

Surname	Centre Number	Candidate Number
Other Names		0



**New GCSE**

4471/01

**ADDITIONAL SCIENCE  
FOUNDATION TIER  
BIOLOGY 2**

A.M. TUESDAY, 15 May 2012

1 hour

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	6	
2	3	
3	12	
4	7	
5	8	
6	5	
7	8	
8	7	
9	4	
<b>Total</b>	<b>60</b>	

**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.

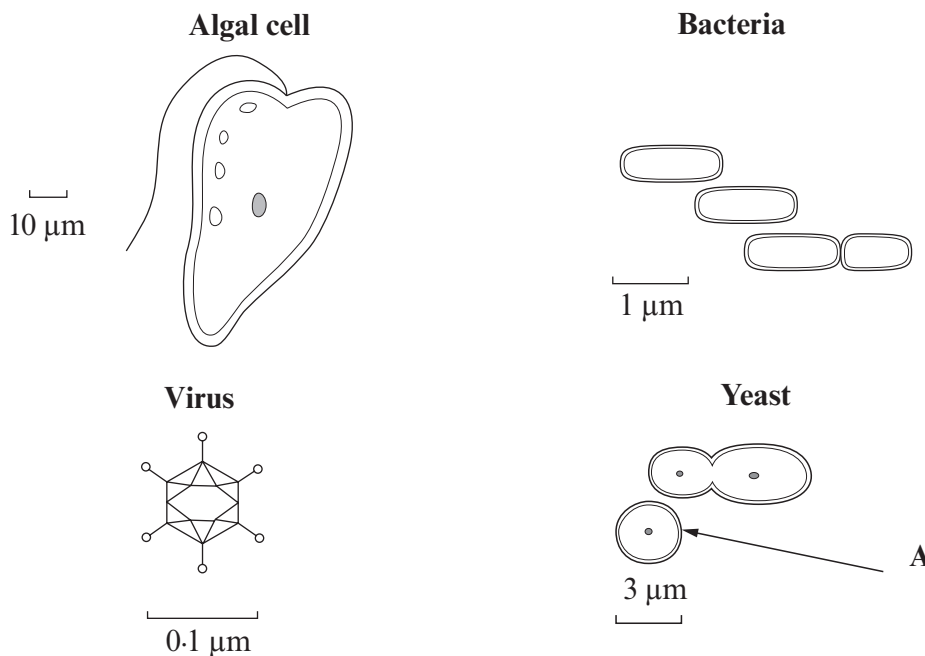
**INFORMATION FOR CANDIDATES**

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 7.

Answer **all** questions.

1. The diagram below shows four types of micro-organisms.



Use the scale bars:

(a) (i) to give the diameter of yeast cell A; [1]

.....

(ii) to identify the largest micro-organism. [1]

.....

