

Worksheet 1: Cell structures

Extracting key information from text is an important study skill for A-level candidates.

Read through the passage below about animal, plant and bacterial cells. Use the information and your own knowledge to complete the table to list some of the structural features of animal, plant and bacterial cells.

The plant cell and the animal cell possess a nucleus containing chromosomes and a nucleolus. In a bacterial cell the DNA is located in the cytoplasm. Only the bacterial cell and the plant cell have a cell wall but all three cells have a cell membrane. The plant cell wall is made of cellulose and the bacterial cell wall is made of peptidoglycan.

Centrioles are present only in the animal cell and chloroplasts are found only in the plant cell. Mitochondria and rough endoplasmic reticulum are not present in the bacterial cell. All three cells contain structures called ribosomes, which are involved in the synthesis of protein. Bacterial cells can have pili or a capsule.

Features present in animal cells	Features present in plant cells	Features present in bacterial cells

Research a function for each feature listed.

Worksheet 2: Data analysis

Processed data should be recorded to the same number of decimal places as the primary data.

This table shows the same data recorded to different numbers of decimal places:

Data set 1	Data set 2
2.4	2.37
3.6	3.55
4.1	4.05
2.8	2.76
3.5	3.51

- 1 Compare the mean values for data set 1 and data set 2.
- 2 Express data set 2 to 1 decimal place. What do you notice?
- 3 Explain why it is incorrect to record 3.28 as the mean for data set 1.

Being able to convert data, using standard form and different units, is an important skill.

- 4 Convert the data in the table below:

Data		Value
45 100 g	into standard form	
45 100 g	into kilograms	
34 ms	into seconds	
780 μm	into millimetres	
0.25×10^{-9} s	into nanoseconds	

Worksheet 3: Biological prefixes

Scientific terms use common prefixes.

Find out the definition/meaning of the prefixes shown in the table.

Word/prefix	Definition/meaning
endo-	
exo-	
pulmonary	
cardiac	
hepatic	
mono-	
di-	
photo-	
haem	
bio-	
chemo-	

Worksheet 4: Keywords

Candidates frequently lose marks in examinations because they do not use sufficient key words in detailed responses.

Read the responses to the questions below. Using the keywords from the box write improved answers to the questions.

concentration		capillaries		vein	
	diffusion		thin		semi-lunar
right		pulmonary		valve	
	gradient		atrioventricular		left
aorta		vena cava		artery	
	thick		osmosis		

- 1 Explain how oxygen enters the blood at the alveoli.

'In the alveolus oxygen from the air moves into the blood vessels through the walls of the alveolus. The blood is moving so there is always a low concentration in the blood.'

- 2 Describe the route blood takes from the lungs to the body.

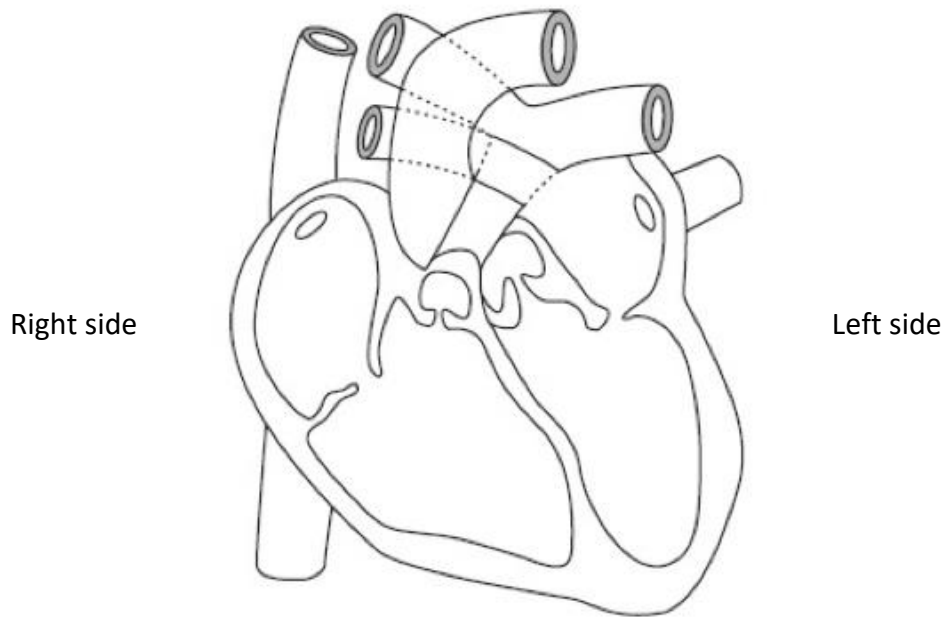
'Blood from the lungs blood travels through a vein to the atrium. The blood is pumped from the atrium into the ventricle and then into the aorta.'

