

Surname	Centre Number	Candidate Number
First name(s)		0



GCSE

3430U10-1



MONDAY, 9 JUNE 2025 – MORNING

SCIENCE (Double Award)

Unit 1: BIOLOGY 1

FOUNDATION TIER

1 hour 15 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	6	
2.	7	
3.	6	
4.	5	
5.	8	
6.	13	
7.	8	
8.	7	
Total	60	

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 a 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 page(s) 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 **6(c)** is a quality of extended response (QER) question where your writing skills will be assessed.



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Answer **all** questions.

1. **Table 1.1** gives four cell structures (**A** to **D**) and their size in mm.

Table 1.1

Cell structure	A nucleus	B mitochondria	C vacuole	D chloroplast
Size (mm)	0.005	0.001	0.010	0.008

- (a) **Complete the list below** by placing structures **A**, **C** and **D** in order of size. [1]

	smallest	letter B
	↓	letter
increasing size		letter
	↓	letter
	largest	

- (b) **Complete Table 1.2** by placing **one** tick (✓) in **each row** to show whether these structures are present in animal cells only, in plant cells only or in animal and plant cells. [4]

Table 1.2

Structure	Present in		
	animal cells only	plant cells only	animal and plant cells
A nucleus			
B mitochondria			
C vacuole			
D chloroplast			

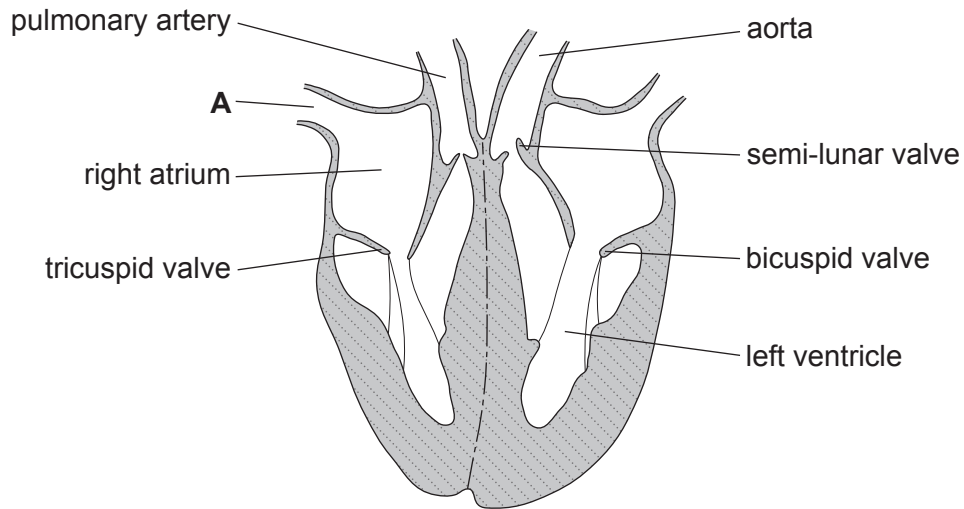
- (c) **Complete the following sentence** by underlining the correct word in the brackets. [1]

Mitochondria release energy in a process called (**digestion** / **photosynthesis** / **respiration**).



2. **Image 2** shows a diagram of the heart. Some structures are labelled.

Image 2



- (a) **Complete the following sentence** by underlining the correct blood vessel in the brackets. [1]

Blood vessel **A** in **Image 2** is the (**coronary artery** / **vena cava** / **pulmonary vein**).

- (b) State the **organ** that receives blood from the pulmonary artery. [1]

.....

- (c) State the name of the **tissue** that allows the heart to contract and relax. [1]

.....



- (d) Statements (1–6) below describe the flow of blood through the **right** side of the heart but they are in the **wrong order**.

Place the statements in the **correct order**. The first two have been done for you. [4]

- 1 into the right ventricle
- 2 the right ventricle contracts
- 3 blood flows from the right atrium
- 4 through the tricuspid valve
- 5 into the pulmonary artery
- 6 pushing blood through the semi-lunar valve

3 4



3. When a solution of glucose and Benedict's reagent is heated strongly, the solution changes colour from **blue** to **red**.