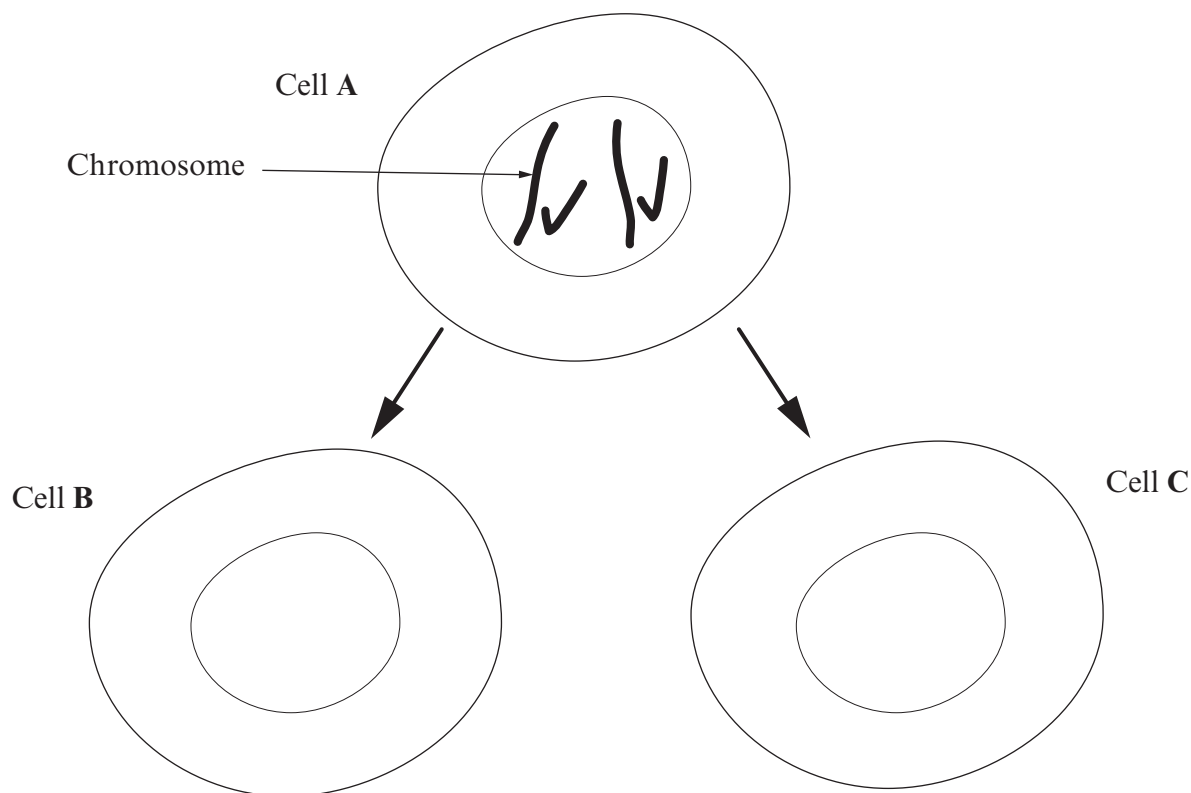
(b) The table gives reproductive features of some of the micro-organisms. Write the name of the correct micro-organism in each space. [3]

Feature	Micro-organism
Reproduces by budding	.....
Reproduces by dividing in two	.....
Reproduces inside a host cell	.....

(c) Complete the following sentence by underlining the correct word. [1]

Viruses have an outer coat made of glucose / fat / protein.

2. Cell division by mitosis leads to growth in plants and animals. The diagram below shows part of the process of mitosis. Cell A divides to make two new cells, B and C.



- (a) Label the nucleus in cell A. [1]
- (b) How many chromosomes does cell A have? [1]  
 .....
- (c) Complete the diagram by drawing in the chromosomes present in cells B and C, produced by mitosis. [1]

3. Sweetcorn is a popular food.



Sweetcorn grows best in countries with warm climates but can be grown in the UK. Many farmers in the UK sow sweetcorn seeds in soil under plastic sheets instead of in the open. The plants then grow through slits in the sheets.



