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|---------------|---------------|------------------|
| Surname       | Centre Number | Candidate Number |
| First name(s) |               | 0                |



**GCSE**

3400U10-1



S25-3400U10-1

**MONDAY, 9 JUNE 2025 – MORNING**

**BIOLOGY – Unit 1:  
Cells, Organ Systems and Ecosystems**

**FOUNDATION TIER**

1 hour 45 minutes

| For Examiner's use only |              |              |
|-------------------------|--------------|--------------|
| Question                | Maximum Mark | Mark Awarded |
| 1.                      | 11           |              |
| 2.                      | 12           |              |
| 3.                      | 9            |              |
| 4.                      | 8            |              |
| 5.                      | 6            |              |
| 6.                      | 14           |              |
| 7.                      | 9            |              |
| 8.                      | 11           |              |
| <b>Total</b>            | <b>80</b>    |              |

### ADDITIONAL MATERIALS

A calculator and a ruler.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use pencil for graphs and diagrams only.

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. If you run out of space, use the additional pages at the back of the booklet, taking care to number the question(s) correctly.

### INFORMATION FOR CANDIDATES

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

Question **5** is a quality of extended response (QER) question where your writing skills will be assessed.

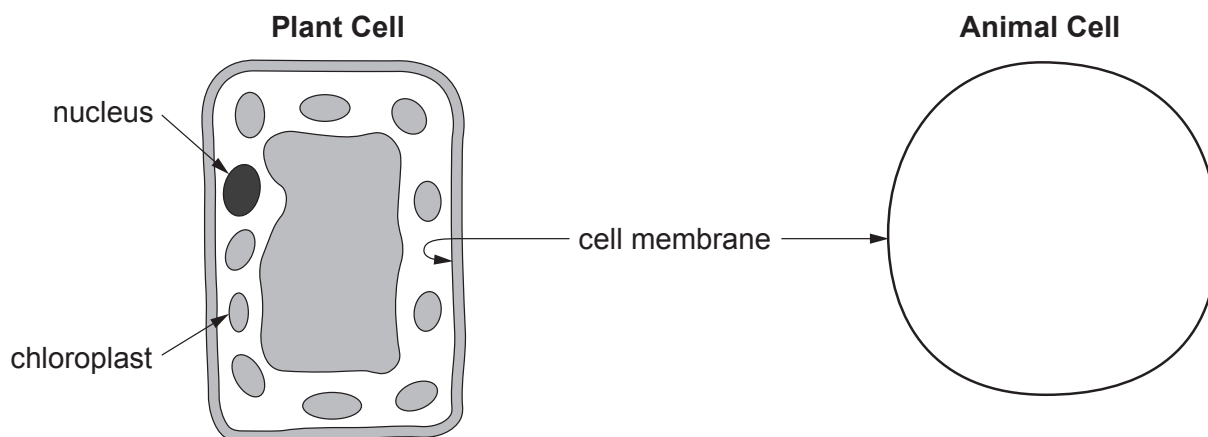


JUN253400U10101

Answer **all** questions.

1. **Image 1.1** shows a plant cell and the outline of an animal cell.

**Image 1.1**



- (a) (i) **Draw a nucleus** in the outline of the **animal cell** in **Image 1.1**. [1]

- (ii) Use **Image 1.1** to:

- I. State **two** structures found in **both** animal and plant cells. [2]

1. ....
2. ....

- II. State **one** structure which is **only** found in **plant cells**. [1]

.....

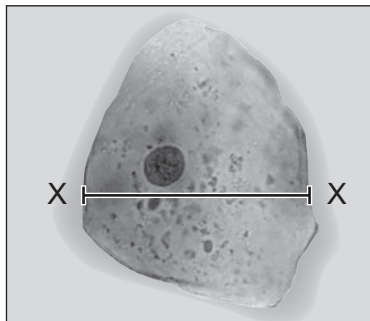
- (b) **Use a ruler** to join the structures with their functions. [3]

| Structure     | Function                                              |
|---------------|-------------------------------------------------------|
| chloroplast   | site of most chemical reactions                       |
| nucleus       | controls the activities of the cell                   |
| cell membrane | controls the substances that enter and leave the cell |
| cytoplasm     | carries out photosynthesis                            |



- (c) **Image 1.2** shows a stained human cheek cell as seen using a microscope.

**Image 1.2**



- (i) State the purpose of staining the cell. [1]

.....  
 .....

