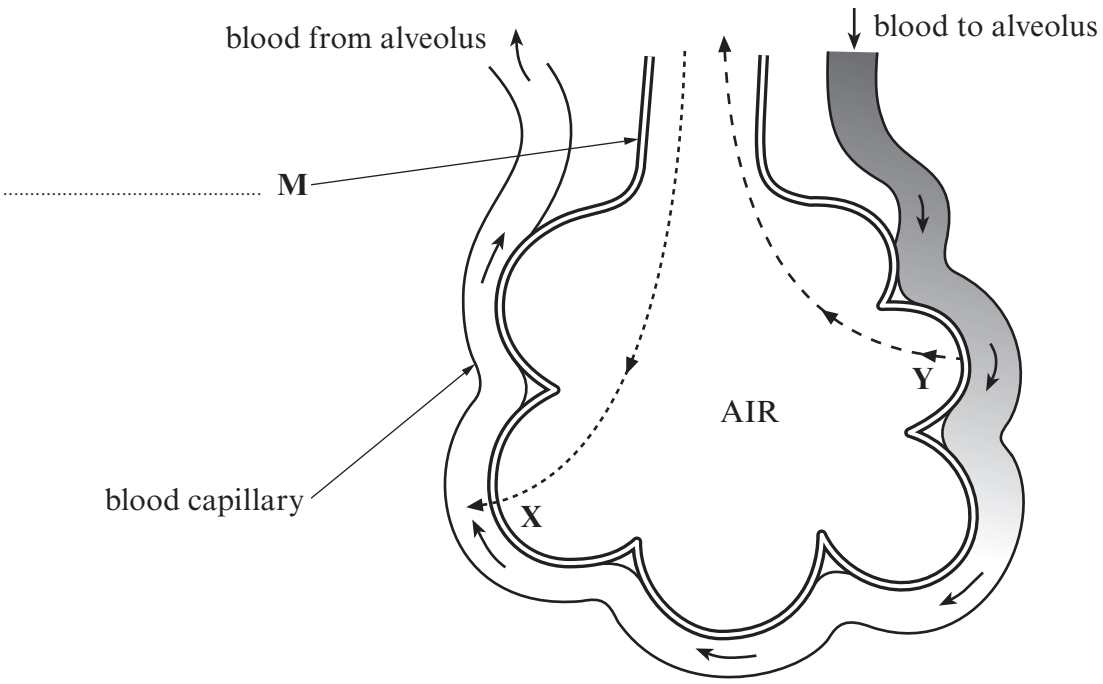
7. The diagram shows an alveolus.



(a) (i) Label structure **M** on the diagram above. [1]

(ii) Name gas **Y** shown on the diagram above. ..... [1]

(b) Explain how gas **X** passes from the alveolus into the blood capillary. [2]

.....

.....

.....

.....

Examiner only

(c) Complete the table below to show the differences between inspired and expired air. [2]

Gas	Inspired air (%)	Expired air (%)
oxygen	21	.....
carbon dioxide	.....	4
nitrogen	79	79
water vapour	varies	1

6

8. A plant was destarched. A leaf on the plant was treated as shown in diagram **M** below. The plant was then placed in bright sunlight for 6 hours. The leaf was removed and tested for starch. The result is shown in diagram **N**.