Dewi heated a 10 cm^3 sample of solution X with Benedict's reagent.

- (a) Some of the apparatus he used are given in the list below.

Apparatus list

- test tube rack
- 250 cm^3 beaker containing solution X
- thermostatically controlled water bath
- bottle of Benedict's reagent with dropper
- eye protection

•

•

Choose **two** of the items shown below that Dewi would have needed to use for this investigation **and add them to the apparatus list** above. [2]



test tube



balance



scalpel



10 cm^3
measuring
cylinder



mounted
needle

- (b) **Table 3.1** shows the result of Dewi's experiment.

Table 3.1

Colour of solution X with Benedict's reagent	
before heating	after heating
blue	red

Use the information above to state the conclusion Dewi could make about the contents of solution X. [1]

.....

.....



- (c) (i) Dewi tested a solution of **starch** with Benedict's reagent.

Complete Table 3.2 to show the expected colour after testing. [1]

Table 3.2

Colour of starch solution with Benedict's reagent	
at start of test	at end of test
blue	

- (ii) Dewi added the enzyme carbohydrase to the **starch** solution and repeated the Benedict's test.

Predict the colour he observed at the end of this test and explain your answer.

- I. Colour observed: [1]

.....

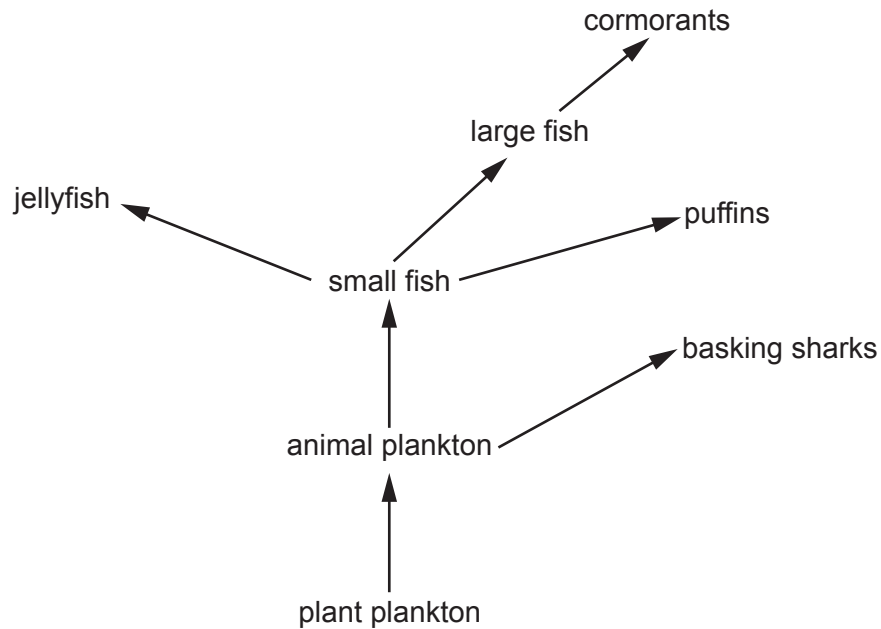
- II. Explanation: [1]

.....



4. **Image 4.1** shows part of a food web in the sea off the coast of North America.

Image 4.1



- (a) **Complete the sentence below** by underlining the correct term in the brackets. [1]

Puffins and cormorants are (**carnivores** / **decomposers** / **herbivores**).

- (b) DDT is a pesticide.

Read the information in the fact file about DDT.

Fact file
• DDT can enter food chains in the sea. • DDT concentration builds up at each stage of a food chain. • DDT is toxic to consumers. • DDT breaks down over several years.



Table 4.2 shows DDT concentrations in the eggs of puffins and cormorants from 1968 to 1984.

Table 4.2

Year	DDT concentration in the eggs (ppm)	
	puffins	cormorants
1968	0.90	2.70
1972	0.90	2.85
1976	0.59	2.18
1980	0.55	1.34
1984	0.36	1.08

- (i) I. Use **Table 4.2** to compare the concentration of DDT in the eggs of puffins and cormorants in **1968**. [1]

.....