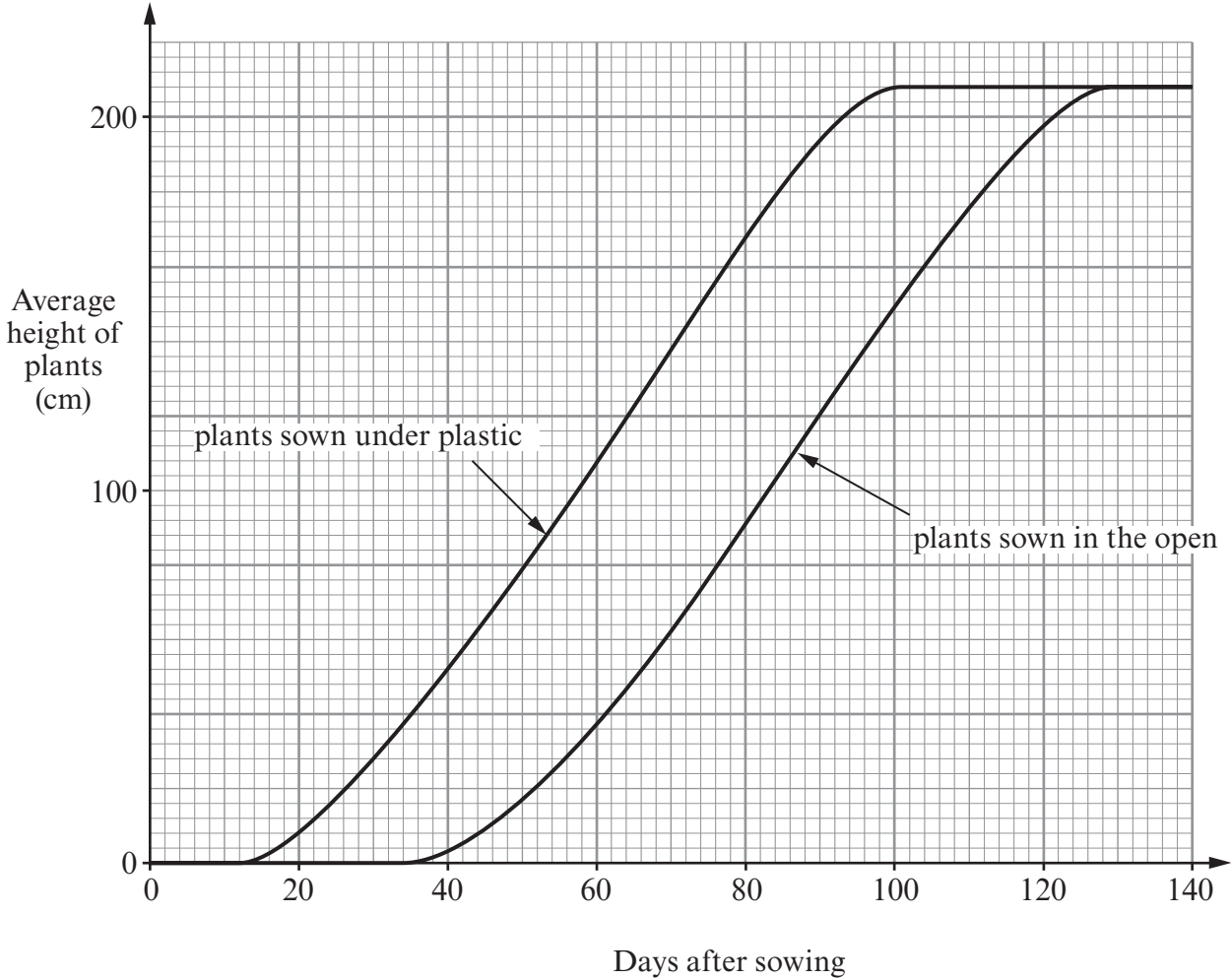
Soil under the sheets gets warmer than soil in the open. As a result the seeds are protected from frost damage. Another advantage is that the enzymes in the seeds work faster so the plants grow earlier in the year.

- (a) (i) Explain why seeds sown under plastic sheets start to grow earlier in the year than seeds sown in the open. [2]

.....

.....

- (ii) Scientists carried out field experiments to compare the growth of sweetcorn plants sown under plastic with plants sown in the open. All the seeds were sown at the same time. The results are shown in the graph.



From the graph:

- I Describe the pattern of growth of the plants **sown under plastic** between days 20 and 140. [1]
- .....
- II State the maximum average height of the plants. [1]
- ..... cm
- III How many days after sowing did the plants **sown under plastic** reach maximum average height? [1]
- ..... days
- IV How much longer did it take the plants **sown in the open** to reach maximum average height? [1]
- ..... days

- (b) Scientists wanted to see if the colour of the plastic sheet affected the sweetcorn. Some of the results are shown in the table.

Sowing condition	Number of sweetcorn harvested per hectare	% sugar content of sweetcorn harvested
in the open	6 400	18.0
clear plastic	7 310	18.0
blue plastic	7 400	20.0
red plastic	7 830	19.0

- (i) Which sowing condition resulted in the largest number of sweetcorn harvested? [1]  
 .....
- (ii) Which sowing condition resulted in the greatest sugar content in the sweetcorn? [1]  
 .....
- (iii) Why did the scientists sow some of the seeds in the open? [1]  
 .....
- (c) Explain why field experiments should be repeated over many years. [2]  
 .....  
 .....
- (d) Suggest **one** reason why some people have environmental concerns about the use of plastic sheets in farming. [1]  
 .....