Diagram **M**

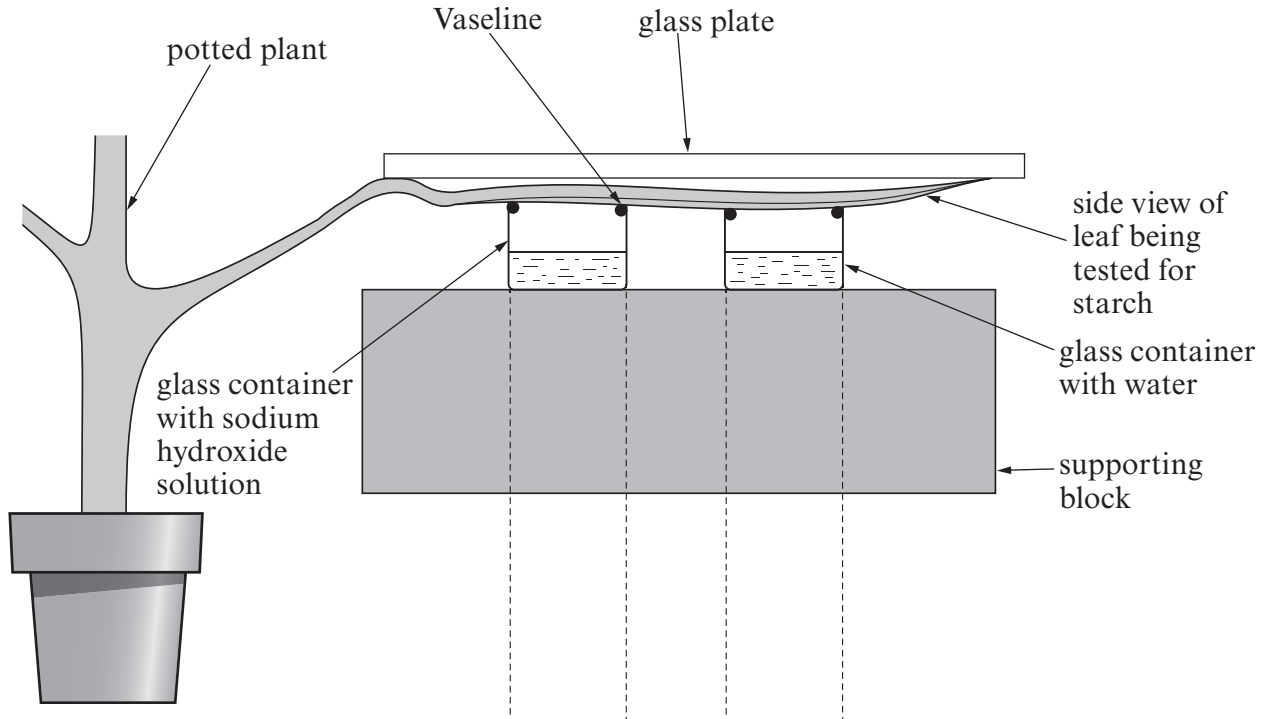
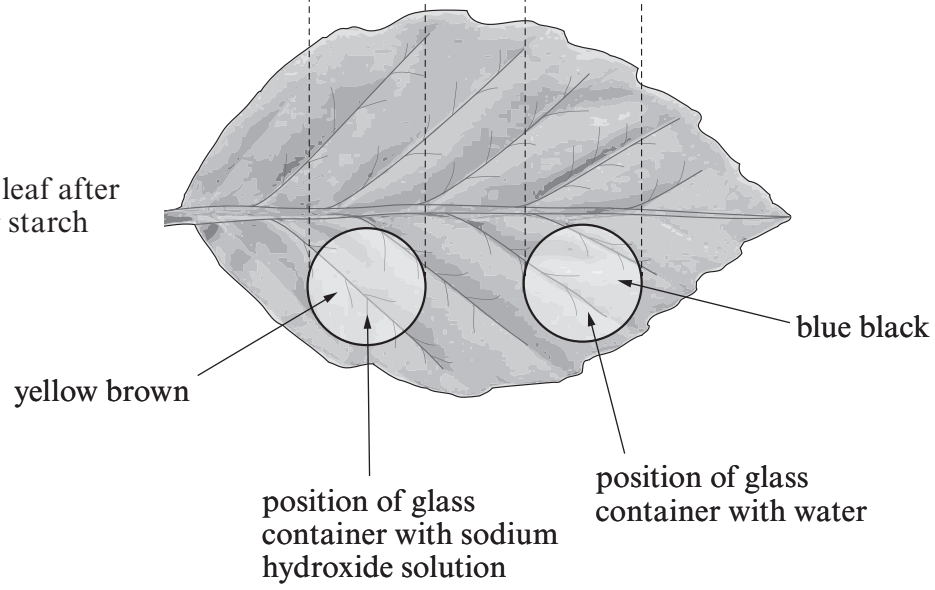


Diagram **N**

surface view of leaf after being tested for starch



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(a) State what the investigation shown opposite demonstrates. [1]

.....

