

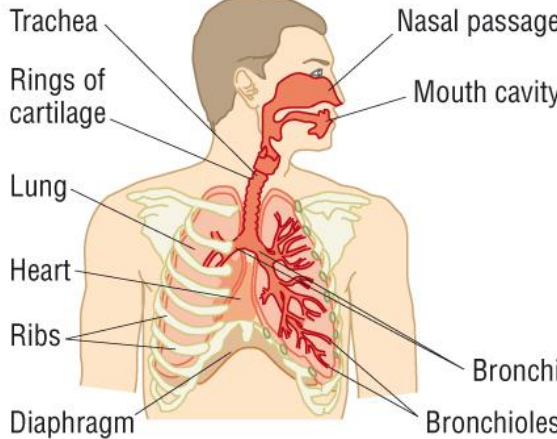
Task 1 Specialised Exchange Surfaces Research.

Example 1 Mammalian Lungs, Alveoli and Exchange

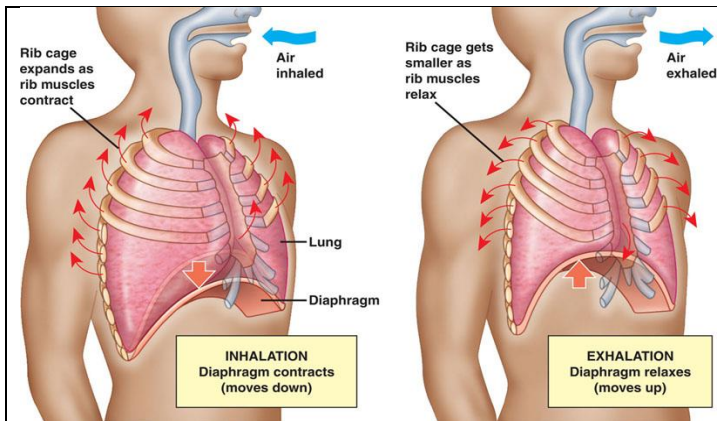
FOR EACH EXAMPLE the aim is for you to be able to:

1. Name the substances exchanged
2. Describe key processes involved with increasing mass movement of air or water = ventilation
3. Describe key structures and tissue types and adaptations using A level terminology
4. Describe and explain the transfer methods diffusion/ osmosis/ active transport

Describe the key structures of a mammalian lung

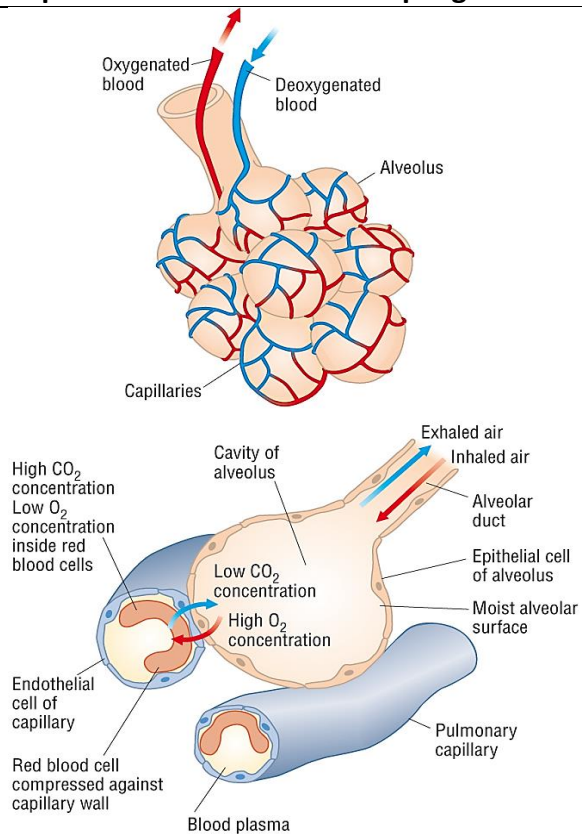
 <p>The diagram illustrates the human respiratory system within the torso. Labels on the left side point to the Trachea, Rings of cartilage, Lung, Heart, Ribs, and Diaphragm. Labels on the right side point to the Nasal passage, Mouth cavity, Bronchi, and Bronchioles. The trachea is shown as a large tube with cartilaginous rings, branching into bronchi and then into a dense network of bronchioles leading to the lungs.</p>		
Part	Location/ function	Features/ tissue arrangement
Lungs		
Trachea		
Bronchus		
Cartilage		
Bronchioles		
Alveoli		

Ventilation and the mass movement of air in and out of the lungs



	Inspiration [inhaling]	Expiration [exhaling]
Diaphragm		
External intercostal muscles		
Internal intercostal muscles		
Relative change in volume of chest cavity		
Pressure in chest cavity relative to atmospheric		
Subsequent direction of air movement		
Explanation for ventilation linked to concentration gradients of oxygen and carbon dioxide		

Adaptation of the alveoli for rapid gas exchange.