- (ii) **Use a ruler** to measure the length of line X–X in **Image 1.2** in **mm**. [1]

Length of line X–X = ..... mm

- (iii) The actual width of cell at X–X is 0.06 mm.  
 Use the equation below to calculate the magnification of the cell. [2]

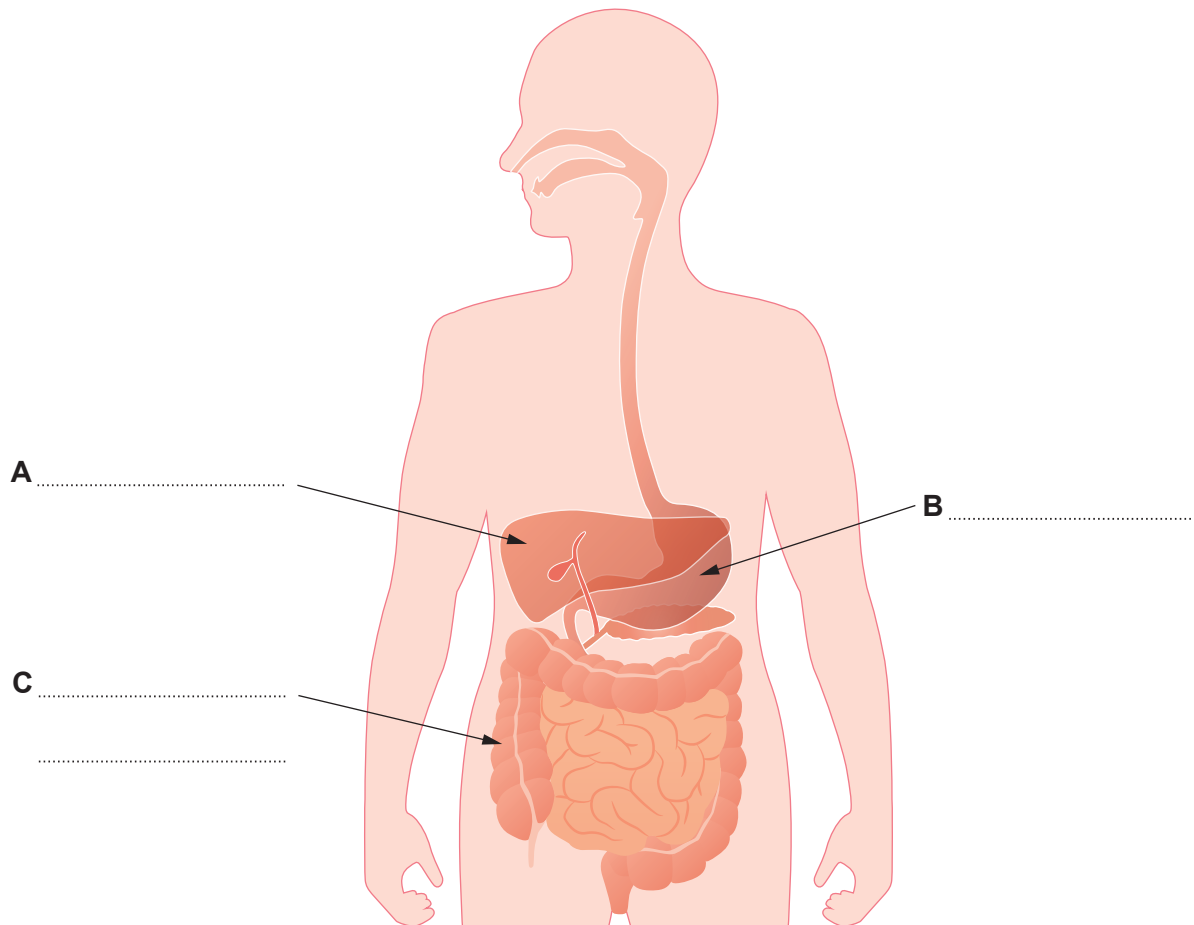
$$\text{Magnification of the cell} = \frac{\text{measured length of line X–X}}{\text{actual width of cell X–X}}$$

Magnification of the cell = × .....



2. **Image 2.1** shows the human digestive system.

**Image 2.1**



(a) Label structures **A**, **B** and **C** on **Image 2.1** using some of the following words.

[3]

large intestine

small intestine

gall bladder

pancreas

liver

stomach



- (b) **Complete the flow chart showing the correct order** in which food travels from the mouth into the bloodstream.

Choose some words from the list below.

[3]

