

WJEC

GCSE

WORKBOOK

Biology

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Higher tier
Suitable for
Biology GCSE and
Science (Double
Award) GCSE
Answers online

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1 This workbook will help prepare you for the WJEC GCSE Biology exams.

2 Your exams will include a range of short, structured questions and longer questions requiring continuous prose. On each of the exam papers there will also be a 6-mark question that will test your biological knowledge and the quality of your written communication. The exam questions will cover the following assessment objectives:

- AO1 — Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures.
- AO2 — Apply knowledge and understanding of scientific ideas, processes, techniques and procedures.
- AO3 — Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, in order to: make judgements and reach conclusions, and develop and refine practical design and procedures.

This workbook will help you develop the skills to answer all these different question types.

3 For each topic, there are:

- stimulus materials, including key terms and concepts
- short and longer exam-style questions
- space for you to write your answers

4 Answering the questions will help you develop your skills and meet the assessment objectives AO1 (knowledge and understanding), AO2 (application) and AO3 (analysis and evaluation).

5 You still need to read your textbook and refer to your revision guides and lesson notes.

6 Timings are given for the exam-style questions to make your practice as realistic as possible.

7 Marks available are indicated for all questions so that you can gauge the level of detail required in your answers.

8 Answers are available at www.hoddereducation.co.uk/workbookanswers

Cells, organ systems and ecosystems

Cells and movement across membranes

Substances are able to move across membranes in three different ways: diffusion, osmosis and active transport.

Methods of movement across membranes

Method	Description	Direction	Example
Diffusion	Passive process	High concentration to low concentration	Oxygen and carbon dioxide into and out of cells
Osmosis	Diffusion of water through a selectively permeable membrane	High water concentration to low water concentration	The movement of water across the cell membrane
Active transport	Active process	Low to high concentration	Mineral salts into root hairs

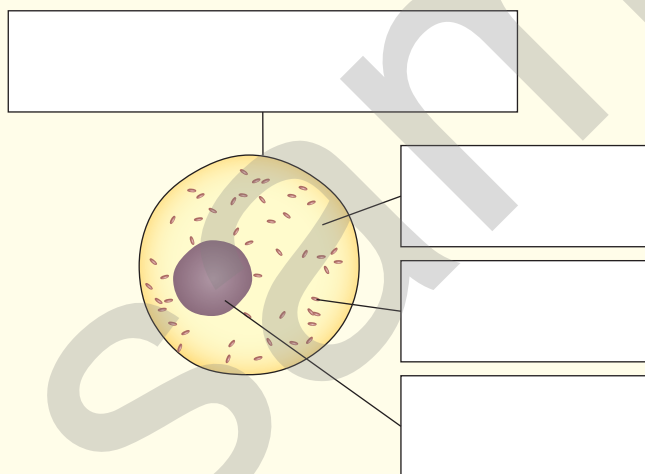
1 a Underline the correct definition of a tissue in the following statements.

1 mark

- Group of similar cells with a similar function
- Fundamental unit of living organisms
- System that works with other systems to form an organism

b Label the diagram of a cell below.

2 marks



c Match the following structures to their correct functions using connecting lines.

2 marks

Structure
Chloroplast
Mitochondrion
Nucleus

Function
Aerobic respiration
Contains the cell's DNA
Photosynthesis

- i A light microscope was used to observe a sample of cells. The objective lens used has a magnification of x 4 and the eyepiece lens has a magnification of x 10. What is the total magnification of the microscope? Show how you arrived at your answer.

2 marks

- ii The sample of cells were stained before being examined. Explain the importance of doing this.

1 mark

- iii Match up the type of microscope with the sample being studied and in each case give a reason for your answer.

3 marks

Electron microscope

Light microscope

Sample	Type of microscope	Reason
A single-celled organism that needs to be observed feeding		
Observing very small structures within a mitochondrion		

- d By what process does oxygen move through cell membranes?

1 mark

- e Give two ways in which active transport differs from diffusion.

2 marks

- f What term is given to the diffusion of water through a selectively permeable membrane from a region of high water concentration to a region of low water concentration?

1 mark

- g When plant cells are placed in some solutions water moves out of the vacuole into the surrounding solution.

- i What statement could be made about the water concentration of the solution compared to the vacuole of the cell? Explain your answer.

2 marks

- ii Plants placed in this type of solution were observed to wilt. Explain this observation.