Tissue or substance	Descriptions	Adaptation linked rapid rate of diffusion
Alveoli number in lungs		
Alveolus size linked to SA/Vol		
Epithelial cells of the alveolus		
Surfactant		
Endothelial cells of the capillary		
Red blood cells erythrocytes		

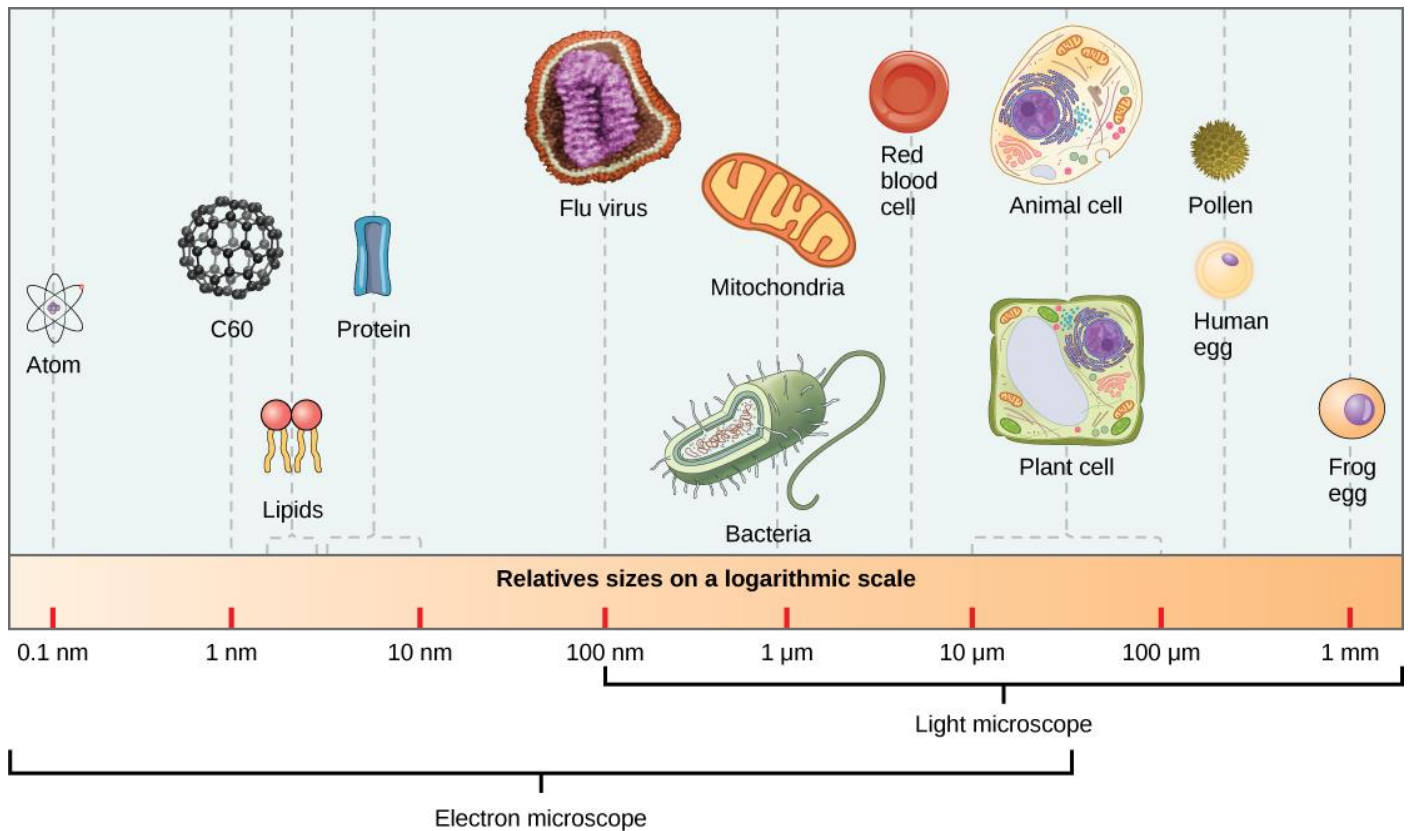
Example 1 Mammalian Lungs, Alveoli and Exchange

FOR EACH EXAMPLE the aim is for you to be able to:

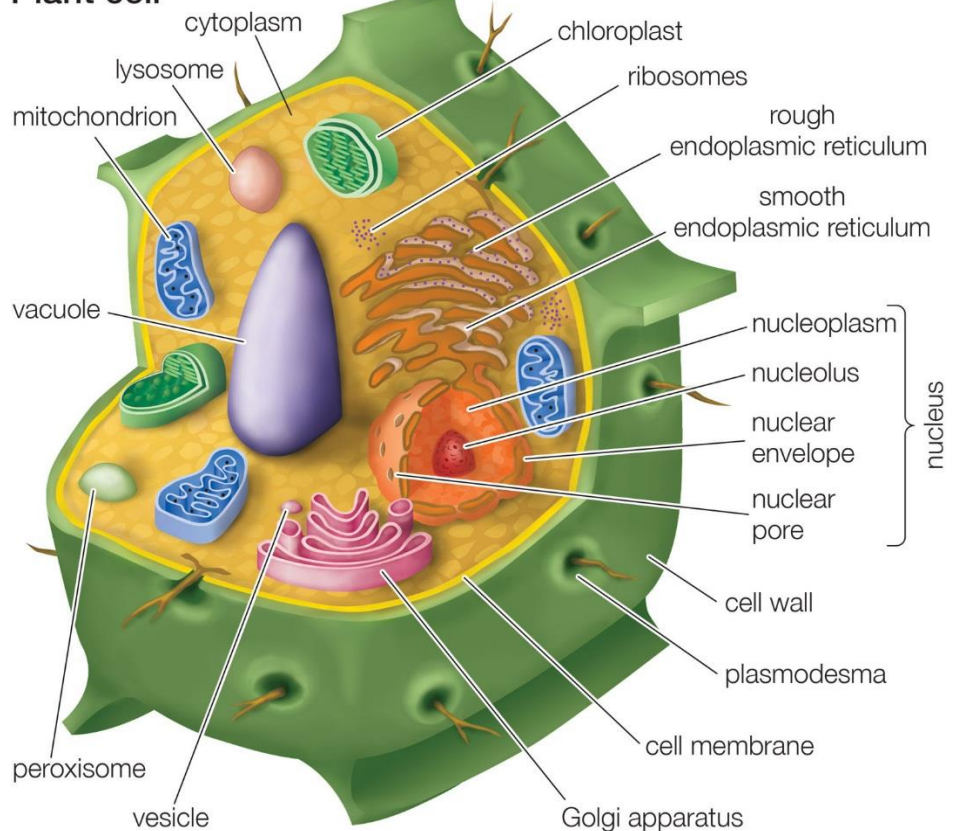
1. Name the substances exchanged
2. Describe key processes involved with increasing mass movement of air or water = ventilation
3. Describe key structures and tissue types and adaptations involved using A level terminology
4. Describe and explain the transfer methods diffusion/ osmosis/ active transport

Extended writing task

Welcome to A-Level Cell Biology and Enter the world of cells; where size does matter!