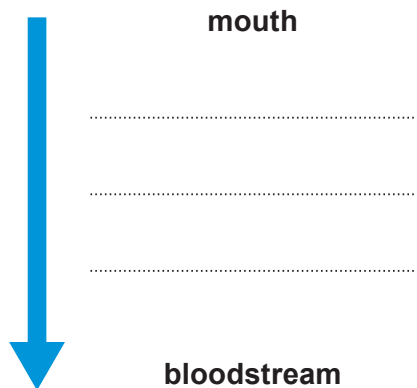
**liver**

**stomach**

**oesophagus**

**pancreas**

**small intestine**

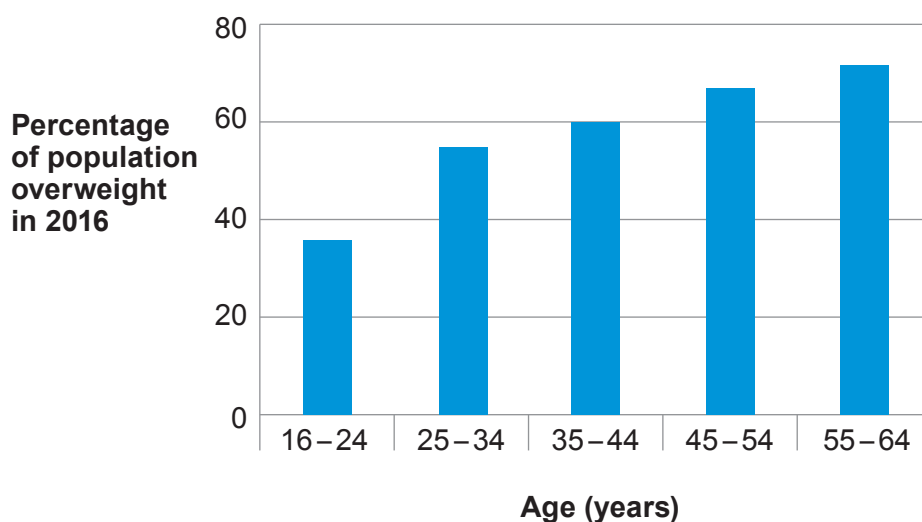


**bloodstream**



- (c) Being overweight is an increasing problem for many people in Wales. **Graph 2.2** shows the percentage of the Welsh population that was overweight in 2016 by age.

**Graph 2.2**



- (i) Describe the trend shown in **Graph 2.2**. [1]
- .....
- .....
- (ii) Suggest **one** reason for this trend. [1]
- .....
- .....
- (iii) State the **two** food groups that can cause obesity if eaten to excess. [2]
1. ....
2. ....
- (iv) The population of Cardiff in 2016 was 360 000 people.  
Calculate the number of overweight people in Cardiff in 2016 if 60% were overweight. [2]

Number of overweight people = .....

12



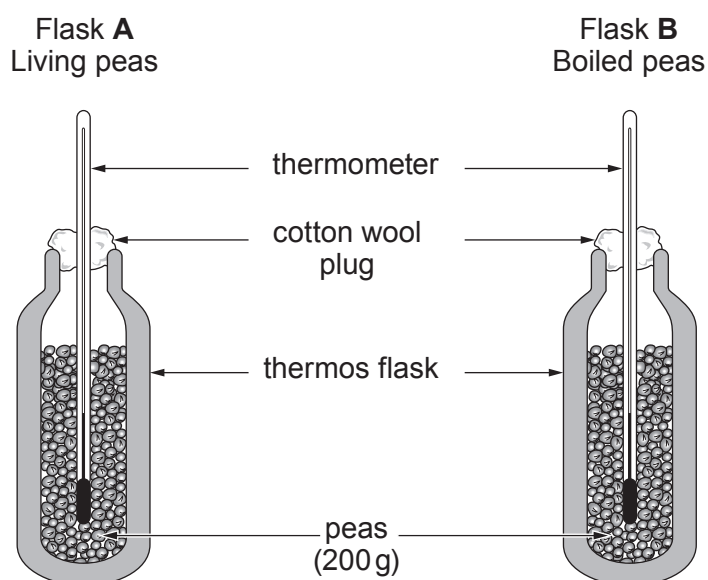
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3. Students carried out an investigation into the energy released by living organisms. They used peas as their example of a living organism. **Image 3.1** shows the apparatus they set up.

**Image 3.1**



All the peas were soaked in disinfectant before the investigation started.

The students recorded the temperature of flask **A** and **B** each day for 5 days. The results are shown in **Table 3.2**.

**Table 3.2**

| Time (days) | Temperature (°C) |                |
|-------------|------------------|----------------|
|             | Flask <b>A</b>   | Flask <b>B</b> |
| 1           | 19               | 19             |
| 2           | 22               | 19             |
| 3           | 22               | 19             |
| 4           | 28               | 19             |
| 5           | 31               | 19             |



- (a) (i) **Complete the sentence** to describe the trend shown in the results in **Table 3.2** for Flask **A**. [1]

As time increases, the temperature .....

- (ii) Underline the correct term from the list below to give the name of the process that caused the temperature change in Flask **A**. [1]

**photosynthesis**

**respiration**

**decomposition**

**digestion**

- (iii) **Complete the word equation** for this process. [2]

..... + oxygen  $\longrightarrow$  ..... + water + energy

- (b) State **two** variables that the students controlled in this investigation. [2]

(i) .....

(ii) .....

