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| Surname | Centre Number | Candidate Number |
| Other Names | | 0 |



GCSE

4483/01

BIOLOGY

**BIOLOGY 3
FOUNDATION TIER**

A.M. TUESDAY, 13 May 2014

1 hour

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

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.

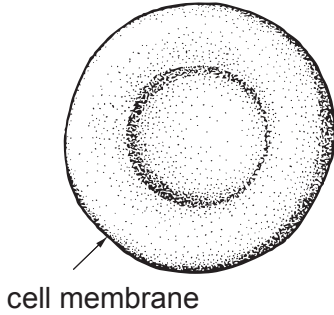
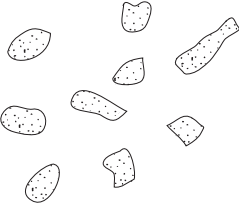
INFORMATION FOR CANDIDATES

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 **8(b)**.

Answer **all** questions.

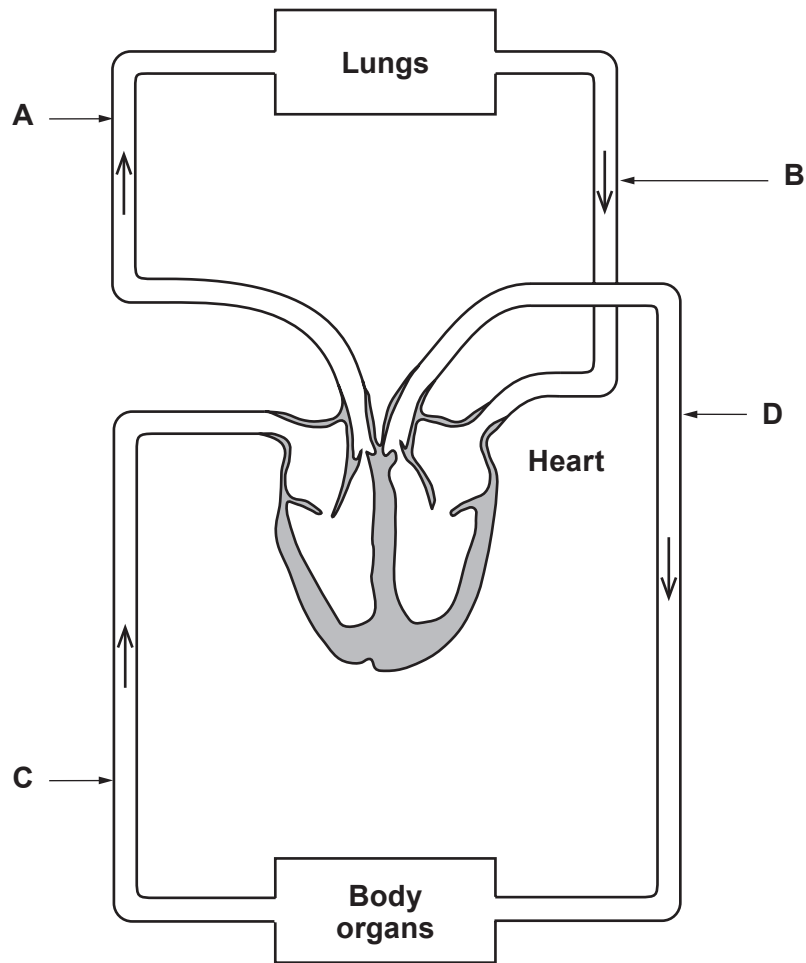
1. (a) The table below has information on some of the parts of blood.

| part of blood | structure | function |
|------------------|---|-------------------------|
| red blood cell |  | |
| white blood cell | | defence against disease |
| platelets |  | |

Complete the table above by

- (i) drawing a diagram of a white blood cell and labelling the cell membrane and nucleus; [2]
- (ii) giving the functions of a red blood cell and platelets. [2]
- (b) The liquid part of the blood is called plasma. State **two** substances which are transported in blood plasma. [2]
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(c) The diagram below shows the human circulatory system.