Plant cell



For each organelle you need to

- Draw an annotated diagram
- Describe its structure using the phrases in the end table
- Describe its function again using the phrases in the end table
- Add extra points to your research.

Organelle	Labelled diagram
Nucleus	
Function of the Nucleus	

Organelle	Labelled diagram
Rough Endoplasmic Reticulum	
Function of the Rough Endoplasmic Reticulum	

Organelle	Labelled diagram
<p data-bbox="97 674 362 819">Smooth Endoplasmic Reticulum</p>	
<p data-bbox="97 1384 1465 1435">Function of the Smooth Endoplasmic Reticulum</p>	

Organelle	Labelled diagram
Golgi Apparatus	
Function of the Golgi Apparatus	

Use the information in the table below to complete your tables

STRUCTURE Points	FUNCTION points
<ul style="list-style-type: none"> <input type="checkbox"/> The largest organelle <input type="checkbox"/> Dark patches are chromatin which consists of DNA wound round histone proteins. <input type="checkbox"/> Surrounded by an envelope a double membrane structure <input type="checkbox"/> Has pores - allows large molecules through like messenger RNA to pass <input type="checkbox"/> Nucleolus inside <input type="checkbox"/> Consists of flattened membrane-bound sacs - which pinched off to form vesicles <input type="checkbox"/> System of membranes, containing fluid filled cavities and is continuous with the nuclear membrane. <input type="checkbox"/> Endoplasmic reticulum with attached Ribosomes <input type="checkbox"/> This part is not surrounded by a membrane and it contains RNA <input type="checkbox"/> Endoplasmic reticulum without attached Ribosomes <input type="checkbox"/> Stack of membrane-bound, flattened sacs <input type="checkbox"/> In mammalian cells, the average is approximately 6 micrometres (μm) 	<ul style="list-style-type: none"> <input type="checkbox"/> Receives proteins from the ER and modifies them adding sugar molecules <input type="checkbox"/> Contains genetic material <input type="checkbox"/> Packages proteins into vesicles to be transported inside cell or to the outside of the cell <input type="checkbox"/> Folds protein molecules into their specific 3D shape <input type="checkbox"/> Chromatin consists of DNA and proteins <input type="checkbox"/> When cells divide, chromatin condenses into visible chromosomes <input type="checkbox"/> Nucleolus makes RNA and ribosomes. <input type="checkbox"/> Provides a large surface area for ribosomes, these assemble amino acids into proteins <input type="checkbox"/> Involved in making Lipids <input type="checkbox"/> Transports proteins made on attached ribosomes <input type="checkbox"/> Contains enzymes involved with the lipid metabolism <input type="checkbox"/> The ribosomes are where protein synthesis takes place assembly line to use mRNA to assemble proteins.

Welcome to A level Biology

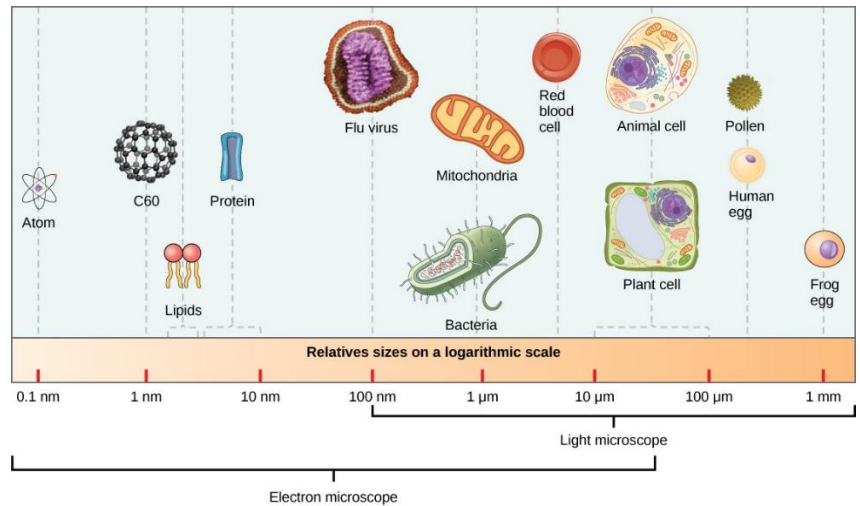
Cells organelles Part 2

The world of cells; where size does matter!