- (c) Flask **B** contained boiled peas.  
Explain why the temperature in Flask **B** did not change. [2]

.....  
.....  
.....  
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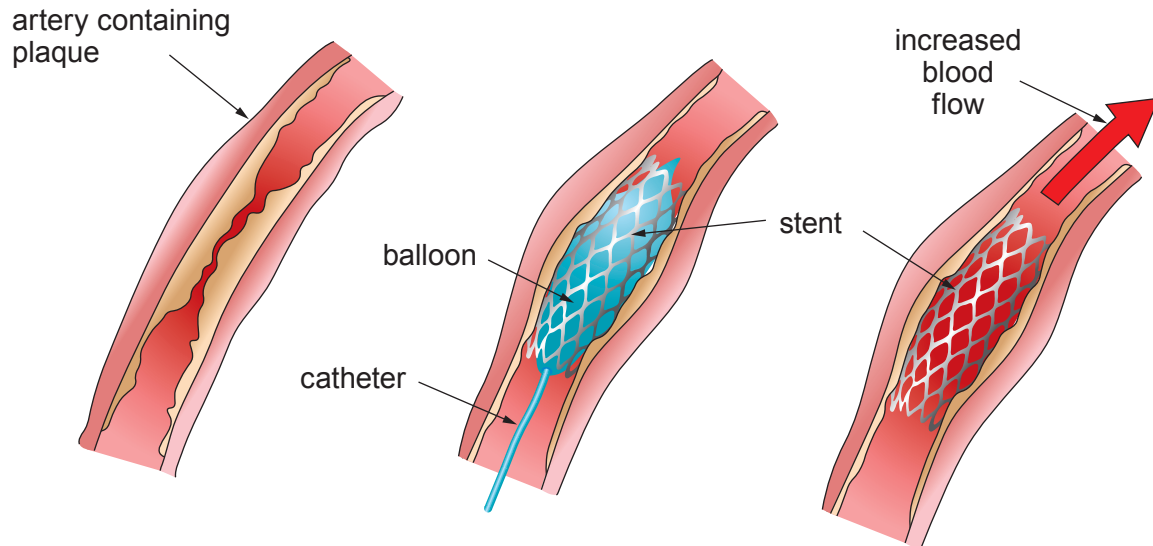
- (d) State the purpose of the disinfectant. [1]

.....  
.....



4. Doctors use a procedure called coronary angioplasty to widen blocked or narrowed coronary arteries. This method is shown in **Image 4**.

**Image 4**



#### Method

1. A local anaesthetic is used, so the patient will be awake during the procedure.
2. A thin flexible tube with a deflated balloon at the end is inserted into an artery in an arm.
3. The tube is guided to the affected coronary artery.
4. The balloon is then inflated to widen the artery. This squashes the plaque against the artery wall.
5. Sometimes a stent is also used. A stent is a wire mesh cylinder, which is placed around the balloon before it is inserted. The stent expands when the balloon is inflated and remains in place when the balloon is deflated and removed.



- (a) **Complete the table** by writing **True or False** next to each statement.  
One has been done for you. [3]

| Statement                                                                       | True or False |
|---------------------------------------------------------------------------------|---------------|
| A possible symptom of narrowing of coronary arteries is dizziness and fainting. | True          |
| The aim of angioplasty is to improve blood flow to the heart muscle cells.      | .....         |
| Angioplasty is carried out whilst you are unconscious.                          | .....         |
| Stents are inserted by cutting open the heart during surgery.                   | .....         |
| Angioplasty always involves a stent.                                            | .....         |

- (b) Suggest the benefit of using a stent in angioplasty. [1]

.....

.....

- (c) (i) Explain why the heart muscle needs a supply of blood to be able to contract. [3]

.....

.....

.....

.....

.....

.....

- (ii) The mean resting human heart rate is 72 bpm (beats per minute). A patient with narrowed coronary arteries has a resting heart rate of 102 bpm.

Suggest a reason why the patient with narrowed coronary arteries needs a higher resting heart rate. [1]