**BLANK PAGE**

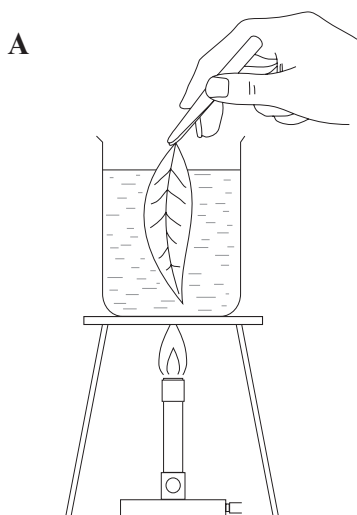
4. (a) Complete the word equation for photosynthesis. [2]

..... + water  $\longrightarrow$  glucose + .....

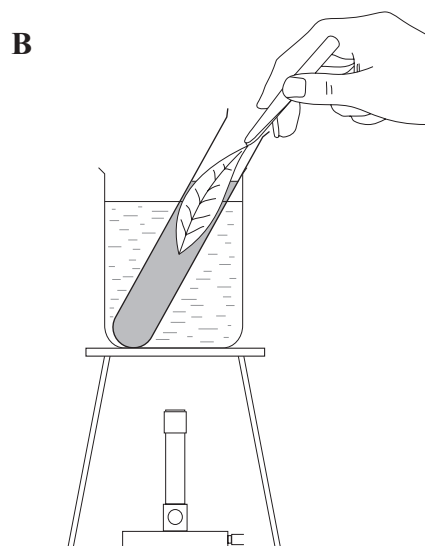
(b) State the function of chlorophyll in photosynthesis. [1]

(c) Some of the glucose produced in photosynthesis may be turned into starch and stored in the leaf.

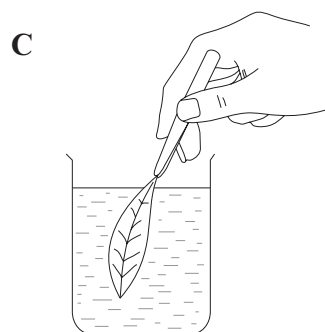
The diagram below shows stages in an experiment to test a leaf for the presence of starch.



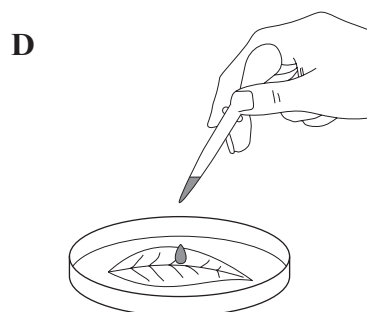
The leaf is dipped in boiling water.



- The Bunsen burner is turned off.
- The leaf is placed in a test tube containing ethanol.
- The test tube is placed in the beaker of hot water.



The leaf is dipped in hot water.



The leaf is blotted dry and covered with dilute iodine solution.



What is the purpose of:

(i) Stage **A**; [1]

.....

(ii) The ethanol used in stage **B**; [1]

.....

(iii) Stage **C**? [1]

