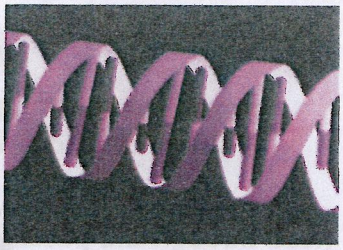


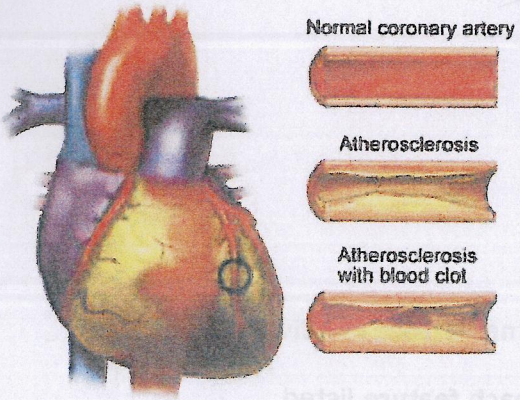
A Level SNAB Biology

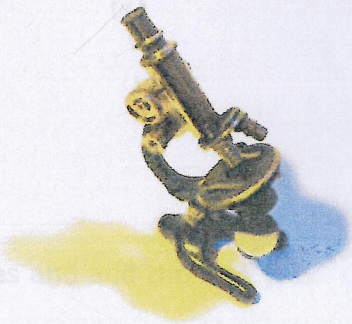
2018 – 2019

Transition /Induction Activities

To be completed by Tuesday 4th September and handed in to the Biology department

- Name : .....





Worksheet 1: Cell structures 1

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

Extension activity – research a function for each feature listed.

Worksheet 2: Cell structures 2

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 draw and label an animal, plant and bacterial cell. You should include the features listed if appropriate.

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.

cell wall	nucleus	cell membrane	ribosome	capsule
mitochondria	cytoplasm	chloroplast	plasmid	chromosome

Animal cell

Plant cell

Bacterial cell

Extension activity – research any unfamiliar features and add them to your cell diagrams.

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	

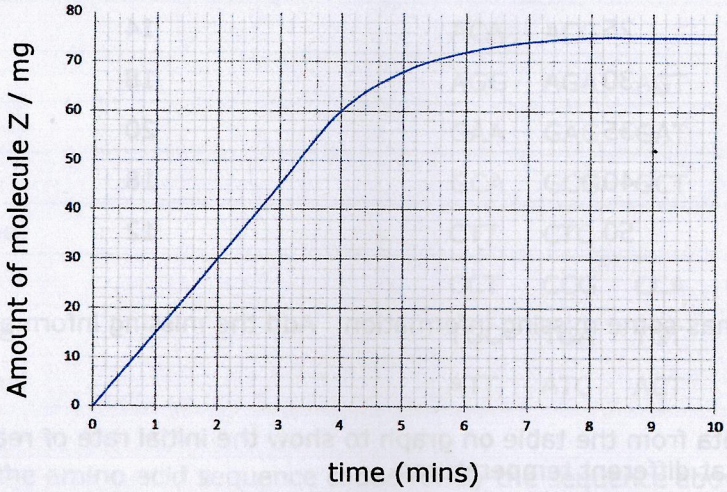
Practice questions

1 Enzyme A catalyses the breakdown of molecule X into Y and Z.

$$X \xrightarrow{\text{Enzyme A}} Y + Z$$

Molecule X and enzyme A were mixed together at 30°C at pH 6.8.

This graph shows the mass of molecule Z formed over a 10 minute time period.



a Calculate the initial rate of reaction of enzyme A.

b What is the rate of reaction of enzyme A after 8 minutes?

c Suggest a reason for the rate of reaction calculated in **b**.

2 Enzyme B catalyses the breakdown of molecule X into Y and Z.

$$X \xrightarrow{\text{Enzyme B}} Y + Z$$

Molecule X and enzyme B were mixed together at different temperatures.

This table shows the initial rate of reaction of enzyme B at 15°C, 25°C, 30°C, 35°C, 40°C and 50°C.