.....

- II. Use the information in **Image 4.1** and the **fact file** to explain the difference in concentration. [2]

.....

.....

.....

.....

- (ii) In 1972, DDT was banned in North America.

Describe **one** piece of evidence from **Table 4.2** that shows that DDT breaks down over time. [1]

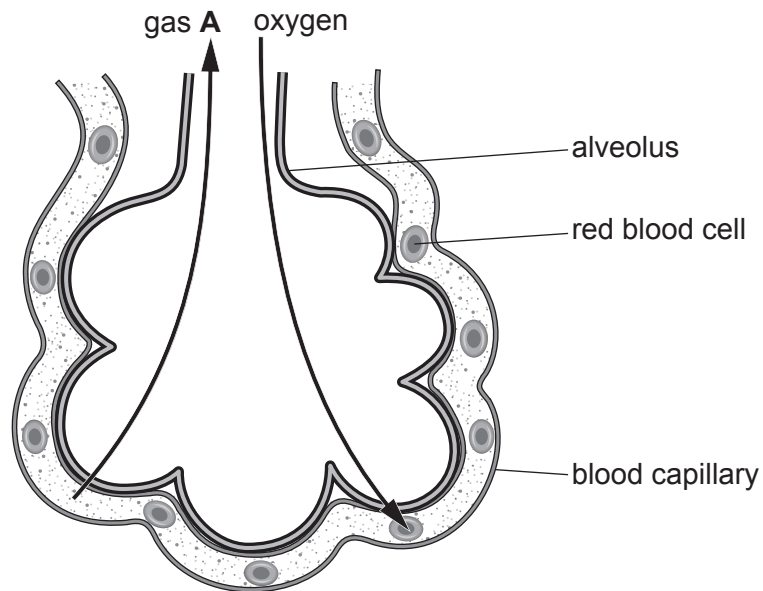
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5. Image 5.1 shows an alveolus from a human lung.

Image 5.1



(a) Gas exchange takes place in an alveolus.

(i) State the name of gas **A**.

[1]

.....

(ii) State **one** way an alveolus is adapted for gas exchange.

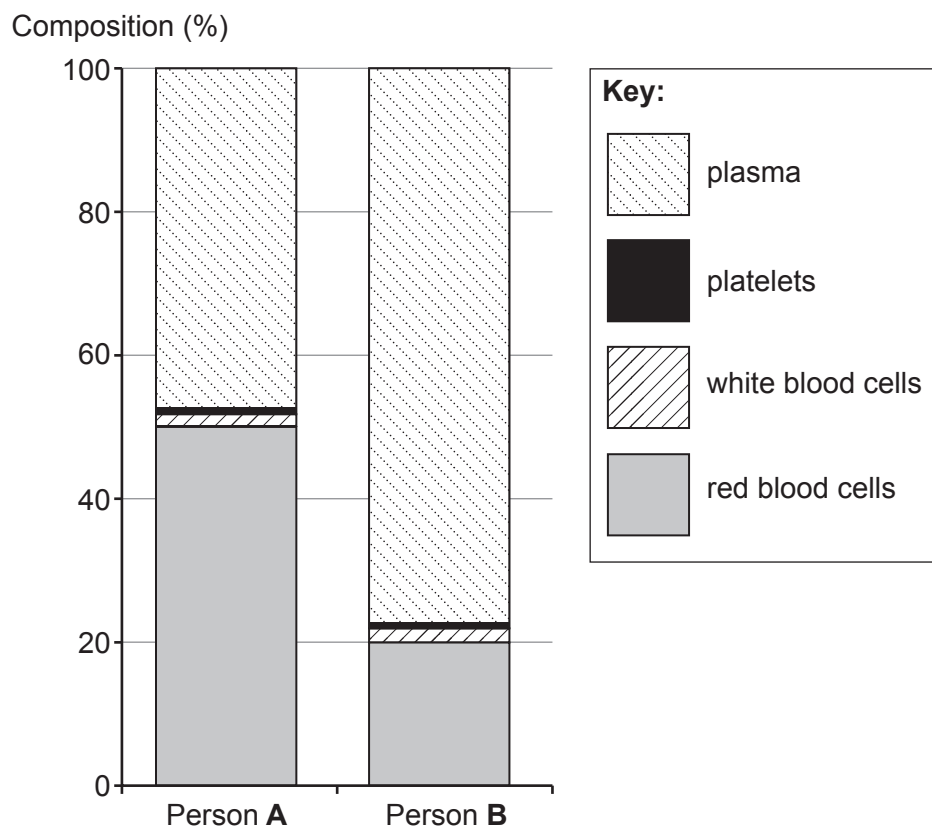
[1]

.....