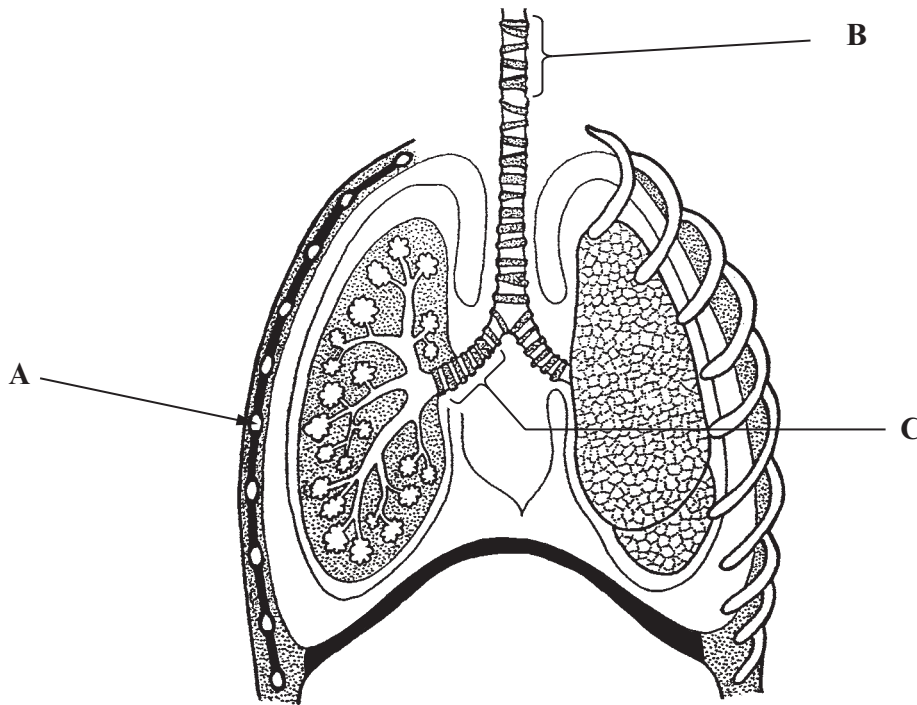
.....

(iv) What colour will the leaf turn in stage **D** if the leaf contains starch?

Place a **tick (✓)** in the correct box below. [1]

Colour of leaf	Tick (✓) correct box
dark blue-black	
dark brown	
pale yellow	

5. (a) The diagram below shows the human respiratory system.



(i) Complete the table below to name structures **A**, **B** and **C**.

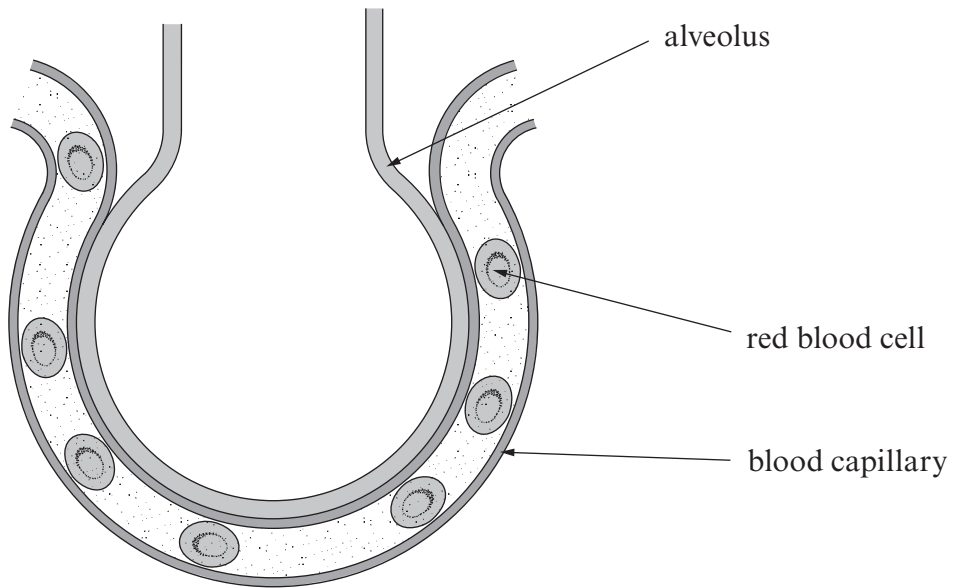
[3]

Structure	Name
<b>A</b>	.....
<b>B</b>	.....
<b>C</b>	.....

(ii) **On the diagram above**, name and label a structure that contracts when we inhale (breathe in).

[2]

(b) The diagram below shows an alveolus in section together with its blood supply.



(i) Gas exchange takes place between an alveolus and the blood.

State the process by which gas exchange takes place.

[1]

.....