Complete the table as you did for Cell Organelles Part 1

There is a part 3 to cell organelles

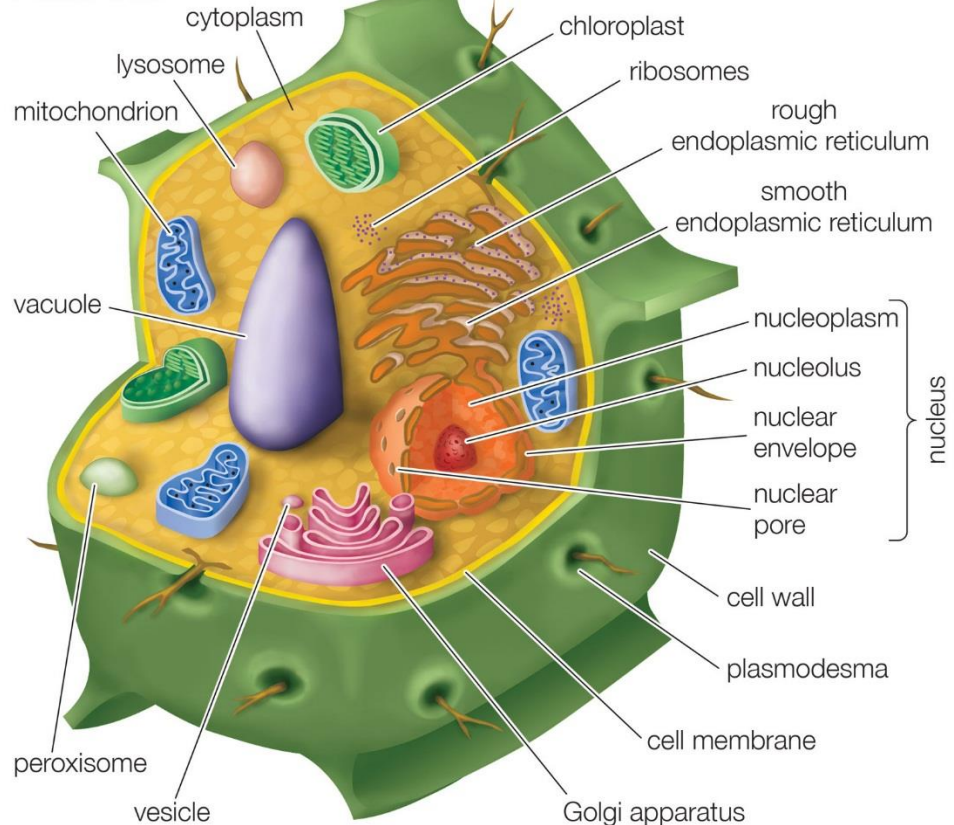
For each of the organelles in Part 1 and 2 write a paragraph in your own words to describe their structure and function, next week you can add the final organelles also.



For each organelle you need to

- Draw an annotated diagram
- Describe its structure using the phrases in the end table
- Describe its function again using the phrases in the end table
- Add extra points to your research.

Plant cell



Cell structure research Part 2

Organelle	Labelled diagram
Mitochondria	
Function of the Mitochondria	

Organelle	Labelled diagram
Chloroplast	
Function of the chloroplasts	

Organelle	Labelled diagram
Vacuole	
Function of the Vacuole	

Organelle	Labelled diagram
Lysosomes	
Function of the Lysosomes	

Organelle	Labelled diagram
Cilia and undulipodia	
Function of the Cilia and undulipodia	

Use the information in the table below to complete table

STRUCTURE	FUNCTION
<ul style="list-style-type: none"> <input type="checkbox"/> Inner membrane is folded to form cristae. <input type="checkbox"/> Central part is the fluid filled matrix. <input type="checkbox"/> Contain a fluid filled matrix called a stroma. <input type="checkbox"/> A stack of thylakoids is called a granum. <input type="checkbox"/> Can be spherical or rod shaped and are 2-5µm long. <input type="checkbox"/> Surrounded by 2 membranes with a fluid space between them. <input type="checkbox"/> These are protrusions from the cell and are surrounded by the cell surface membrane. <input type="checkbox"/> Small single membrane bound bags formed by the Golgi apparatus. <input type="checkbox"/> They are formed from centrioles. <input type="checkbox"/> Each contains microtubules. <input type="checkbox"/> Each stack of thylakoids is called agrana. <input type="checkbox"/> Chlorophyll molecules are located within the thylakoid membranes. <input type="checkbox"/> The inner membrane is a stack of membrane-bound, flattened sacs called thylakoids <input type="checkbox"/> Contain loops of DNA <input type="checkbox"/> Contain a loops of DNA and starch granules <input type="checkbox"/> Spherical sacs surrounded by a single membrane called a tonoplast <input type="checkbox"/> Are large organelles 4-10µm long <input type="checkbox"/> Are only found in plants and protoctist cells <input type="checkbox"/> Surrounded by a double membrane or envelope 	<ul style="list-style-type: none"> <input type="checkbox"/> Contains fluid <input type="checkbox"/> Site of photosynthesis <input type="checkbox"/> Keep hydrolytic enzymes separate from the rest of the cell <input type="checkbox"/> Can fuse with phagosomes/phagocytic vesicles to digest pathogens <input type="checkbox"/> Only plant cells have large permanent ones <input type="checkbox"/> The second stage occurs in the stroma and is when hydrogen reduces carbon dioxide using energy from ATP to make carbohydrates <input type="checkbox"/> Helps to support the plant, when a cell is turgid this pushes the cell membrane against the cell wall <input type="checkbox"/> Spermatozoon have a single undulipodium which uses a whip like action to move the cell <input type="checkbox"/> They are self-replicating <input type="checkbox"/> Are called plastids <input type="checkbox"/> Cells with these line the airways and move mucus <input type="checkbox"/> These beat to move a band of mucus <input type="checkbox"/> They are abundant in cells with a high level of metabolic activity <input type="checkbox"/> Site where ATP is produced during respiration <input type="checkbox"/> There are many of these in phagocytic cells <input type="checkbox"/> Contain hydrolytic digestive enzymes which break down materials <input type="checkbox"/> First stage of photosynthesis take place in the grana, this is where light energy is trapped by chlorophyll to make ATP