1 mark

- h What type of molecule is an enzyme? Place a tick next to the correct answer.

1 mark

■ Lipid

■ Protein

■ Carbohydrate

i How is an enzyme–substrate complex formed?

2 marks

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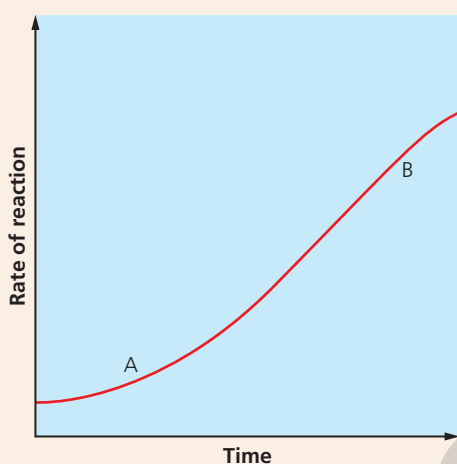
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Exam-style questions

10

- 1 The graph below shows the results of an investigation into the effect of temperature on an enzyme-catalysed reaction.



- a Using the idea of molecular collisions, explain the differences in rate of reaction at A and B.

3 marks

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- b Why was it important to ensure the pH remains the same during this investigation?

2 marks

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- c In a follow-up experiment the enzyme was heated to 100°C. The rate of reaction was zero. Why did this occur?

2 marks

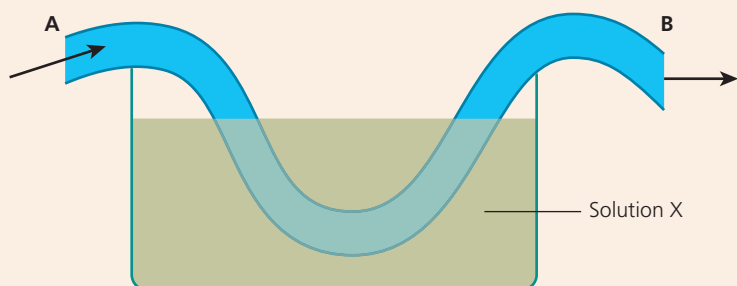
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Exam-style questions

- 2 An experiment was conducted into the movement of molecules through Visking tubing. The tubing contains pores of a fixed diameter. The experiment was set up as shown below.



A solution containing glucose and protein was passed through the tubing from A to B. The concentrations at the start (A) and end (B) of the tube were recorded. The results are shown below.

Molecule	Concentration at the start of the tube (A)	Concentration at the end of the tube (B)	Concentration in solution X
Glucose	6	2	2
Protein	3	3	8

All values are arbitrary units of concentration.

- a i Explain the results for glucose.

2 marks

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- ii What can be deduced about the size of the protein molecules from these results?

2 marks

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- b In the intestines substances are able to move from a low concentration to a high concentration. Explain how this occurs.

2 marks

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- c What is the percentage change in glucose concentration between the start and end of the tube?

2 marks

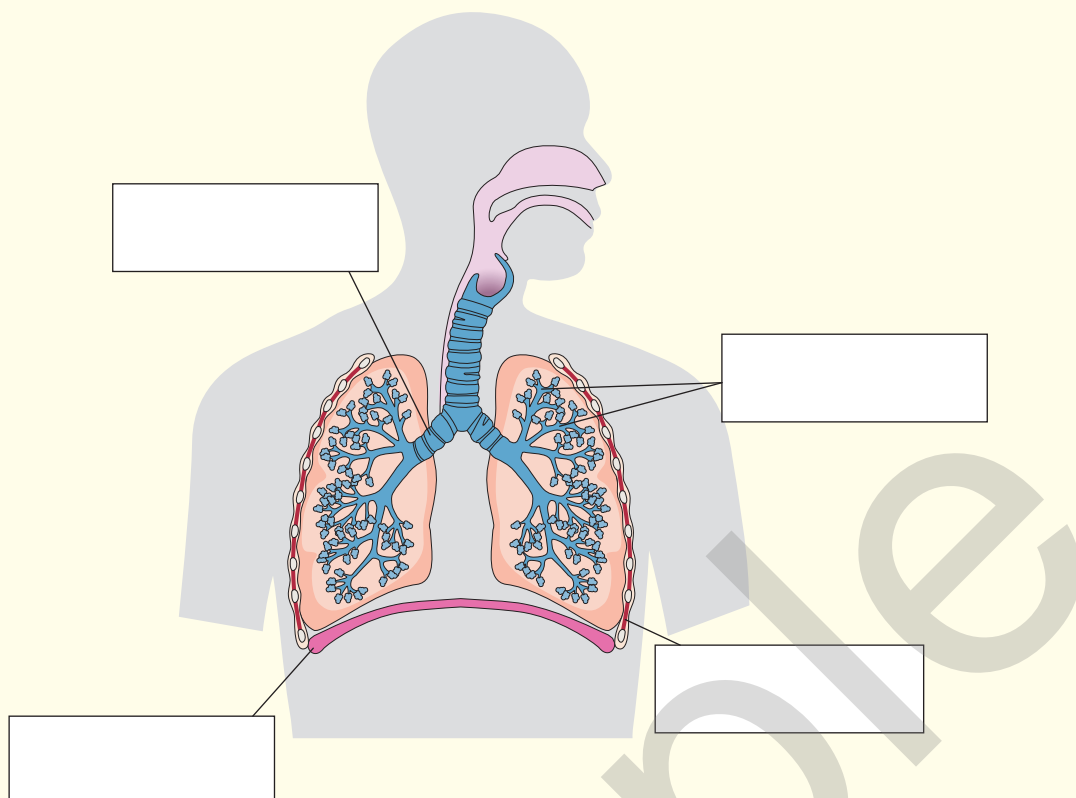
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- 2 a Label the diagram of the respiratory system below.