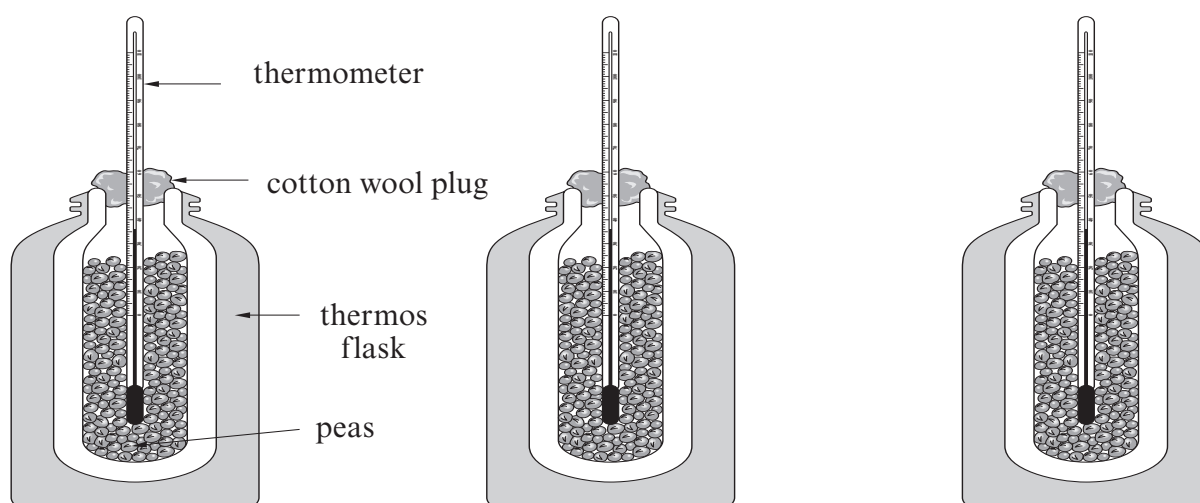
(ii) Describe **two** adaptations of an alveolus that help gas exchange.

[2]

**I** .....

**II** .....

6. Siân set up the following investigation in a school laboratory. Before the start of the investigation all the peas were soaked in a very weak disinfectant.



**Flask A**  
Living peas

**Flask B**  
Boiled peas

**Flask C**  
Boiled peas and strong  
disinfectant

Siân recorded the temperature in each flask at the start of the experiment (day 0) and at the same time of day for the next 6 days. She also recorded the room temperature. The results are shown below.

Day	Temperature °C			
	Room	Flask A Living peas	Flask B Boiled peas	Flask C Boiled peas and strong disinfectant
0	14	14	14	14
1	15	16	15	14
2	14	18	14	14
3	16	22	16	14
4	15	24	16	14
5	17	26	19	14
6	16	28	24	14

(a) What process in the living peas caused the temperature to rise? [1]

.....