- (i) From the diagram above, state the letter which shows [2]
- I. the pulmonary artery
 - II. the aorta
- (ii) Name the doctor, working in the 17th century, who discovered how blood circulated around the human body. [1]
Underline your answer.

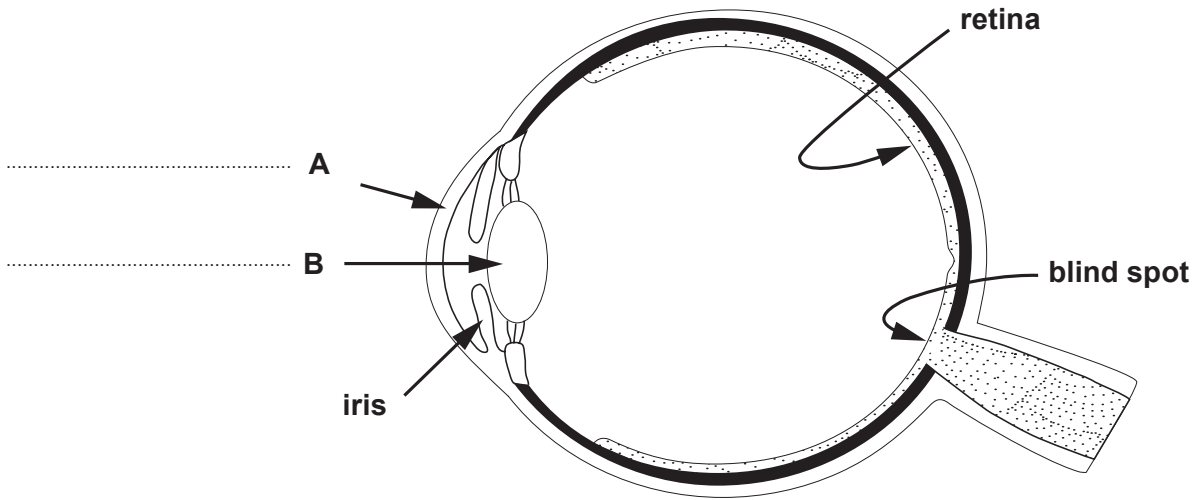
Harvey

Fleming

Mendel



2. The diagram below shows a section through the human eye, with some parts labelled.



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

(ii) The retina is the light sensitive layer of the eye where images are formed. Explain why no image is detected at the blind spot. [2]

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(b) Name the parts of the eye described below. [2]

Description

Part of the eye

tough, protective coating

.....

layer containing blood vessels

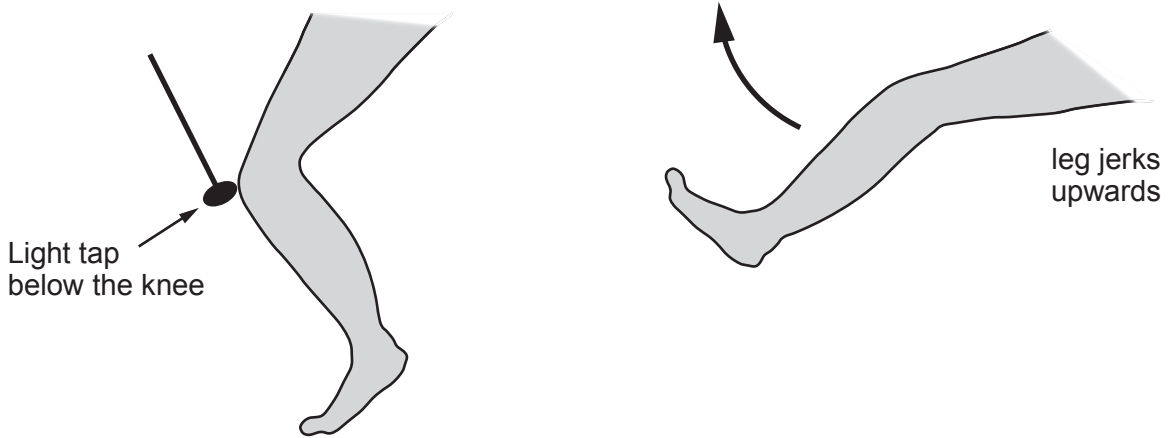
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3. (a) Complete the sentence about the human nervous system.