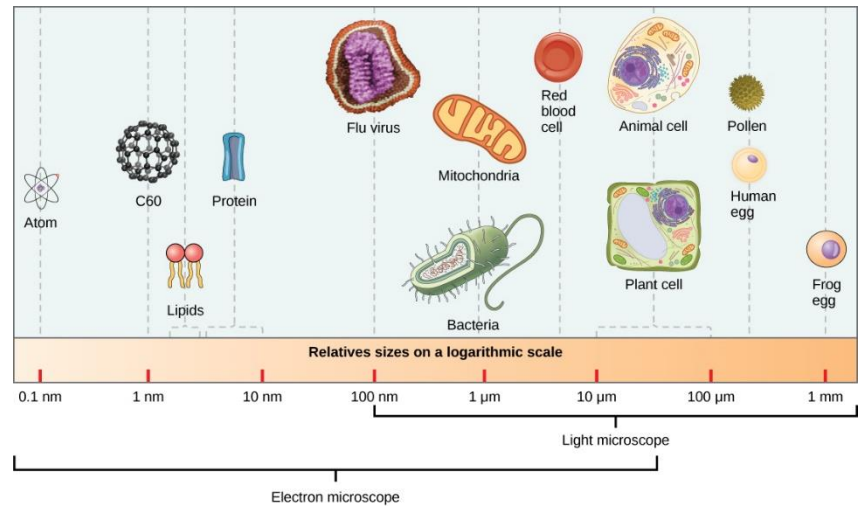
For each of the organelles in Part 1 and 2 write a paragraph in your own words to describe their structure and function.

Welcome to A level Biology

Cells organelles Part 3

Organelles without membranes

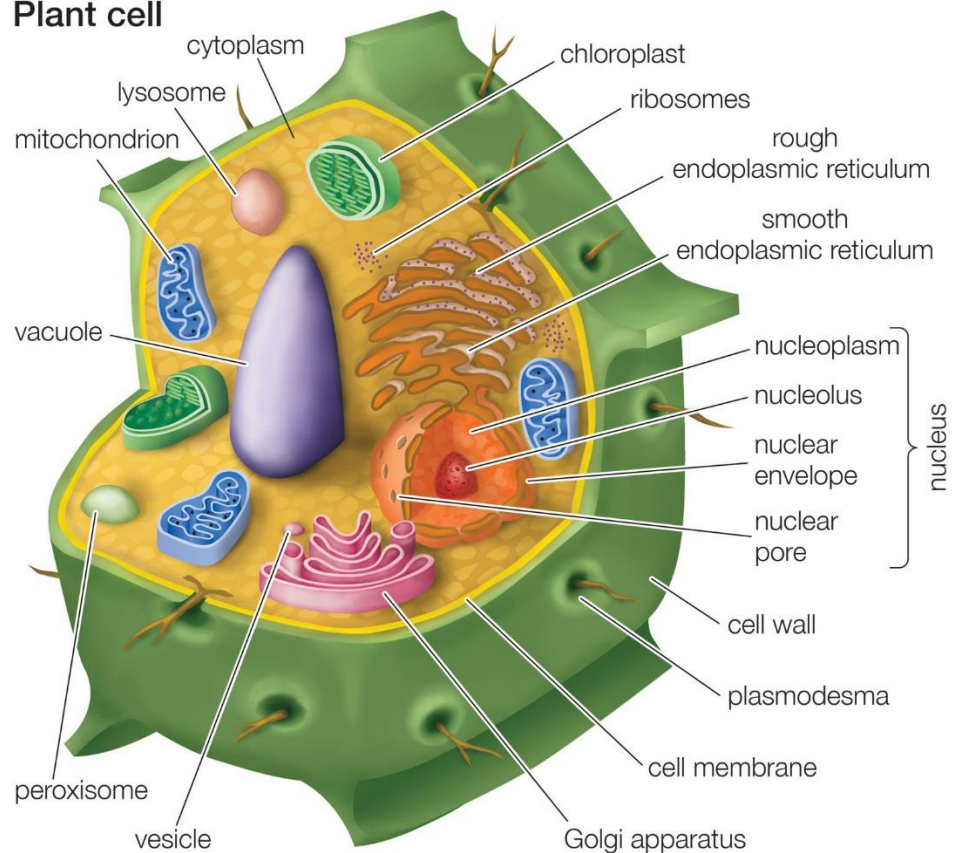
1. Complete the table as you did for Cell Organelles parts 1 and 2
2. **Submission task** For each of the organelles in Part 1,2 and 3 write a paragraph in your own words to describe their structure and function.



For each organelle you need to

- Draw an annotated diagram
- Describe its structure using the phrases in the end table
- Describe its function again using the phrases in the end table
- Add extra points to your research.

Plant cell



Cell structure research Part 3

Organelle	Labelled diagram
Ribosomes	
Function of the Ribosomes	

Organelle	Labelled diagram
Centrioles	
<p>Function of the Centrioles</p> <p>Please watch https://www.youtube.com/watch?v=7_QD3zCapoA</p>	

Organelle	Labelled diagram
Cytoskeleton	
Function of the Cytoskeleton	

Organelle	Labelled diagram
<p data-bbox="97 712 287 784">Cellulose cell wall</p>	
<p data-bbox="97 1384 630 1429">Function of the cellulose cell wall</p>	