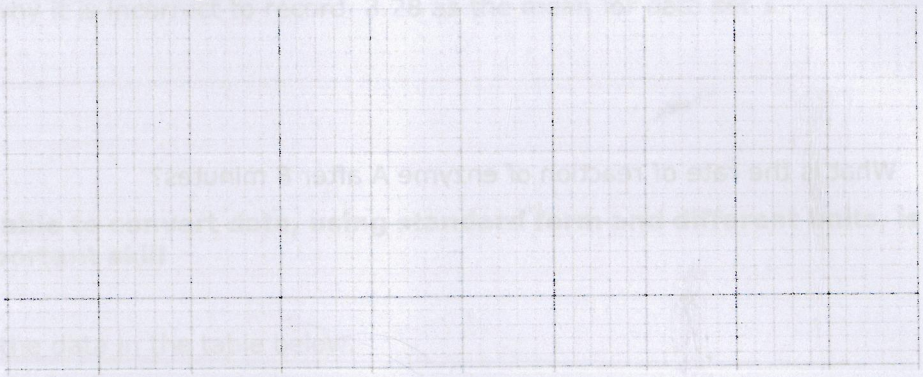
Temperature	Initial rate of reaction of enzyme B ($mmol.min^{-1}$)
15	8
25	14
30	18
35	20
40	18
50	12

a The table has some missing information. Add the missing information to the table.

b Plot the data from the table on graph to show the initial rate of reaction of enzyme B at different temperatures.

You should consider:

- the variable which should be on the x-axis
- the labels for the axis
- the title of the graph.



c Compare different rates of reaction of enzyme B at 20°C, 37°C and 45°C.

For questions which involve the use of data from a graph you must use scientific knowledge to explain the data you have extract from the graph.

3 Mutations in DNA can impact on the activity of enzymes.

This DNA sequence is from the region of the gene which codes for the active site of an enzyme.

GAA GAG AGT GGA CTC ACA GCT CGG

The table shows the amino acid coded for by some codons.

Amino acid/stop signal	**DNA triplet codons**			
Proline	GGT	GGG	GGA	
Alanine	CGG	CGA	CGT	CGC
Cysteine	ACA	ACG		
Serine	AGG	AGA	AGT	AGC
Leucine	GAA	GAG	GAT	GAC
Arginine	GCA	GCG	GCT	GCC
Glutamine	CTT	CTC		
Gkycine	CCT	CCG	CCA	CCC
Threonine	TGC	TGA	TGT	TGG
Stop signal	ATT	ATC	ACT	

a State the amino acid sequence coded for by the sequence above.

b Using the information above explain the effect on the protein produced for the following mutations.

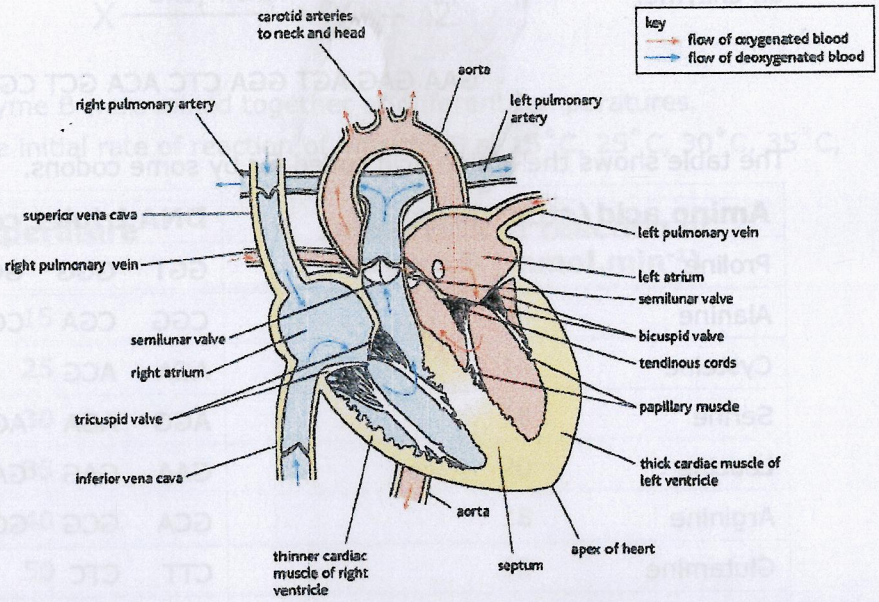
GAA GA**T** AGT GGA CTC ACA GCT CGG

GAA GAG AGT GGA CTC **C**CA GCT CGG

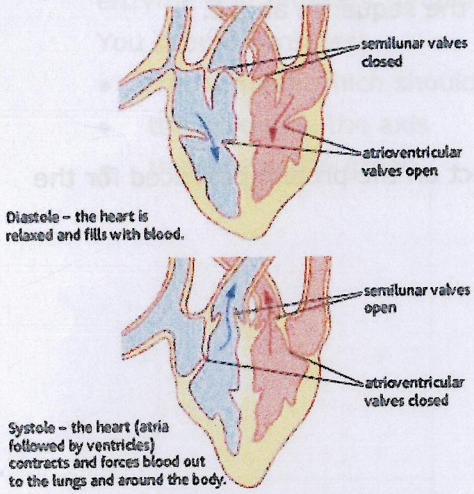
GAA GAG AGT GGA CTC ACA **A**CT CGG

Summary sheet 1: Heart and lungs

The left side of the heart pumps oxygenated blood from the lungs around the body. The blood enters the left atrium from the pulmonary vein. It flows through the atrioventicular or bicuspid valve to the left ventricle. The blood is then pumped into the aorta, through a semi-lunar valve, and around the body.