- (b) **Graph 5.2** compares the composition of the blood of two people (**A** and **B**).

Graph 5.2



- (i) Person **B** has a condition called anaemia. Use the information in **Graph 5.2** to describe why person **B** may have difficulty getting enough oxygen from their lungs to the cells in their body. Explain your answer. [2]

.....

.....

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- (ii) State the function of platelets. [1]

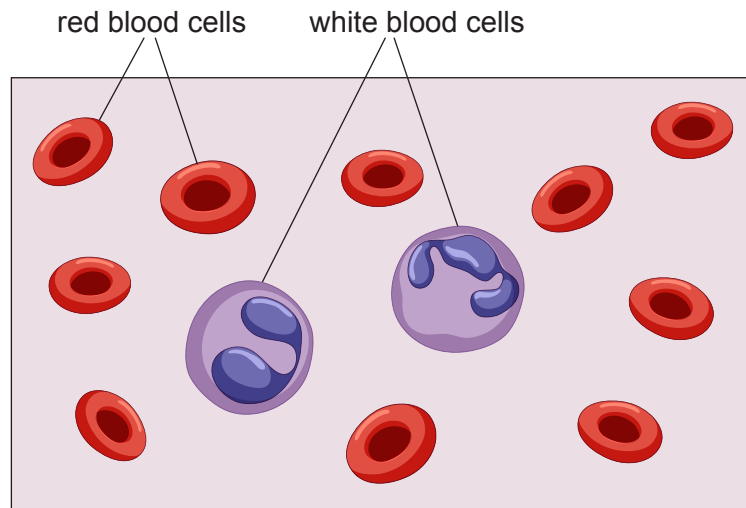
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- (c) **Image 5.3** shows a labelled blood smear.

Image 5.3



- (i) Calculate the ratio of **red** blood cells to **white** blood cells shown in **Image 5.3**. [2]

Ratio of red blood cells : white blood cells = :

- (ii) **Complete the following sentence** by underlining the correct answer in the brackets. [1]

Following infection, many more white blood cells are made, so the ratio of red blood cells to white blood cells would (**increase / decrease / stay the same**).



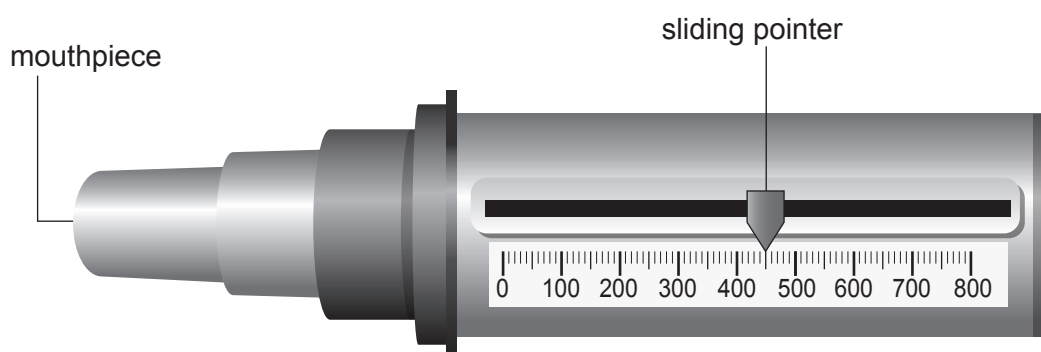
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6. **Image 6.1** shows a peak flow meter.

Image 6.1



The peak flow meter measures how quickly a person can blow air out of their lungs.