Use the information in the table below to complete table

STRUCTURE	FUNCTION
<ul style="list-style-type: none"><input type="checkbox"/> Small spherical organelles 20nm in diameter.<input type="checkbox"/> Consist of two bundles of microtubules at right angles to each other<input type="checkbox"/> Consist of microtubules, these are made of tubulin protein subunits, and are arranged to form a cylinder<input type="checkbox"/> A network of protein structures in the cytoplasm<input type="checkbox"/> Rod-like microfilaments made of actin sub units and each microfilament has a diameter of 7nm<input type="checkbox"/> Outside the plasma membrane<input type="checkbox"/> Motor proteins for example myosin and kinesins are attached<input type="checkbox"/> Is made from bundles of cellulose fibres<input type="checkbox"/> Made of ribosomal RNA<input type="checkbox"/> Can be bound to endoplasmic reticulum or remain free in the cytoplasm	<ul style="list-style-type: none"><input type="checkbox"/> Involved with the synthesis of proteins<input type="checkbox"/> Forms the spindle fibres required for mitosis and meiosis<input type="checkbox"/> If free in cytoplasm they are involved with synthesising proteins for use in the cell<input type="checkbox"/> Chromes attach to the spindles and motor proteins 'walk along' the tubulin threads moving the chromosomes to the poles<input type="checkbox"/> If bound to the RER they are involved with synthesising proteins for export out of the cell<input type="checkbox"/> Are involved in the formation of cilia and undulipodia<input type="checkbox"/> Support the cytoplasm and help the cell keep its shape<input type="checkbox"/> They form the track that motor proteins walk along to drag organelles<input type="checkbox"/> Provide strength and support in plant cells<input type="checkbox"/> Prevent the cell bursting when turgid

Review what you have learn before finishing your major submission task described below

https://www.youtube.com/watch?v=cj8dDTHGJBY&list=PLnyeng9CrBLdH0yhxt2ABSt2aMucE_9vP

https://www.youtube.com/watch?v=9UvIqAVCoqY&list=PLnyeng9CrBLdH0yhxt2ABSt2aMucE_9vP&index=2

Submission task

For each of the organelles in Part 1,2 and 3 write a paragraph in your own words to describe their structure and function.

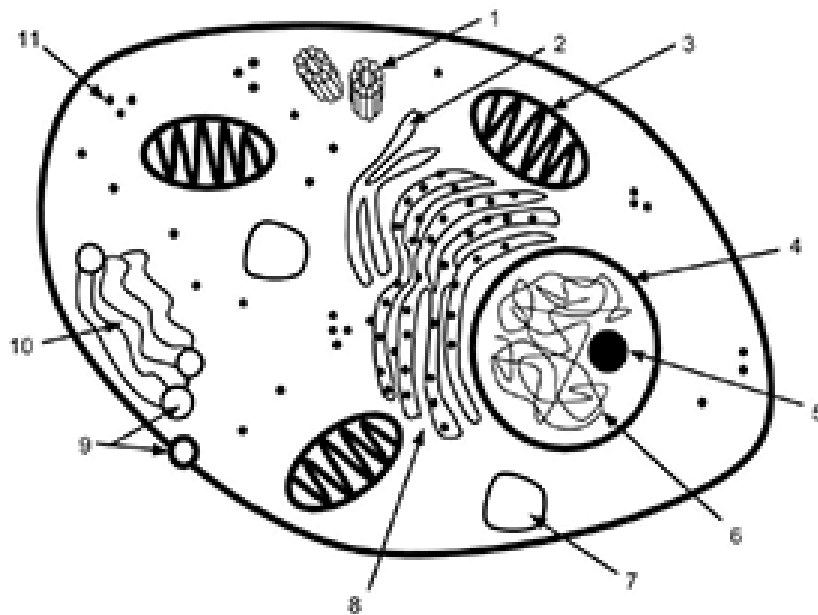
A Level Biology Bridging Cells Section: Examination style Questions NAME:-

Guidance	
Response	

1. Describe three structures / organelles that are present in generalised plant cells but absent from animal cells.

A	
B	
C	

2. Name the numbered structures in the Animal cell diagram below:



Cell part	Name of organelle	Cell part	Name of organelle
1		7	
2		8	
3		9	
4		10	
5		11	
6			

3. Name the organelle [the numbers do not correspond to the diagram in the last question]

Organelle	Function
1	Controls the activity of the cell.
2	Where polypeptides are synthesised.
3	Aerobic respiration takes place here.
4	Receives proteins from the ER and modifies them adding sugar molecules
5	Supports the cell and helps organelles and substances move through the cytoplasm
6	Contains hydrolytic enzymes.
7	These beat to move a band of mucus in trachea
8	They are abundant in cells with a high level of metabolic activity
9	Involved in making lipids, including steroids.
10	Contains genetic material
11	Keeps hydrolytic enzymes separate from the rest of the cell
12	Only plant cells have large permanent ones
13	Where protein synthesis takes place assembly line to use mRNA to assemble proteins.
14	Packages proteins into vesicles to be transported inside cell or to the outside of the cell
15	Chromosomes attach to the spindles and motor proteins 'walk along' the tubulin threads moving the chromosomes to the poles
16	Forms the spindle fibres required for mitosis and meiosis
17	Helps to support the plant, when a cell is turgid this pushes the cell membrane against the cell wall
18	Are called plastids
19	Provide strength and support to plant cells
20	Are involved in the formation of cilia and undulipodia
21	Folds protein molecules into their specific 3D shape

4. Name the organelle

Organelle	Structure
1	Made of ribosomal RNA
2	A stack of membrane-bound, flattened sacs
3	Has pores - allows large molecules through like messenger RNA to pass
4	Consists of flattened membrane-bound sacs - which pinched off to form vesicles
5	Contain a loops of DNA and starch granules
6	Contain loops of DNA
7	Site of photosynthesis
8	They are formed from centrioles.
9	Endoplasmic reticulum without attached Ribosomes
10	Surrounded by an envelope which has a double membrane structure
11	Nucleolus inside
12	Transports proteins made on attached ribosomes
13	A stack of thylakoids is called a granum.
14	A network of protein structures in the cytoplasm
15	They are formed from centrioles.
16	Surrounded by 2 membranes with a fluid space between them.
17	Each contains microtubules.
18	Chlorophyll molecules are located within the thylakoid membranes.
19	Can fuse with phagosomes/phagocytic vesicles to digest pathogens
20	Contain a fluid filled matrix called a stroma.
21	These are protrusions from the cell and are surrounded by the cell surface membrane
22	Spherical sacs surrounded by a single membrane called a tonoplast
23	The inner membrane is a stack of membrane-bound, flattened sacs called thylakoids
24	Outside the plasma membrane
25	Is made from bundles of cellulose fibres

5. **Fig. 8.1** shows an animal cell.