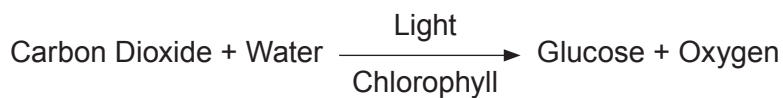
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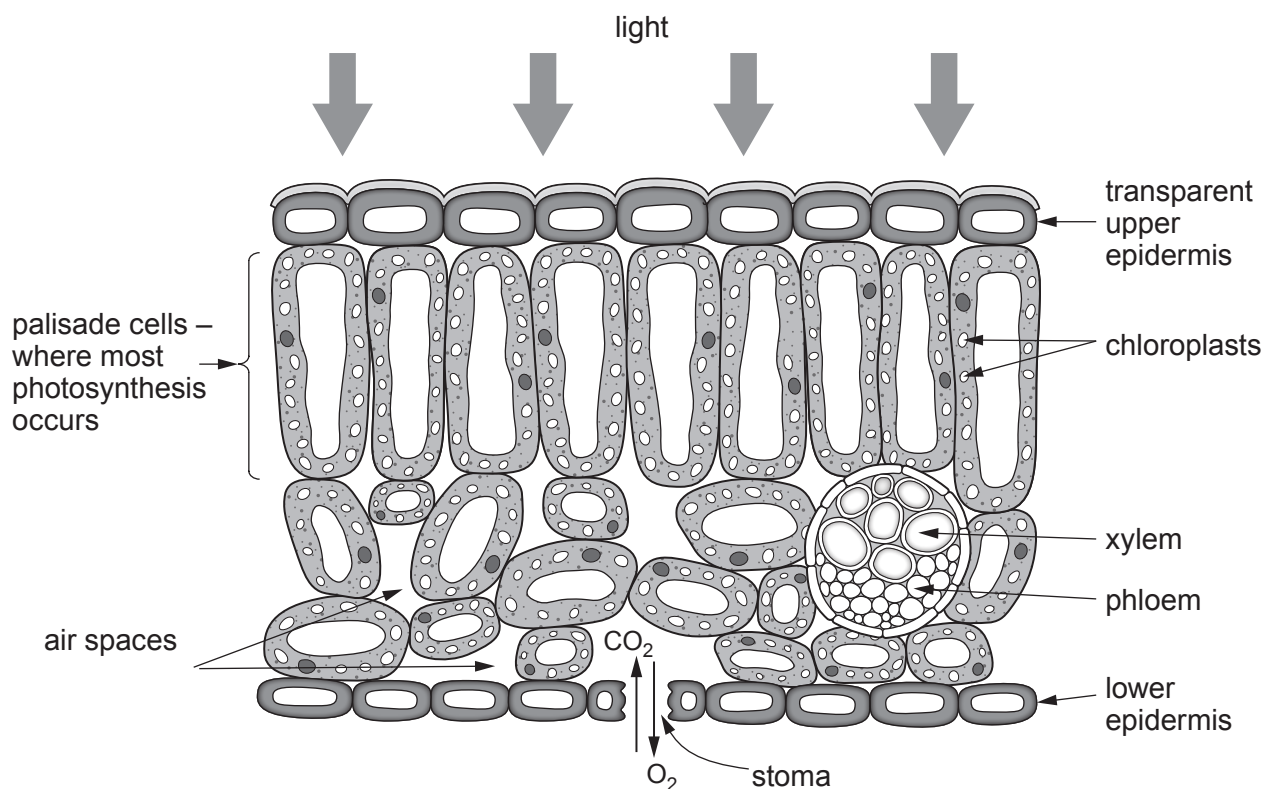


5. Photosynthesis takes place in leaves. The equation for photosynthesis is:



**Image 5** shows a section through the leaf.

**Image 5**



Use **Image 5** and your own knowledge to explain how the leaf is adapted to carry out photosynthesis.

[6 QER]



Examiner  
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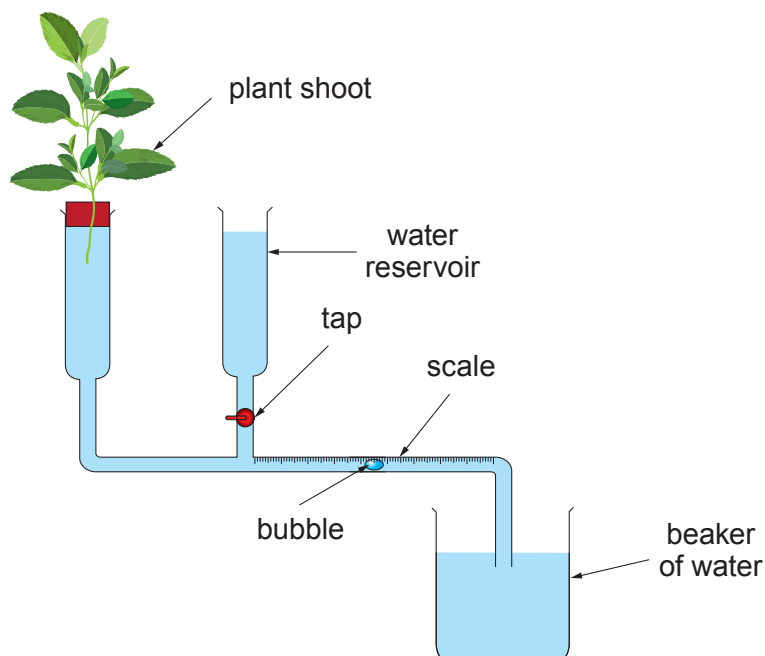
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|---|
|   |
| 6 |



6. Some year 10 students investigated the effect of temperature on the rate of water loss in a plant shoot. They used the apparatus shown in **Image 6.1**.

**Image 6.1**



- (a) State the name of the apparatus used. [1]
- .....
- (b) The results from the experiment are shown in **Table 6.2**.