3 marks



- b Use the following phrases to complete the table below showing what occurs during inspiration and expiration.

3 marks

Diaphragm contracts and flattens

Lung volume increases

Rib cage moves down and in

Rib cage moves up and out

Diaphragm relaxes and rises

Lung volume decreases

Inspiration	Expiration

- c An amoeba is a single-celled organism with a diameter of approximately 0.2 mm. Amoebas lack a complex respiratory system, whilst all mammals have a complex respiratory system. Suggest a reason for this difference.

2 marks

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d Explain the importance of mucus and cilia in the respiratory system.

2 marks

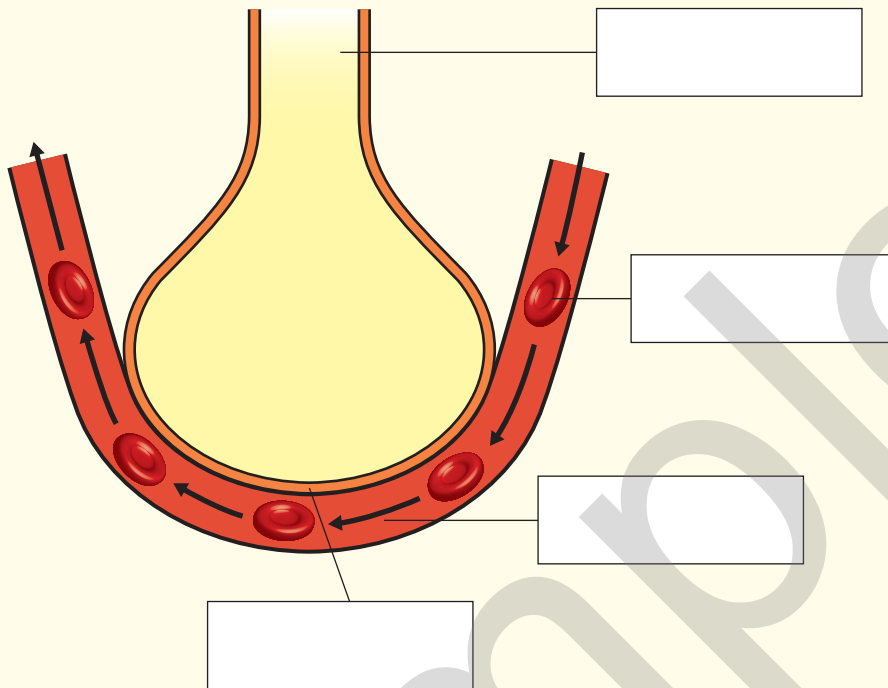
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3 a Label the diagram below of an alveolus.

3 marks



b i Apart from having a moist lining, give three adaptations of the alveoli for gas exchange.

3 marks

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ii How do the adaptations in (i) ensure that gas exchange occurs efficiently?

2 marks

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c Identify the problems caused by these constituents of cigarette smoke.

i Tar

1 mark

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ii Nicotine

1 mark

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