[2]

The central nervous system consists of the and

(b) The diagram below shows the knee jerk response, which is a reflex action.



(i) Apart from being very fast, state **one other** feature of **all** reflex actions.

[1]

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(ii) Give **one other** reflex action which occurs in the human body and state its purpose.

[2]

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4. (a) Complete the sentence. [1]

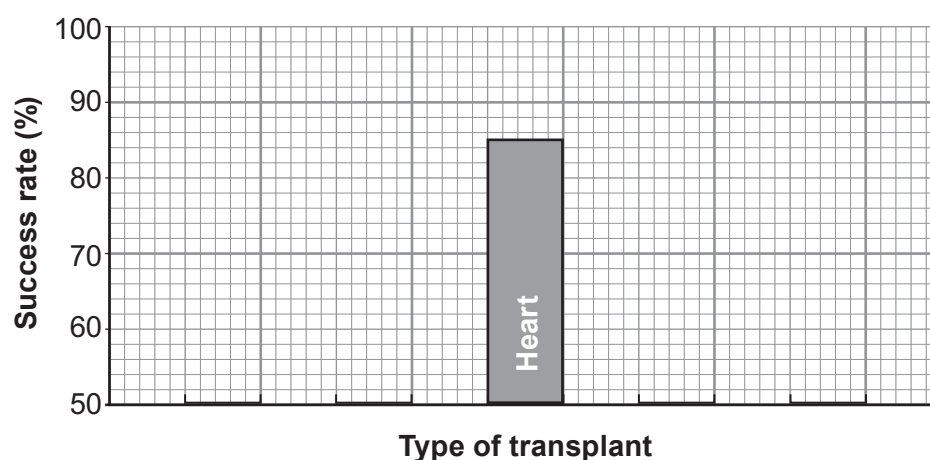
The kidneys remove waste products in a process called

- (b) When a human organ fails to function doctors can carry out a transplant operation using an organ from a donor. The transplant is said to be successful if the transplanted organ functions normally for at least one year.

The table below compares the success rates of some transplant operations.

| type of transplant | success rate (%) | year when doctors first started transplants | number of years doctors have been doing transplants (up to 2014) |
|---------------------------|------------------|---|--|
| kidney (family donor) | 98 | 1960 | 54 |
| kidney (non-family donor) | 87 | 1960 | 54 |
| lung | 77 | 1986 | |
| heart | 85 | 1975 | |
| liver | 84 | 1983 | 31 |

- (i) Complete the table by writing your answers on the dotted lines. [1]
- (ii) Complete the bar chart below by adding the bars for kidneys, liver and lung. Place the bars in order from the **most** to the **least** successful and label them. *The bar for heart has been completed for you.* [3]



- (iii) Use only information in the table and the bar chart to suggest a reason why the success rates for the various transplant operations are different. [1]

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- (iv) From your own knowledge, explain why a kidney transplant is more likely to be successful when the donor is a family member. [2]