To measure peak flow:

- move the sliding pointer to zero
- blow hard into the mouthpiece
- record the peak flow shown by where the sliding pointer stopped on the scale

(a) State the peak flow shown by the sliding pointer in **Image 6.1**.

[1]

Peak flow = litres/minute

(b) **Table 6.2** shows mean peak flow measurements for men and women who are 175 cm tall and aged 15 to 75 years.

Table 6.2

Age (years)	Mean peak flow (litres/minute)	
	men	women
15	510	410
25	610	440
35	630	450
45	620	440
55	590	420
65	540	390
75	490	350

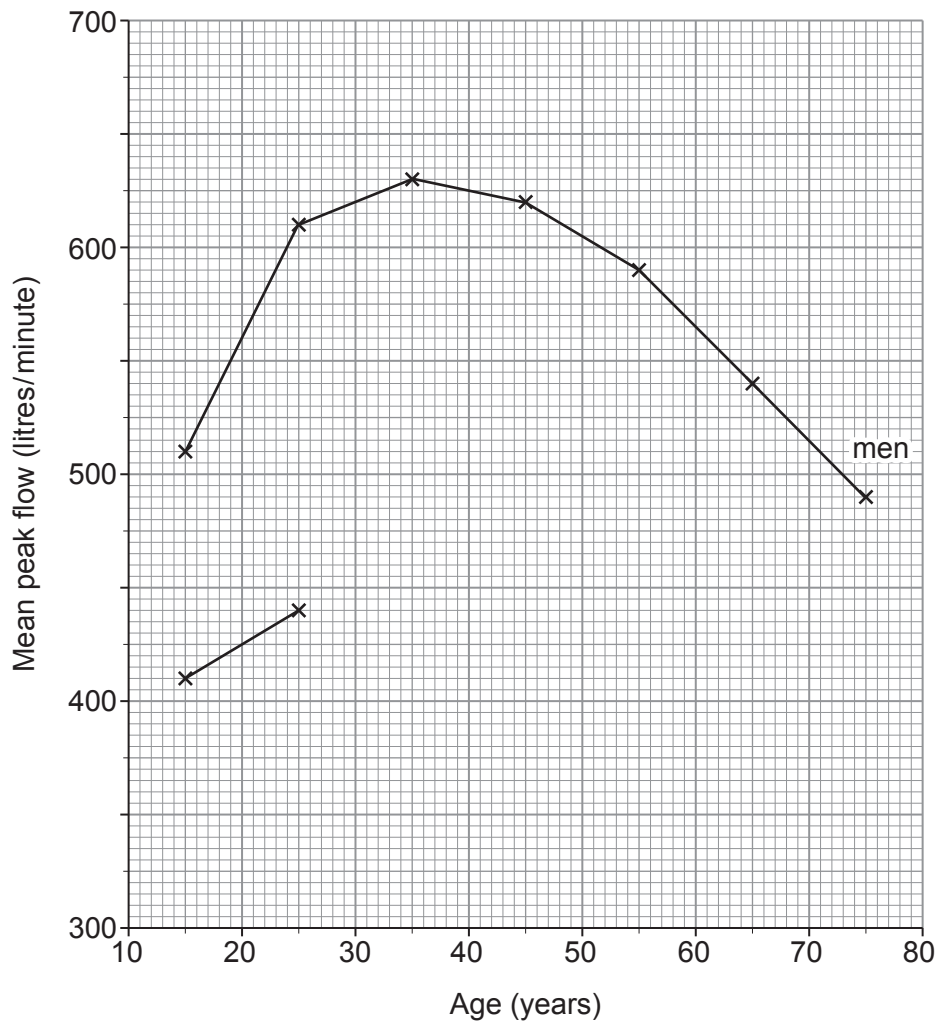
(i) **Complete Graph 6.3** of mean peak flow by:

- plotting the points for **women** aged **35–75**;
- using a ruler to join **all** the plots for women.

[2]

[1]



Graph 6.3

(ii) Use **Graph 6.3** to describe the effect of age on peak flow in **men**.

[2]

.....

.....

.....

.....

(iii) State **one** conclusion you can make about peak flow in men compared to women.