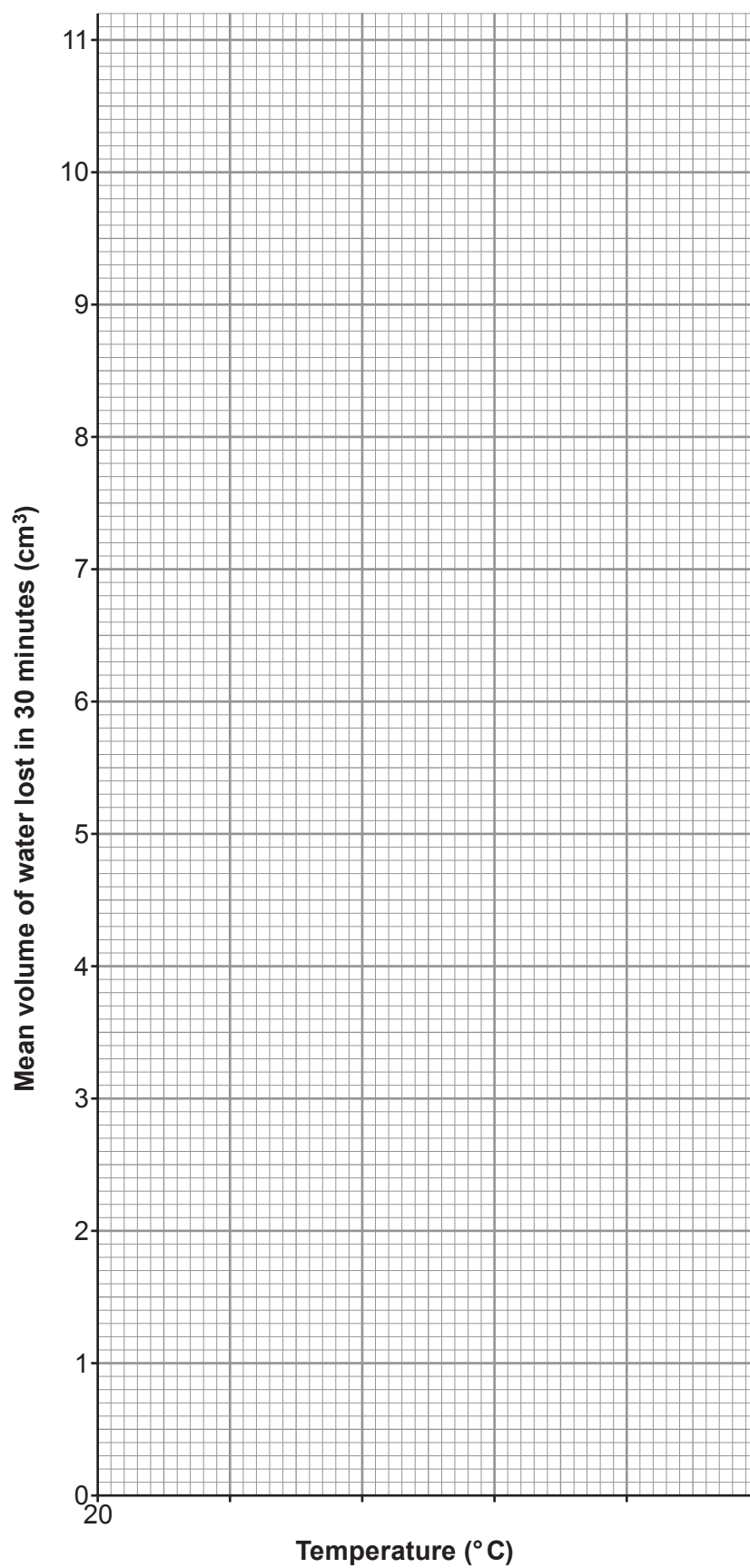
**Table 6.2**

| Temperature<br>(°C) | Volume of water lost in 30 minutes (cm <sup>3</sup> ) |         |         |      |
|---------------------|-------------------------------------------------------|---------|---------|------|
|                     | Trial 1                                               | Trial 2 | Trial 3 | Mean |
| 20                  | 1.1                                                   | 1.0     | 1.2     | 1.1  |
| 25                  | 3.8                                                   | 3.7     | 3.6     | 3.7  |
| 30                  | 5.5                                                   | 5.5     | 5.7     | 5.6  |
| 35                  | 7.9                                                   | 7.9     | 7.9     | 7.9  |
| 40                  | 10.3                                                  | 10.2    | 12.5    | 11.0 |

**Draw a line graph** of the mean results on **Graph 6.3** by:

- (i) completing the scale for temperature; [1]
- (ii) plotting the **mean results** from **Table 6.2**; [2]
- (iii) using a ruler to join the plots. [1]



**Graph 6.3**

- (c) Describe the effect of temperature on the volume of water lost. [1]

.....

.....

.....

- (d) Calculate the mean volume of water lost **per minute** at a temperature of 30 °C.  
**Give your answer to one decimal place.** [3]

Mean volume of water lost = ..... cm<sup>3</sup>/min

- (e) (i) I. State the temperature that gave the most repeatable results. [1]

Temperature = ..... °C

- II. Explain your choice. [1]

.....

.....

- (ii) State what the students could do to check if their investigation was reproducible. [1]

.....

- (f) Another student carried out a similar experiment. They kept the temperature the same but varied the wind speed using a fan.  
Identify the following variables for this new investigation. [2]

Independent variable .....

Dependent variable .....