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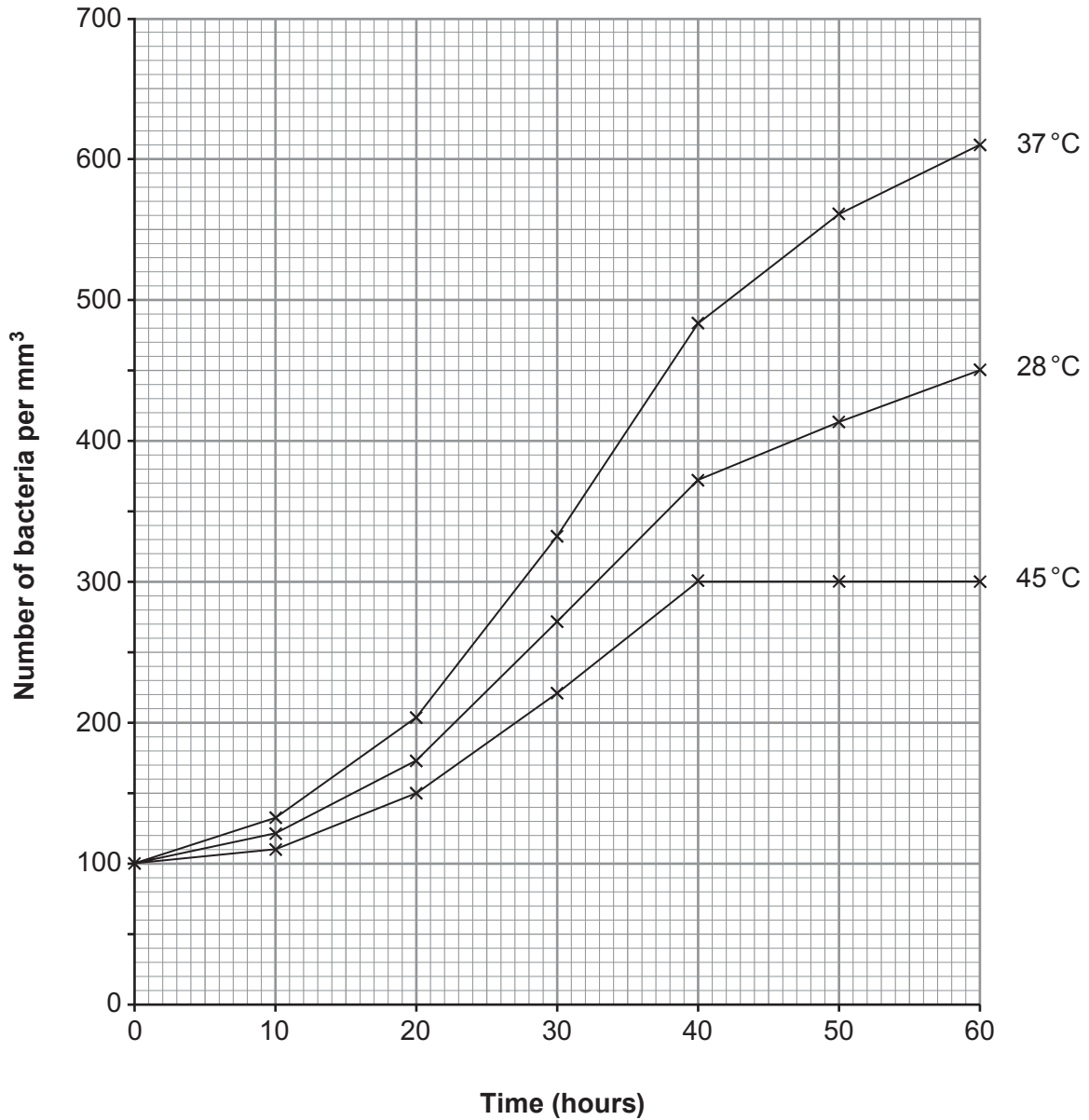
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5. A scientist investigated the growth of the bacterium *E. coli* at different temperatures. The results are shown in the graph below.



(a) From the graph

- (i) Describe the change in numbers of bacteria from 20 – 60 hours at 45°C. [2]

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- (ii) Calculate the difference in numbers of bacteria between 28°C and 37°C at 25 hours.
Show your working. [2]

..... per mm³

- (iii) How did increasing the **temperature** affect the numbers of bacteria present? [2]

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- (b) After the investigation, another scientist was asked to carry out the same investigation using exactly the same methods and apparatus as the first scientist. Why was this necessary? [1]