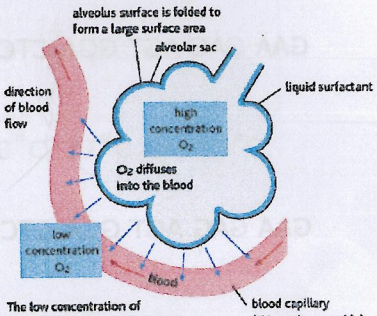
The right side of the heart pumps deoxygenated blood from the body back to the lungs. The blood returns from the body to the right atrium via the vena cava. It flows through the atrioventicular or tricuspid valve to the right ventricle. The blood is then pumped into the pulmonary artery, through a semi-lunar valve, and to the lungs.



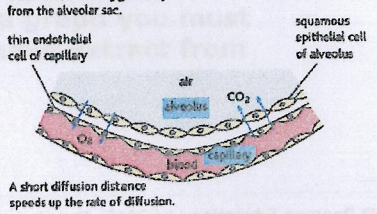
The atrioventricular valves between the atrium and ventricles open to allow blood to flow from the atrium into the ventricles and close when the pressure in the ventricles rises to prevent back flow.

The semi-lunar valves in the aorta and pulmonary artery open to allow blood from the ventricles to flow into the arteries. They close to prevent backflow into the ventricles as the heart relaxes.

Oxygen enters the blood in the alveoli of the lungs. Oxygen in the alveolus is at a high concentration and it diffuses down the concentration gradient into the blood which has a low concentration of oxygen. This low concentration is maintained because the blood is moving and carries the oxygen away.

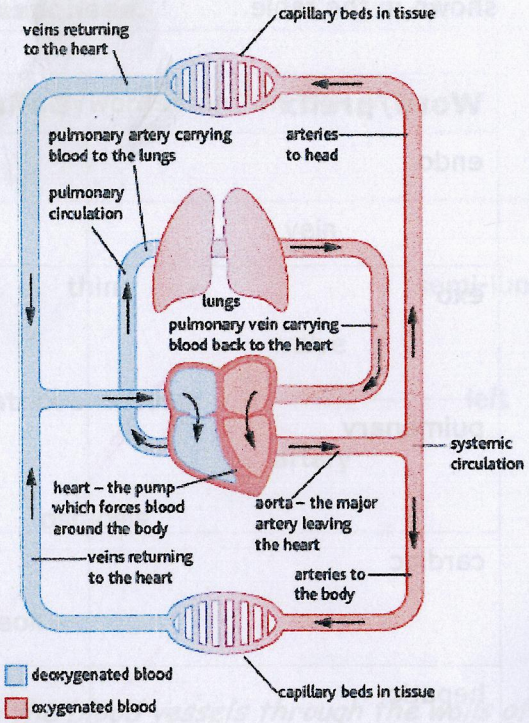


The walls of the alveolus and capillaries are only one cell thick. This creates a short diffusion distance between the alveolus and the blood allowing a high rate of diffusion.



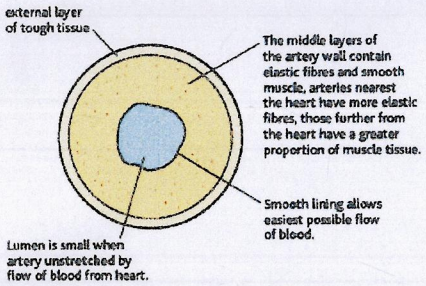
Summary sheet 2: Circulatory system

Blood flows around the body via a network of arteries, veins and capillaries.

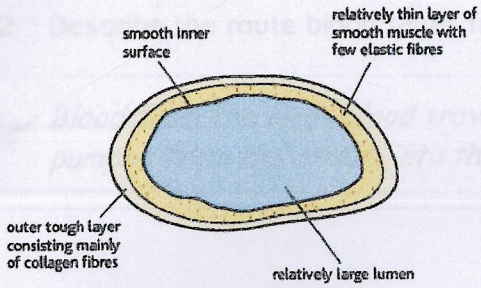


The double circulation system of mammals means that blood flows through the heart twice in one complete cycle of the body.