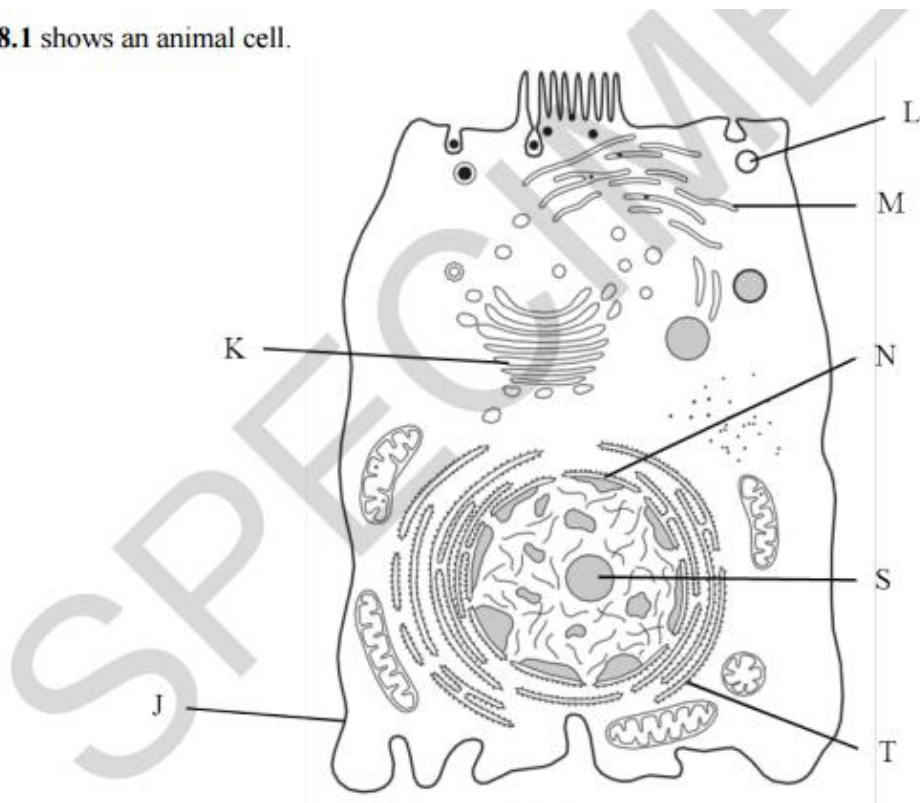


Fig. 8.1

Which option describes the correct sequence of organelles involved during the production and secretion of a protein from this cell?

- A** S, K, L, J **B** T, K, L, J **C** T, M, L, J **D** S, T, K, L

Your answer ☐

[1]

6.

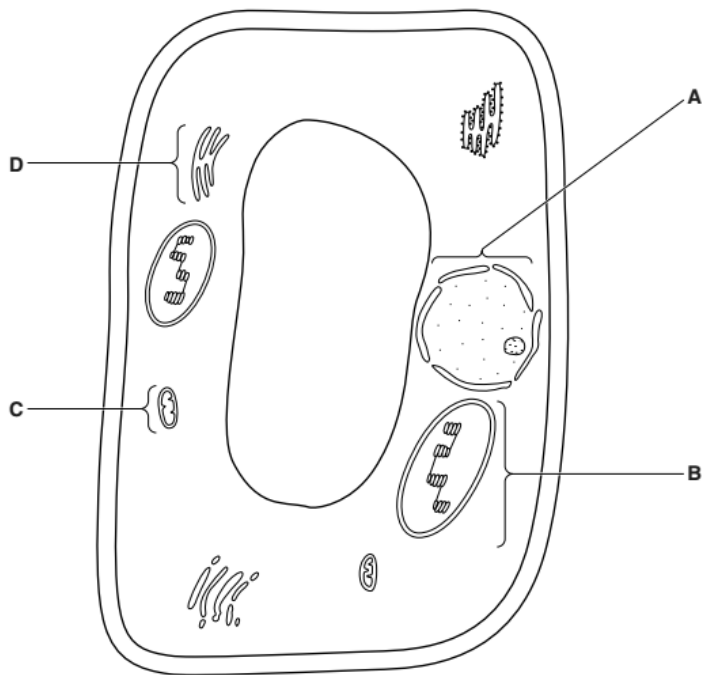


Fig. 1.1

(a) (i) Name the cell components labelled **A** and **B**.

A

B

[2]

(ii) State the **functions** of the components labelled **C** and **D**.

C

D

[2]

(b) A student suggested that the details of component **C** could be seen clearly with a very good light microscope.

Explain why the student is **not** correct.

.....
.....
.....
..... [2]

(c) Staining is a process often used in microscopy.

Describe the **advantages** of staining specimens to be viewed under a microscope.

.....
.....
.....
.....

[2][Total: 8]

7.

Fig. 2.1 is a diagram of a cell showing the organelles involved in the production and secretion of an extracellular protein. The rough endoplasmic reticulum (**RER**) is shown enlarged at the side of the diagram.