.....

(b) (i) How would you completely remove all the chlorophyll from the leaf before testing for starch? [1]

.....

.....

(ii) Name the chemical used to test for starch. [1]

.....

(iii) Explain why part of the leaf in diagram **N** is yellow-brown in colour. [3]

.....

.....

.....

.....

.....

(c) What was the purpose of the glass container with water? [1]

.....

(d) Why is it only possible to form a valid conclusion for this investigation if the glass plate and containers allow light through? [1]

.....

.....

8

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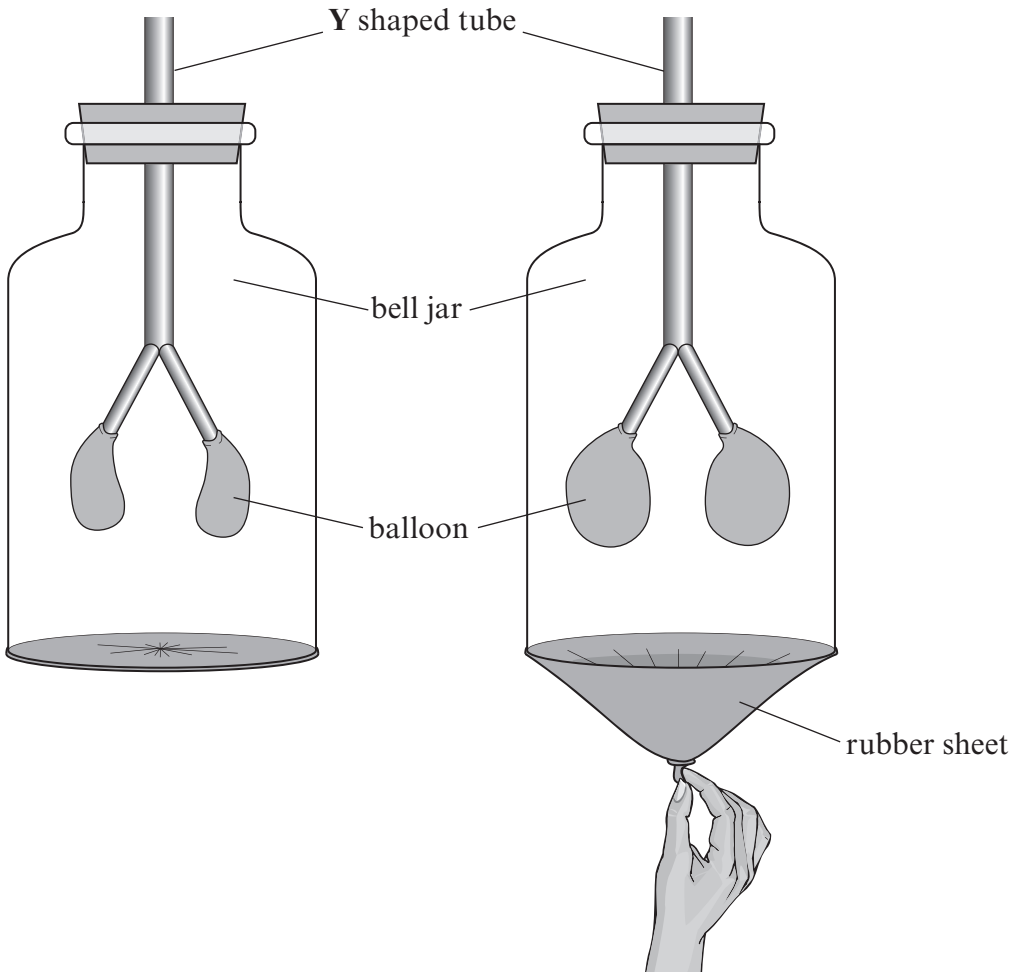
9. Explain how the bell jar model shown below can be used to illustrate **inspiration** (breathing in). In your explanation you must state which organs in the body are represented by the balloons and rubber sheet in the model. [6 QWC]



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END OF PAPER