[1]

.....

.....



- Describe how you could use the peak flow meter and the method described on **page 14** to test this statement.

- **two** ways to ensure a fair test;
- how you would display your results.

[6 QER]



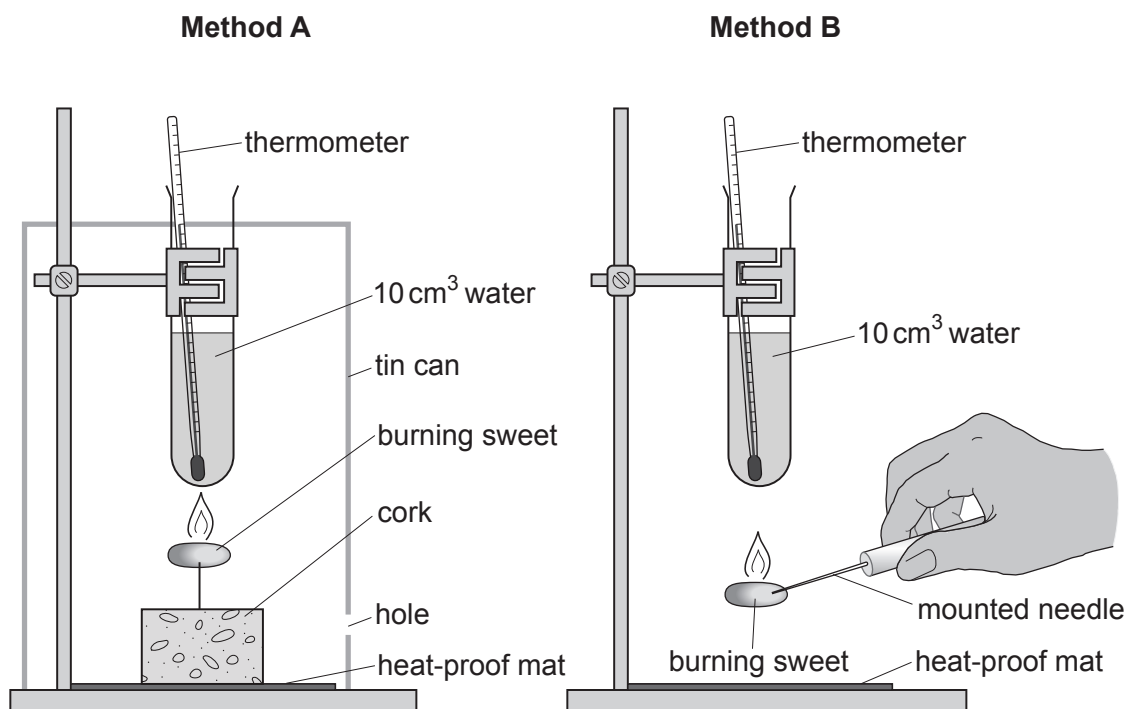
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7. (a) Bethan used two different methods (**A** and **B**) to investigate the energy content of the same type of sweet, as shown in **Image 7.1**.

Image 7.1



In method **A**, Bethan

- fixed a sweet on a pin mounted on a cork block
- ignited the sweet
- placed the remaining apparatus over the burning sweet

In method **B**, Bethan

- fixed a sweet on a mounted needle
- ignited the sweet
- held the burning sweet under the test tube

In **both** methods, Bethan

- recorded the mass of the sweet
- recorded the temperature of the water in the test tube at the start and when the sweet stopped burning
- did three trials



The results of the investigation are shown in **Table 7.2**.

Table 7.2

Method	Trial	Mass of sweet (g)	Temperature of water (°C)			Energy content (J/g)	Mean energy content (J/g)
			start	end	increase		
A	1	10.0	20	45	25	105.0	107.4
	2	10.1	20	46	26	108.1	
	3	10.0	20	46	26	109.2	
B	1	9.9	20	38	18	76.4	90.9
	2	10.0	20	42	22	92.4	
	3	10.1	20	45	25	104.0	

- (i) Use the formula below to calculate the percentage increase in mean energy content shown for method **A** compared to method **B**.
Give your answer to the **nearest whole number**. [3]

$$\text{Percentage increase in mean energy content} = \frac{\text{mean energy content for method A} - \text{mean energy content for method B}}{\text{mean energy content for method B}} \times 100$$

Percentage increase in mean energy content =

- (ii) I. Use **Image 7.1** to suggest an explanation for the percentage increase in mean energy content for method **A** compared to method **B**. [1]

.....

