

Print copy of braille text (UEB)

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WJEC GCSE

3400U10-1

BIOLOGY – Unit 1:

Cells, Organ Systems and Ecosystems

FOUNDATION TIER

MONDAY, 9 JUNE 2025 – MORNING

1 hour 45 minutes (plus your additional time allowance)

ADDITIONAL MATERIALS

A calculator and a tactile ruler.

ITEMS INCLUDED WITH QUESTION PAPER

A separate Diagram Booklet.

Bumpons, Wikki Stix and sticky labels for Question 6 (b).

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INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number on your paper.

Answer ALL questions.

Write your answers on your paper.

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.

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Answer ALL questions.

1. (a) Look at the diagram for Question 1 (a) in the separate Diagram Booklet. The diagram shows a plant cell and the outline of an animal cell.

(i) What is the name of structure A in the animal cell in the diagram?

Ans: ____ [1 mark]

(ii) Use the diagram to:

I. State TWO structures found in BOTH animal and plant cells.

Ans: 1. ____ (1 print line)

Ans: 2. ____ (1 print line)

[2 marks]

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II. State ONE structure which is ONLY FOUND in PLANT CELLS.

Ans: ____ (1 print line) [1 mark]

(b) Look at the list of functions below.

A = site of most chemical reactions

B = controls the activities of the cell

C = controls the substances that enter and leave the cell

D = carries out photosynthesis

For each of the following structures choose its correct function.

Ans: chloroplast: function ____

Ans: nucleus: function ____

Ans: cell membrane: function ____

Ans: cytoplasm: function ____

[3 marks]

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(c) Look at the diagram for Question 1 (c) in the separate Diagram Booklet. The diagram represents a stained human cheek cell as seen using a microscope.

(i) State the purpose of staining the cell.

Ans: ____ (2 print lines) [1 mark]

(ii) USE A RULER to measure the length of line X–X in the diagram in mm.

Ans: Length of line X–X = ____ mm [1 mark]

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(iii) The actual width of the cell at X–X is 0.06 mm.

Use the equation below to calculate the magnification of the cell.

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

Ans: Magnification of the cell = × ____ [2 marks]

(Total for Question 1 = 11 marks)

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2. Look at the diagram for Question 2 in the separate Diagram Booklet. The diagram shows the human digestive system.

(a) Look at the list of words below.

large intestine
small intestine
gall bladder
pancreas
liver
stomach

Label the structures A, B and C in the diagram using some of the words from the list.

Ans: structure A ____

Ans: structure B ____

Ans: structure C ____

[3 marks]

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(b) COMPLETE THE FLOW CHART **BELOW** SHOWING THE CORRECT ORDER in which food travels from the mouth into the bloodstream.

Choose words from the **following** list:

liver
stomach
oesophagus
pancreas
small intestine

mouth → 1. ____ → 2. ____ → 3. ____ → bloodstream

Ans: 1. ____

Ans: 2. ____

Ans: 3. ____

[3 marks]

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(c) Look at the diagram for Question 2 (c) in the separate Diagram Booklet.
The diagram shows a graph.

Being overweight is an increasing problem for many people in Wales.

The graph shows the percentage of the Welsh population that was overweight in 2016 by age.

(i) Describe the trend shown in the graph.

Ans: ____ (2 print lines) [1 mark]

(ii) Suggest ONE reason for this trend.

Ans: ____ (2 print lines) [1 mark]

(iii) State the TWO food groups that can cause obesity if eaten to excess.

Ans: 1. ____

Ans: 2. ____

[2 marks]

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(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.

Ans: Number of overweight people = ____ [2 marks]

(Total for Question 2 = 12 marks)

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3. Look at the diagram for Question 3 in the separate Diagram Booklet.

Students carried out an investigation into the energy released by living organisms. They used peas as their example of a living organism.

The diagram shows the apparatus they set up.

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 **the table below**.

Time (days)	Temperature (°C)	
	Flask A	Flask B
1	19	19
2	22	19
3	22	19
4	28	19
5	31	19

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(a) (i) COMPLETE THE SENTENCE to describe the trend shown in the results in **the table** for Flask A.

Ans: As time increases, the temperature _____. [1 mark]

(ii) **Choose** the correct term from the list below to give the name of the process that caused the temperature change in Flask A.

photosynthesis

respiration

decomposition

digestion

Ans: ____ [1 mark]

(iii) COMPLETE THE WORD EQUATION for **the** process **given below**.

(i) ____ + oxygen → (ii) ____ + water + energy

Ans: (i) ____ (ii) ____ [2 marks]

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(b) State TWO variables that the students controlled in this investigation.

Ans: **variable** (i) ____

Ans: **variable** (ii) ____

[2 marks]

(c) Flask B contained boiled peas.

Explain why the temperature in Flask B did not change.

Ans: ____ (4 print lines) [2 marks]

(d) State the purpose of the disinfectant.

Ans: ____ (2 print lines) [1 mark]

(Total for Question 3 = 9 marks)

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4. Look at the diagram for Question 4 in the separate Diagram Booklet.