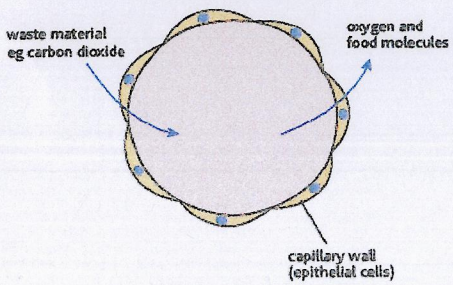
The pulmonary system pumps blood around the lungs and the systemic system pumps blood around the rest of the body.



Arteries carry blood away from the heart. The vessel walls are thick and muscular with elastic fibres to withstand the high pressure generated by the heart.



Veins carry blood from capillary beds back to the heart. The blood is at low pressure and the walls of the vessels are relatively thin with less elastic fibre. The contraction of muscles help push the blood though veins and the vessels have valves to prevent backflow.



Capillaries are thin vessels that form capillary networks around tissues. They allow the exchange of substances such as oxygen, glucose and waste materials between cells and the blood.

Worksheet 1: 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 2: 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.

Practice questions

1 a Write a definition for each key word in the box. If possible give a structural feature for each key word.

atria	ventricles	aorta	vena cava	pulmonary artery
pulmonary vein	atrioventricular valves	septum		
semi-lunar valves	diastolye	systole		

atria:

ventricles:

aorta:

vena cava:

pulmonary artery:

pulmonary vein:

atrioventricular valves:

septum:

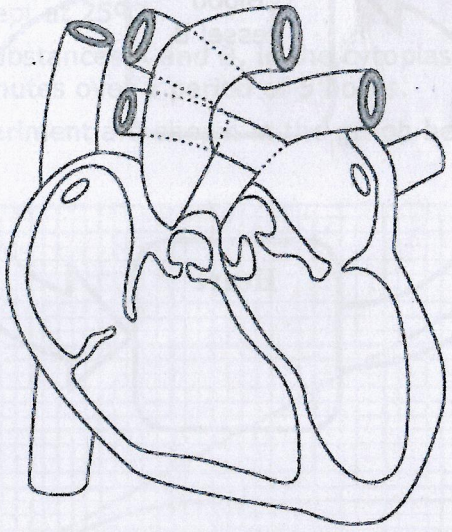
semi-lunar valves:

diastolye:

systole:

b Label this diagram of the heart using as many of the key words from **1 a** as possible.

Right side



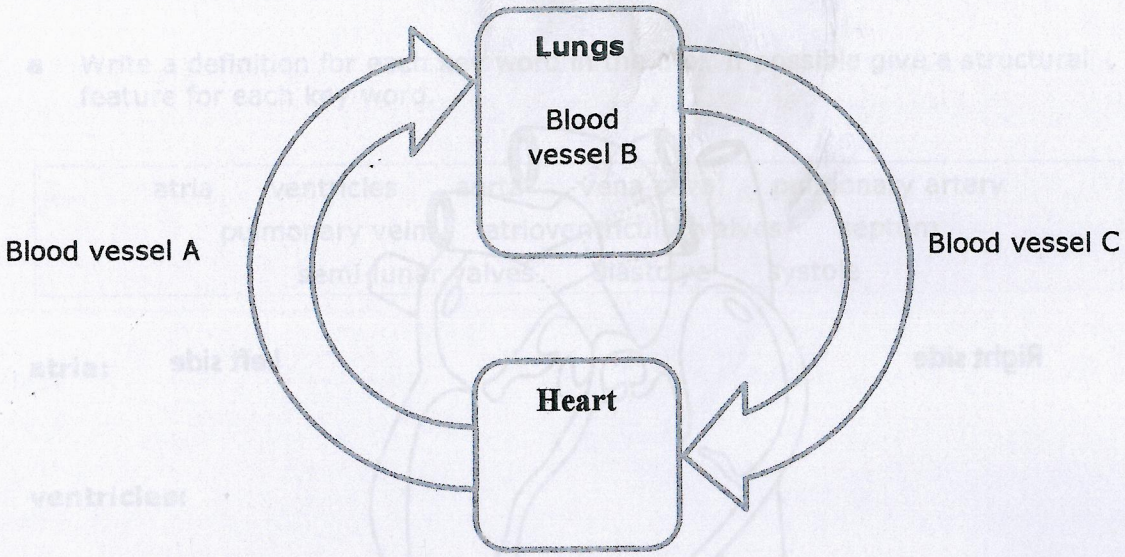
Left side

c Use the keywords from **1 a** in your answers to the following questions.

i Explain why the left ventricles has thicker chamber walls than the right ventricle and the atriums.

ii Describe the role of the atrioventricular valves.