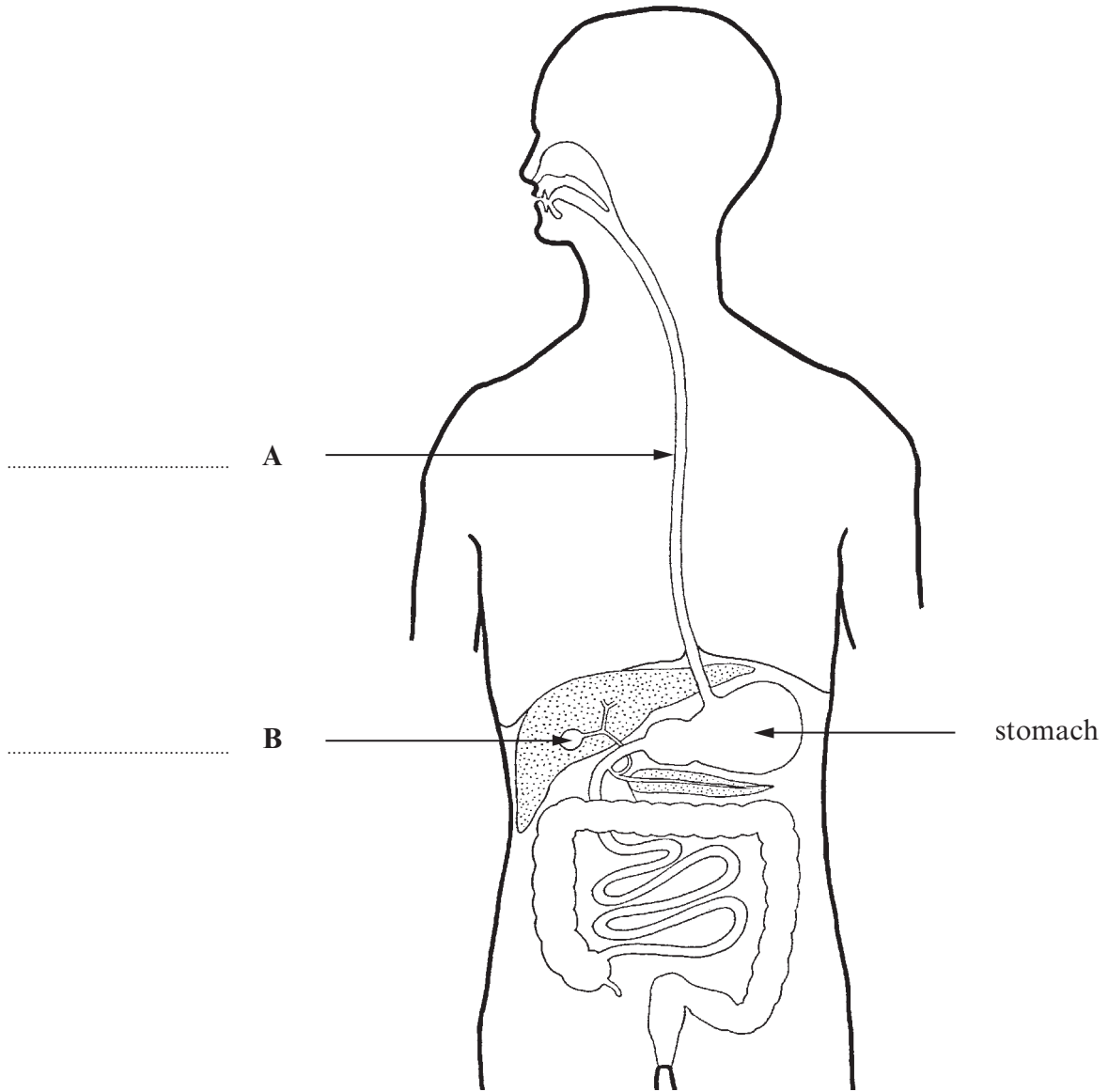
(b) (i) Why were all the seeds soaked in weak disinfectant before the start of the experiment? [1]

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

(ii) Explain fully the rise in temperature recorded in flask **B**. [3]

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

7. The diagram below shows the human digestive system.



(a) Label **A** and **B** on the diagram opposite. [2]

(b) Describe fully the processes involved in the chemical breakdown of food containing **fat** from the time it leaves the stomach. [6 QWC]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

8. The following information appeared in a newspaper in Wales in 2010.



- Some parents who smoke in the car with the window open when travelling with their children think the smoke will have no effect on their children’s health.
- The British Lung Foundation states that smoking just one cigarette, even with the car window open, creates a greater concentration of second-hand smoke than a whole evening’s smoking in a pub or a bar.
- Levels of second-hand smoke in cars can be as much as 27 times greater than in a smoker’s home.
- Young children breathe faster than adults, their lungs are smaller and are still growing.

(a) (i) Using the information above, explain why the lungs of young children in particular are in danger from breathing in second-hand smoke. [3]

.....

.....

.....

.....

.....

.....



- (ii) The Welsh Government is considering introducing strict new laws where parents who smoke while driving with their children face prosecution. Using the information given previously suggest **two other** important pieces of evidence that the Welsh Government may consider in coming to a decision about introducing these new laws. [2]

.....

.....

.....

.....

- (b) State **two** effects that cigarette smoke has on the cleaning mechanism of the lungs. [2]

- (i) .....
- (ii) .....