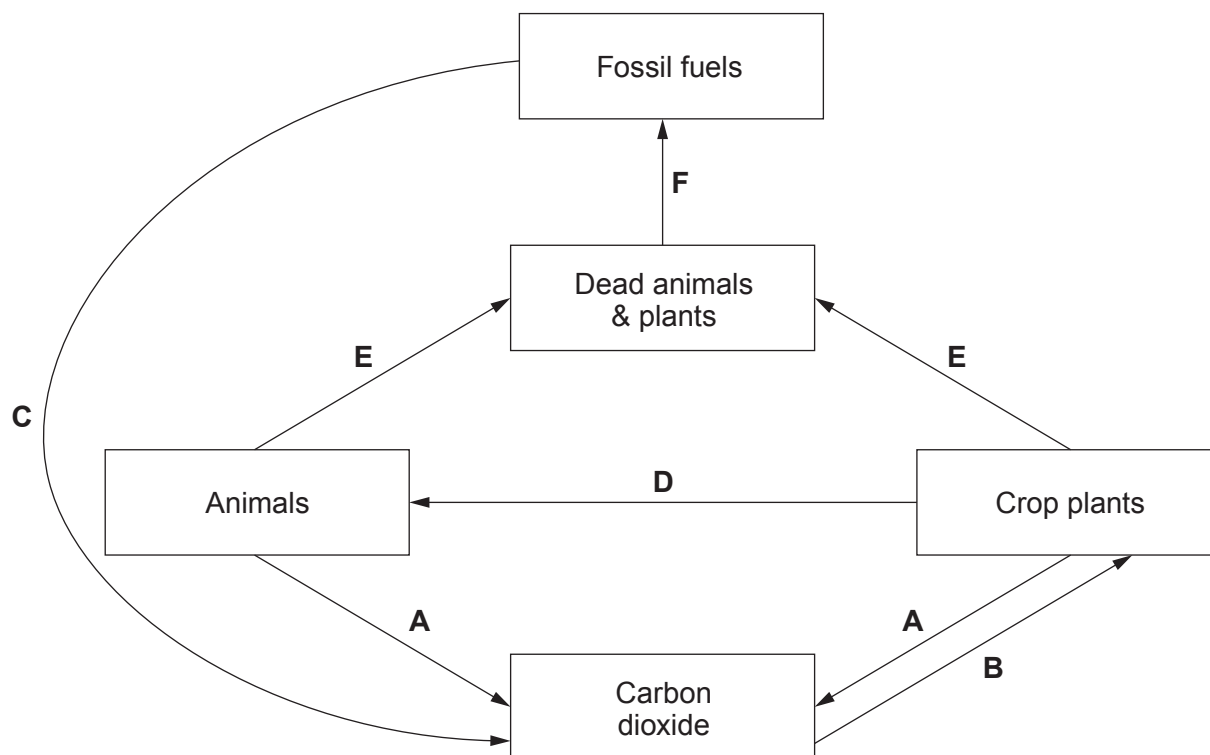
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7. **Image 7** shows part of the carbon cycle.

**Image 7**



(a) (i) State the name of the processes **A**, **C** and **D**.

[3]

**A** .....

**C** .....

**D** .....

(ii) State the name of process **B** which directly removes carbon dioxide from the air.

[1]

.....

(iii) State **one** product of process **B** which contains carbon.

[1]

.....



- (b) Strawberry growers in Gower, near Swansea produced a yield of 21 500 kg in the summer of 2018. In 2019 the yield was 26 000 kg.

- (i) Use the following equation:

[2]

$$\text{Percentage increase in yield} = \frac{\text{yield in 2019} - \text{yield in 2018}}{\text{yield in 2018}} \times 100$$

to calculate the percentage increase in yield

Percentage increase in yield = .....

- (ii) Other than water and carbon dioxide, state **two** substances that could have been used to increase the strawberry yield. [2]

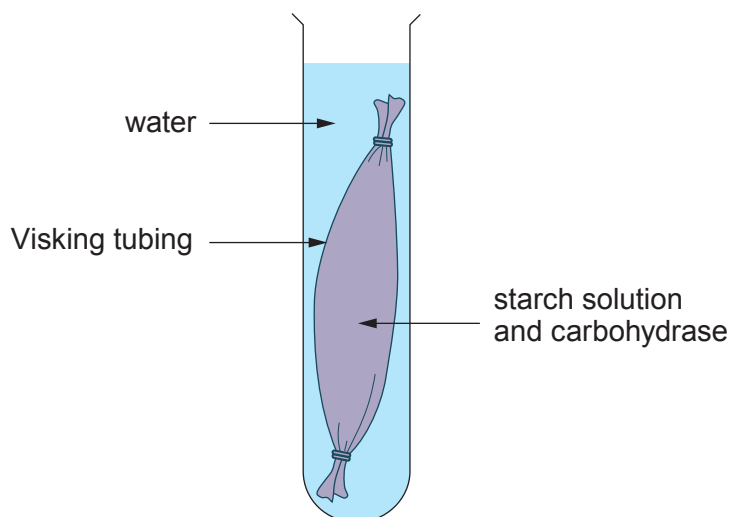
1. ....