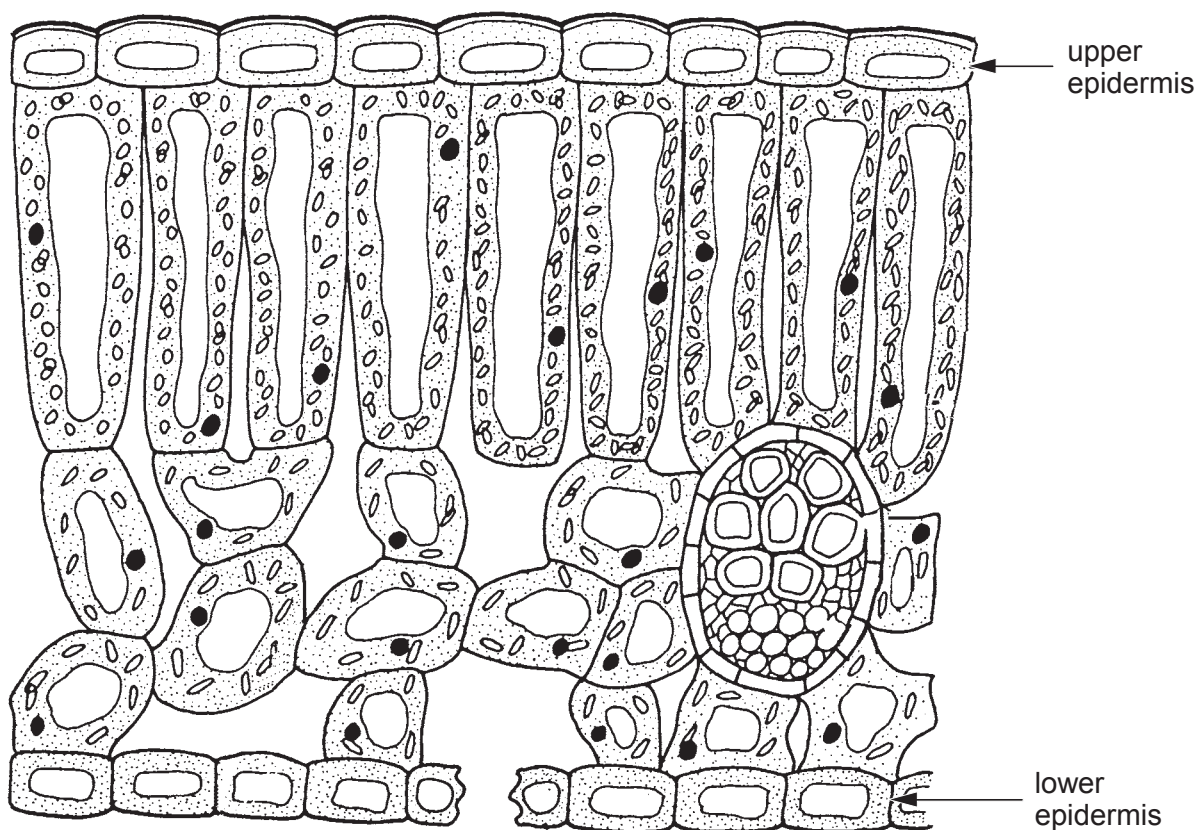
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- (c) *E.coli* in food can cause illness in humans. State why meat must be kept in a refrigerator. [1]

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6. (a) The diagram below shows a leaf in section.



- (i) State the name of the tissue in a leaf that transports sugar. [1]

- (ii) On the diagram above, label this tissue with the letter **A**. [1]
- (b) Complete the following sentence. [1]
 Sugar cannot be stored in a plant, it has to be converted into
 for storage.

- (c) (i) Ethanol can be made by reacting sugar with yeast.
State the name of the reaction between sugar and yeast that produces ethanol. [1]