9. The red spider mite is a pest on fruit trees. It increases in numbers quickly causing damage to the fruit crop.

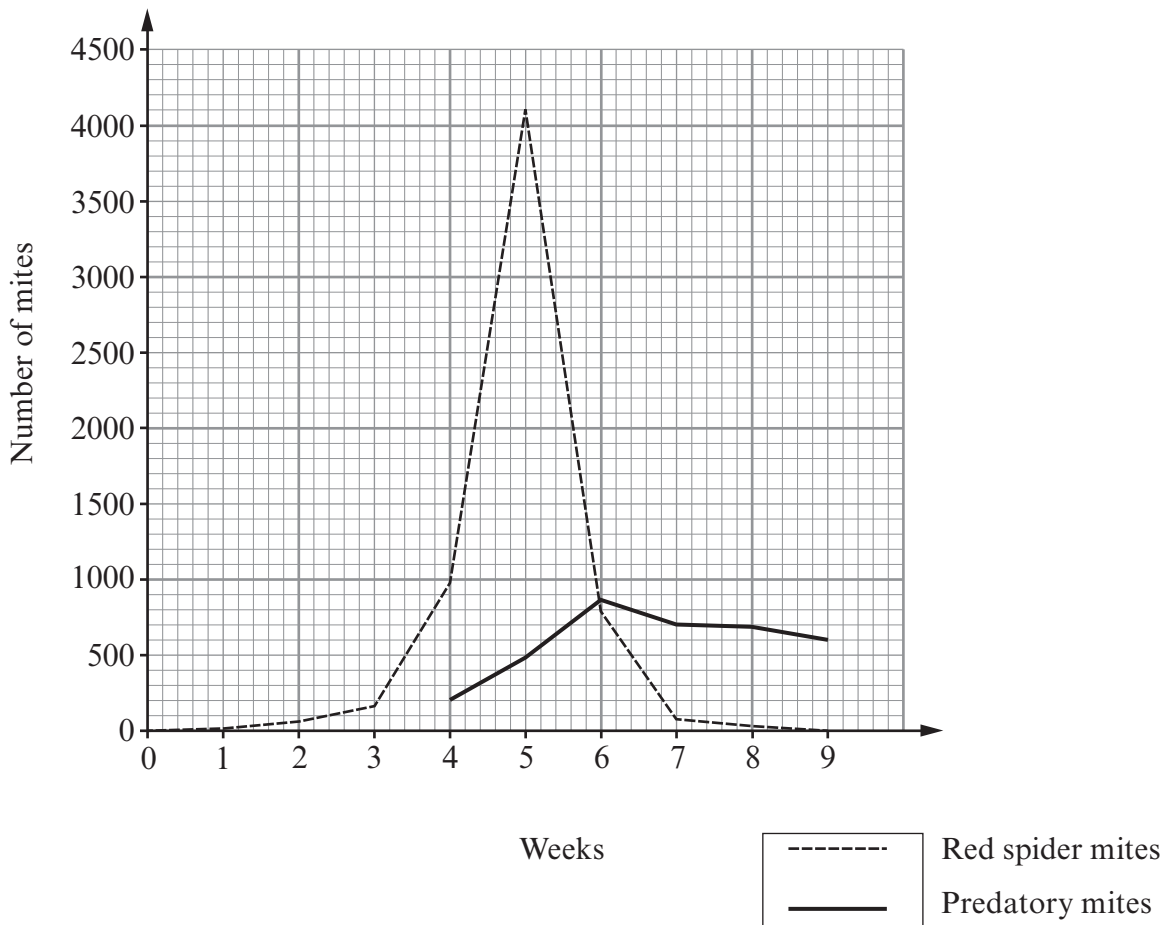
Red spider mite



Predatory mite



When the number of red spider mites was about 1000 per fruit tree, the farmer introduced predatory mites which eat the red spider mites. This happened on week 4 as shown in the graph below.



(a) Use data from the graph to describe the effect that the introduction of the predatory mites has on the number of red spider mites. [2]

.....

.....

.....

.....

(b) What name is given to this type of pest control? [1]

.....

(c) At the end of 9 weeks there are still predatory mites present on the fruit trees. Explain how this could result in a problem. [1]

.....

.....

**THERE ARE NO MORE QUESTIONS IN THIS EXAMINATION.**