Worksheet 5: Practice questions (1)

- 1 Write a definition for each word in the table below. If possible, also give a structural feature for each key word:

Key word	Definition / structural feature
Atria	
Ventricles	
Aorta	
Vena cava	
Pulmonary artery	
Pulmonary vein	
Atrio-ventricular valves	
Septum	
Semi-lunar valves	
Diastole	
Systole	

2 Label this diagram of the heart using as many of the key words from Q1 as possible.



Use the keywords from **Q1** in your answers to the following questions:

3 Explain why the left ventricle has thicker chamber walls than the right ventricle and the atria.

4 Describe the role of the atrio-ventricular valves.

Worksheet 6: Practice questions (2)

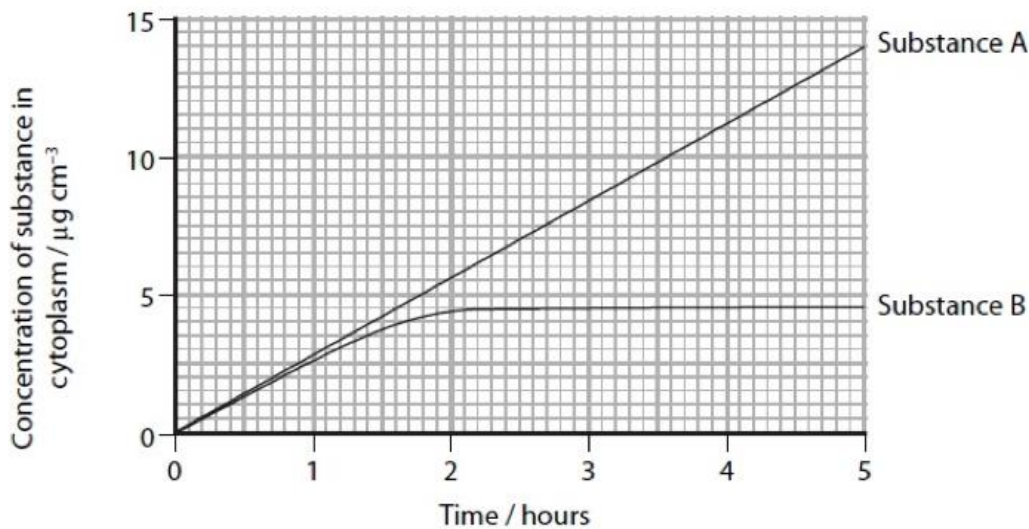
Amoeba is a single-celled aquatic organism. Substances in the water can enter the cell by a variety of mechanisms.

An experiment was carried out to compare the uptake into *Amoeba* of substance A and substance B.

Some of these organisms were placed in a solution containing equal concentrations of both substances and kept at 25°C.

The concentration of substances A and B, in the cytoplasm of these organisms, was measured every 30 minutes over a period of 5 hours.

The results of this experiment are shown in the graph below.



- Using the information in the graph, compare the uptake of substance A with the uptake of substance B during this period of 5 hours.
- Substance B enters the cells by diffusion. Describe and explain how the results of this experiment support this statement.
- Substance A enters the cells by active transport. Give two differences between active transport and diffusion.
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