Doctors use a procedure called coronary angioplasty to widen blocked or narrowed coronary arteries. This method is shown in the diagram.

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.

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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) Look at the list of five statements below.

For each statement, write whether you think it is TRUE or FALSE.

One has been done for you.

Statement 1: A possible symptom of narrowing of coronary arteries is dizziness and fainting.

Statement 2: The aim of angioplasty is to improve blood flow to the heart muscle cells.

Statement 3: Angioplasty is carried out whilst you are unconscious.

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Statement 4: Stents are inserted by cutting open the heart during surgery.

Statement 5: Angioplasty always involves a stent.

Ans: Statement 1: TRUE

Ans: Statement 2: ____

Ans: Statement 3: ____

Ans: Statement 4: ____

Ans: Statement 5: ____

[3 marks]

(b) Suggest the benefit of using a stent in angioplasty.

Ans: ____ (2 print lines) [1 mark]

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

Ans: ____ (6 print lines) [3 marks]

(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.

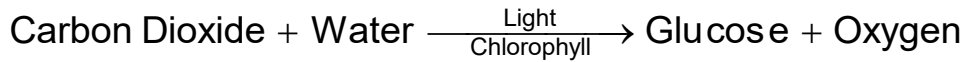
Suggest a reason why the patient with narrowed coronary arteries needs a higher resting heart rate.

Ans: ____ (3 print lines) [1 mark]

(Total for Question 4 = 8 marks)

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



Look at the diagram for Question 5 in the separate Diagram Booklet.
The diagram shows a section through the leaf.

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

Ans: ____ (15 print lines) [6 QER marks]

(Total for Question 5 = 6 marks)

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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 the diagram for Question 6 in the separate Diagram Booklet.

(a) State the name of the apparatus used.

Ans: ____ [1 mark]

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(b) The results from the experiment are shown in the table below.

Temperature (°C)	Volume of water lost in 30 minutes (cm ³)			
	Trial 1	Trial 2	Trial 3	Mean
20	1.0	1.1	1.0	1.0
25	3.7	3.5	3.4	3.5
30	5.6	5.4	5.5	5.5
35	8.0	8.0	8.0	8.0
40	10.2	10.5	12.3	11.0

Look at the diagram for Question 6 (b) in the separate Diagram Booklet.
The diagram is a partially labelled grid.

On the grid, DRAW A LINE GRAPH of the mean results by:

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(i) completing the scale for temperature; [1 mark]

(ii) plotting the MEAN RESULTS from the table; [2 marks]

(iii) using a ruler to join the plots. [1 mark]

A spare tactile diagram, bumpons, Wikki Stix and sticky labels are provided for this question.

(c) Describe the effect of temperature on the volume of water lost.

Ans: ____ (3 print lines) [1 mark]

(d) Calculate the mean volume of water lost PER MINUTE at a temperature of 30°C.

GIVE YOUR ANSWER TO ONE DECIMAL PLACE.

Ans: Mean volume of water lost = ____ cm³/min [3 marks]

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(e) (i) I. State the temperature that gave the most repeatable results.

Ans: Temperature = ____ °C [1 mark]

II. Explain your choice.

Ans: ____ (2 print lines) [1 mark]

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

Ans: ____ (1 print line) [1 mark]

(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.

Ans: Independent variable ____

Ans: Dependent variable ____

[2 marks]

(Total for Question 6 = 14 marks)

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7. Look at the diagram for Question 7 in the separate Diagram Booklet.
The diagram shows part of the carbon cycle.

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

Ans: A ____

Ans: C ____

Ans: D ____

[3 marks]

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

Ans: ____ [1 mark]

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

Ans: ____ [1 mark]

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(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:

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

to calculate the percentage increase in yield.

Ans: Percentage increase in yield = ____ [2 marks]

(ii) Other than water and carbon dioxide, state TWO substances that could have been used to increase the strawberry yield.

Ans: 1. ____

Ans: 2. ____

[2 marks]

(Total for Question 7 = 9 marks)

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8. Look at the diagram for Question 8 in the separate Diagram Booklet.

Students investigated the effect of temperature on a carbohydrase enzyme using the apparatus shown in the diagram.

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

Ans: ____ (1 print line) [1 mark]

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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 the table below.

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

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(b) Look at the diagram for Question 8 (b) in the separate Diagram Booklet.

The diagram shows a graph of percentage of starch against temperature.

COMPLETE THE TABLE using data from the graph.

Ans: Percentage of starch remaining after 5 minutes at 40°C = ____ [1 mark]

(c) (i) Using the data from the graph, identify the optimum temperature for the carbohydrase in this investigation.

Ans: ____°C [1 mark]

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

Ans: ____ (4 print lines) [2 marks]

(iii) Explain the results at 60°C.

Ans: ____ (6 print lines) [3 marks]

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

(i) Name the reagent used to test for starch.

Ans ____ (1 print line) [1 mark]

(ii) Predict the colour that would be seen at the end of the test AND explain your answer.

Ans: ____ (4 print lines) [2 marks]

(Total for Question 8 = 11 marks)

TOTAL FOR PAPER = 80 MARKS

END OF PAPER