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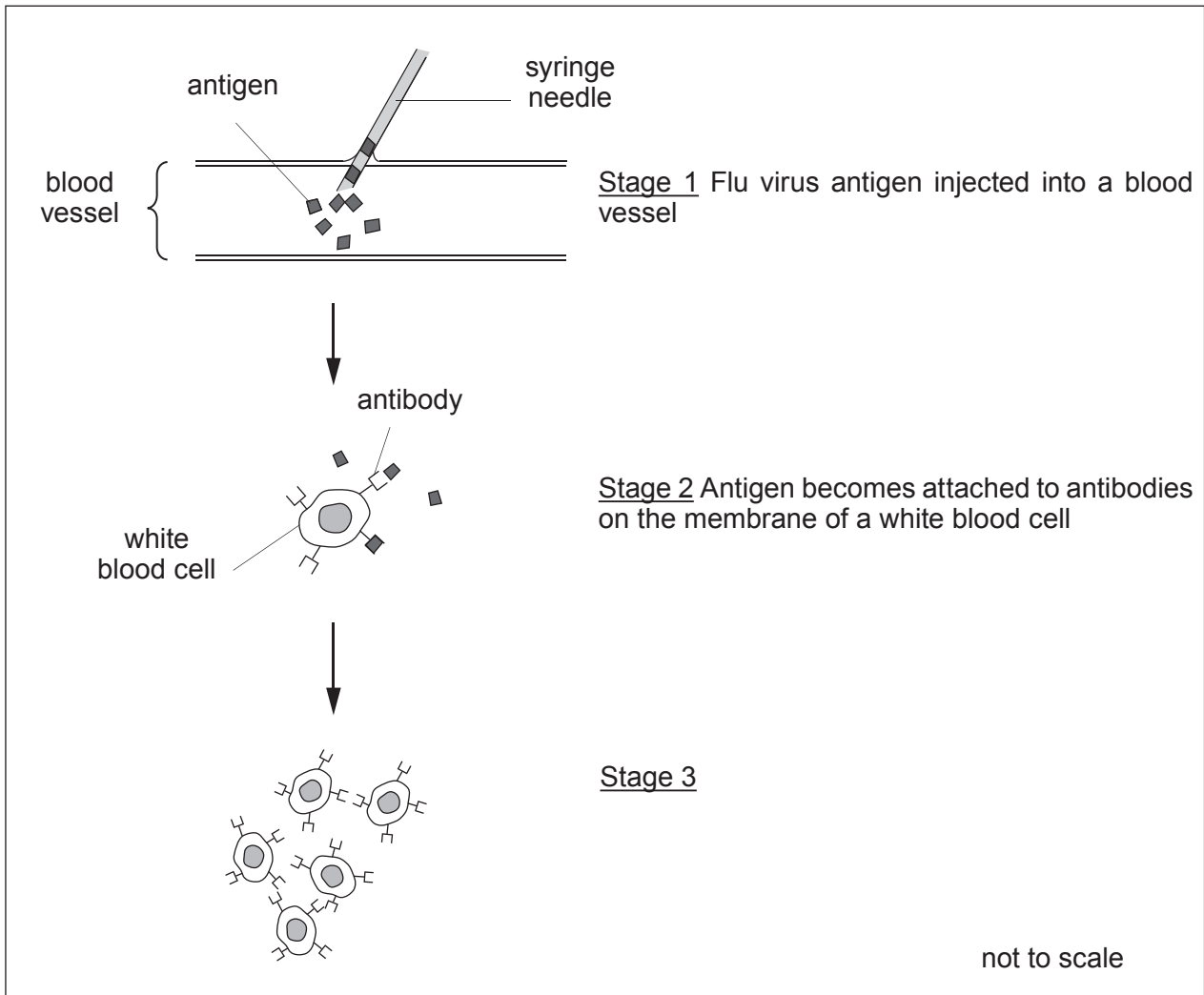
- (ii) Ethanol is a biofuel. The area of farmland used only to grow crops for the production of biofuel could double over the next 15 years.

Suggest **two** reasons why many people have concerns about using so much farmland for this purpose. [2]

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7. The diagram below shows stages in the response by one type of white blood cell to a flu virus vaccination.



- (a) (i) Name the type of white blood cell that produces antibodies. [1]

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- (ii) Describe the process that has taken place between stages 2 and 3. [2]

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- (iii) State the importance of stage 3 in protecting the body from the flu virus. [1]

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(b) New forms of flu virus appear almost every year in the UK.
Suggest why a government report recommends that flu vaccines should be given every year. [2]

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(c) Name the English doctor who first used vaccination to treat a patient in the UK. [1]

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(d) After an injection, blood clots at the site of the wound.
Suggest why it is important for blood to clot at the site of a wound. [2]

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8. (a) What word is used to describe water loss from the leaves of a plant?

[1]

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The diagram below shows a plant shoot in a simple potometer and an electric fan.