.....

- II. There is a **greater range** in the results for method **B** than for method **A**. Use **Image 7.1** to suggest an inaccuracy in method **B** that could result in this variation. [1]

.....

.....



- (b) State the form in which excess energy from food is stored in the body. [1]

.....

- (c) State **two** health problems that might result from eating too much sugar. [2]

I.

II.



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8. (a) (i) State the name of the green pigment found in plant leaves. [1]

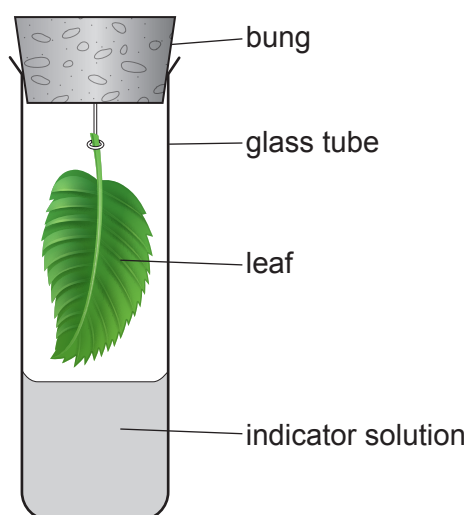
- (ii) State the word equation for photosynthesis. [2]

..... + $\longrightarrow$ +

- (b) Arwyn wanted to investigate both photosynthesis **and** respiration in plants.

He placed one leaf from a plant in a glass tube containing an indicator solution as shown in **Image 8.1**.

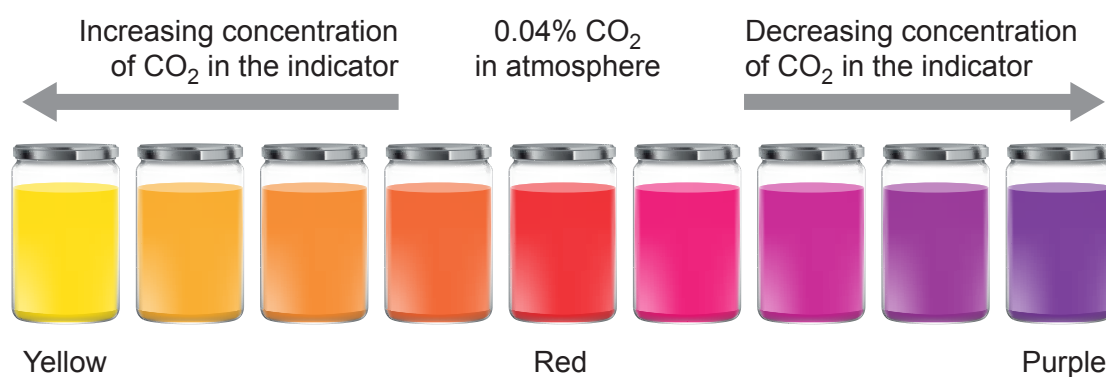
Image 8.1



He left the tube in **darkness** for 12 hours. He then recorded the colour of the indicator solution. He repeated the experiment but left the tube in **bright light** for 12 hours.

The red indicator changes colour in response to the concentration of carbon dioxide present in the solution. This is shown in **Image 8.2**.

Image 8.2



Arwyn recorded his observations in **Table 8.3**.

Table 8.3

Tube kept in	Colour of indicator solution	
	start	at 12 hours
darkness	red	yellow
bright light	red	purple

- (i) Describe how the **concentration of carbon dioxide** changed in each tube over the 12 hours. [1]

Tube kept in darkness:

Tube kept in bright light:

- (ii) Use your knowledge of photosynthesis **and** respiration to explain the result for the tube kept in **darkness**. [3]

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END OF PAPER



[illegible]