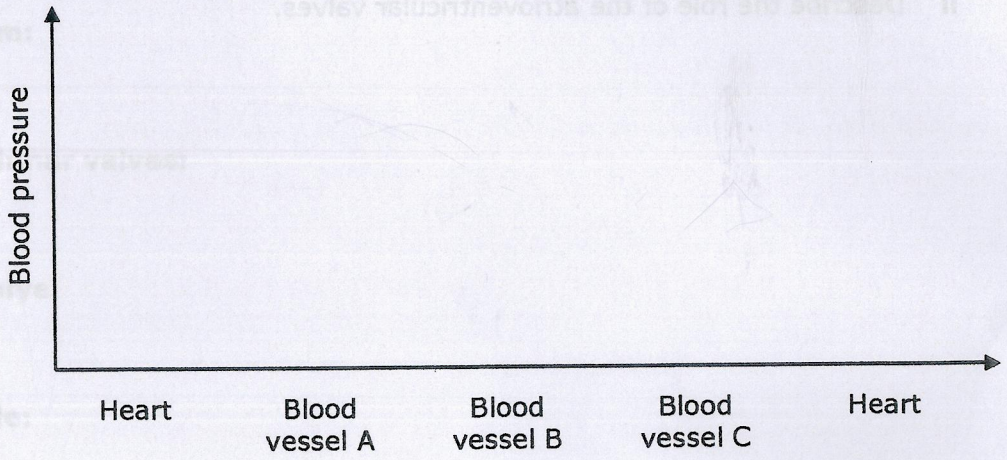
2 This flow diagram shows the part of the circulation system in a mammal.



a Complete a table to show conditions of blood vessel A, B and C.

Blood vessel	Type of vessel	Level of oxygen saturation	Relative pressure of the blood	Valves present in the vessel	Thickness of blood vessel walls
A					
B					
C					

b Draw a line on the axis to show the blood pressure changes in the blood as it flows from the heart to the lungs before returning to the heart.



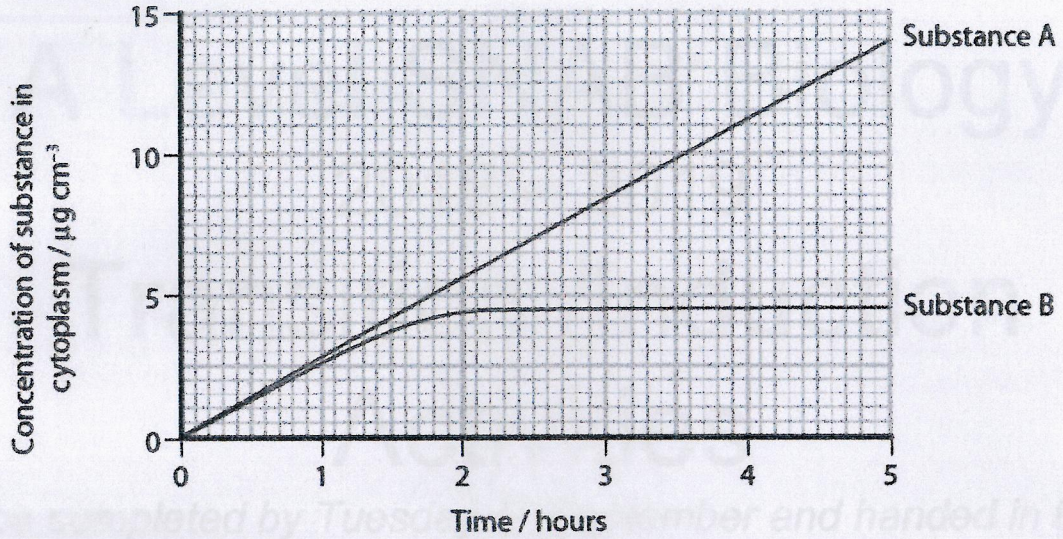
3 *Amoeba* is a single-celled aquatic organism. Substances in the water can enter the cell by a variety of mechanisms.

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.



a Using the information in the graph, compare the uptake of substance A with the uptake of substance B during this period of 5 hours.

b Substance B enters the cells by diffusion. Describe and explain how the results of this experiment support this statement.

c Substance A enters the cells by active transport. Give **two** differences between active transport and diffusion.

1

2