2. ....



8. Students investigated the effect of temperature on a carbohydrase enzyme using the apparatus shown in **Image 8.1**.

**Image 8.1**



- (a) State the name of the model that describes how enzymes work.

[1]

The experiment was carried out at 20 °C, 30 °C, 40 °C, 50 °C and 60 °C. After 5 minutes a sample of solution was removed from inside the Visking tubing and the percentage of starch remaining was determined. Some of the results are shown in **Table 8.2**.

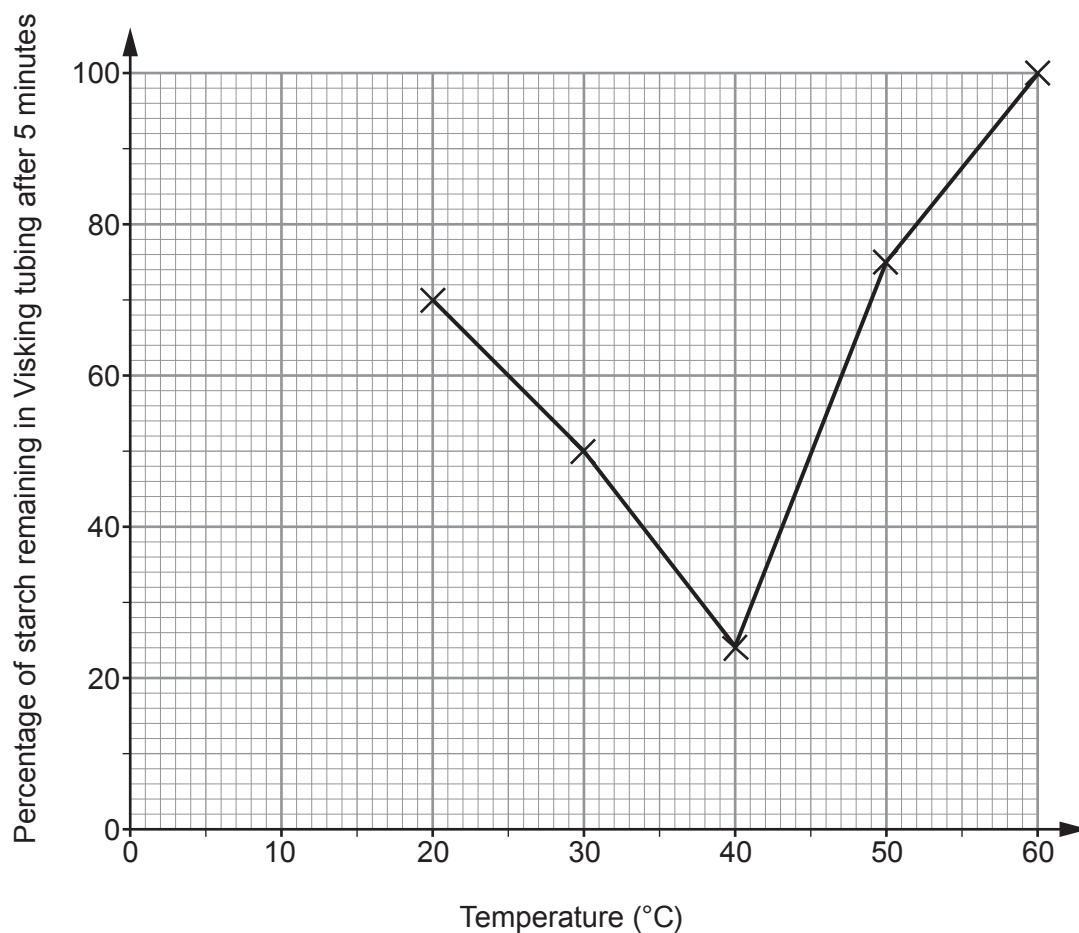
**Table 8.2**

| Temperature (°C) | Percentage of starch remaining in Visking tubing after 5 minutes |
|------------------|------------------------------------------------------------------|
| 20               | 70                                                               |
| 30               | 50                                                               |
| 40               | .....                                                            |
| 50               | 75                                                               |
| 60               | 100                                                              |

- (b) Complete **Table 8.2** using data from **Graph 8.3**.

[1]



**Graph 8.3**

- (c) (i) Identify the optimum temperature for the carbohydrase in this investigation. [1]

..... °C



- (ii) Describe how you could amend the method to identify the optimum temperature more accurately. [2]

.....

.....

.....

.....

- (iii) Explain the results at 60 °C. [3]

.....

.....

.....

.....

.....

.....

- (d) The water around the Visking tubing was also tested for starch.

- (i) Name the reagent used to test for starch. [1]

.....

- (ii) Predict the colour that would be seen at the end of the test **and** explain your answer. [2]

.....

.....

.....

.....

**END OF PAPER**



[illegible]