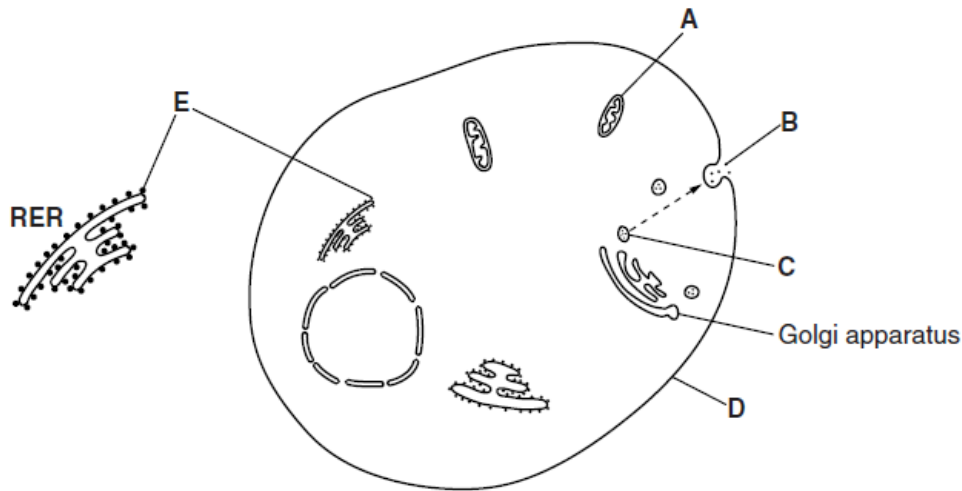


Fig. 2.1

(a) (i) Name the structures labelled **C**, **D** and **E**.

C _____

D _____

E _____

[3]

(ii) Suggest **one** type of extracellular protein secreted at **B**.

[1]

(iii) Organelle **A** provides ATP which is a source of energy.

Suggest **one** stage during the secretion of a protein that requires energy.

[1]

(iv) Outline the role of the Golgi apparatus.

[2]

Task 6 - Specialised Exchange Surfaces Research *Resumed*.

Remember FOR EACH EXAMPLE the aim is for you to be able to:

1. Name the substances exchanged
2. Describe key processes involved with increasing mass movement of air or water = ventilation
3. Describe key structures and tissue types and adaptations using A level terminology

Describe and explain the transfer methods diffusion/ osmosis/ active transport

Example 2 Bony Fish Ventilation Research

<https://www.youtube.com/watch?v=JPAnAleN2DU>

Question 1 – What are the gas exchange surfaces and ventilation structures in a bony fish?

<http://www.todayifoundout.com/index.php/2011/09/how-fish-gills-work/>

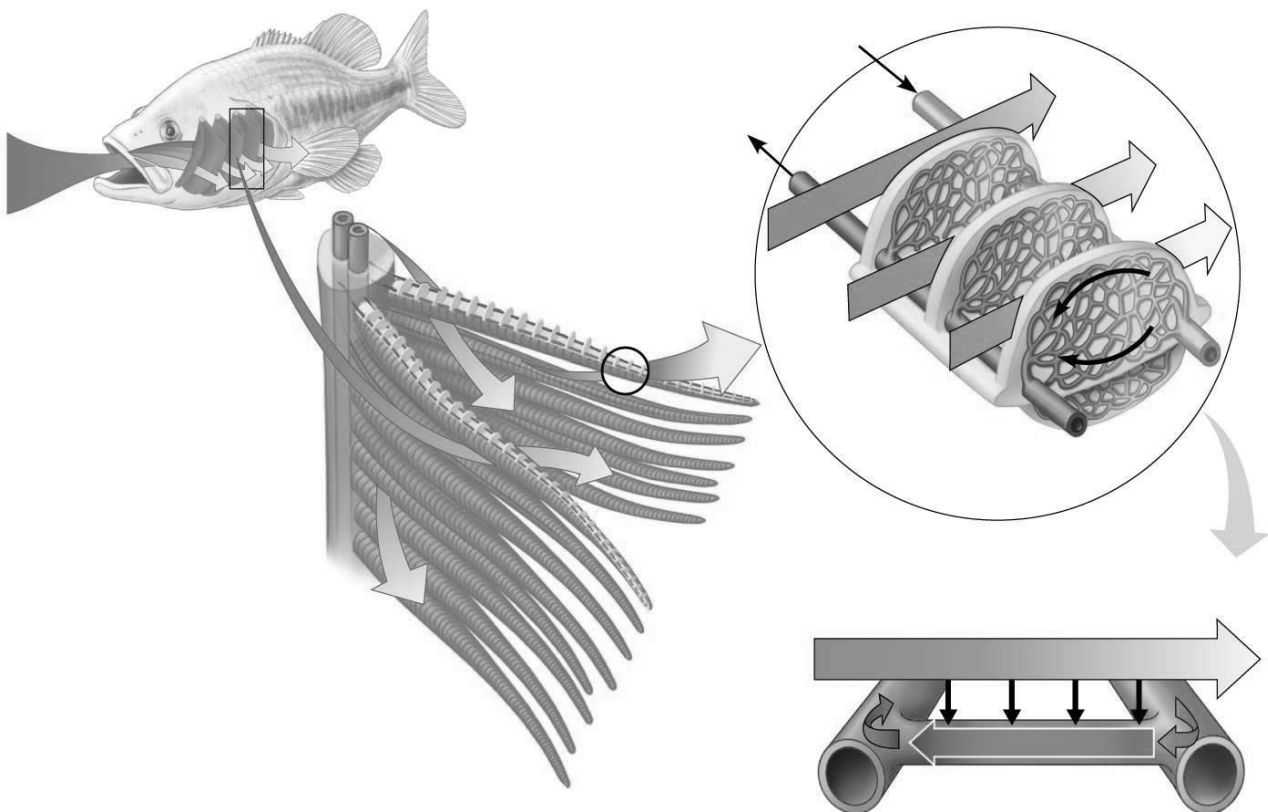
<http://www.biologymad.com/resources/M6GasExchange.pdf>

The numerous primary lamellae of bony fishes (also known as gill filaments) increase surface area.

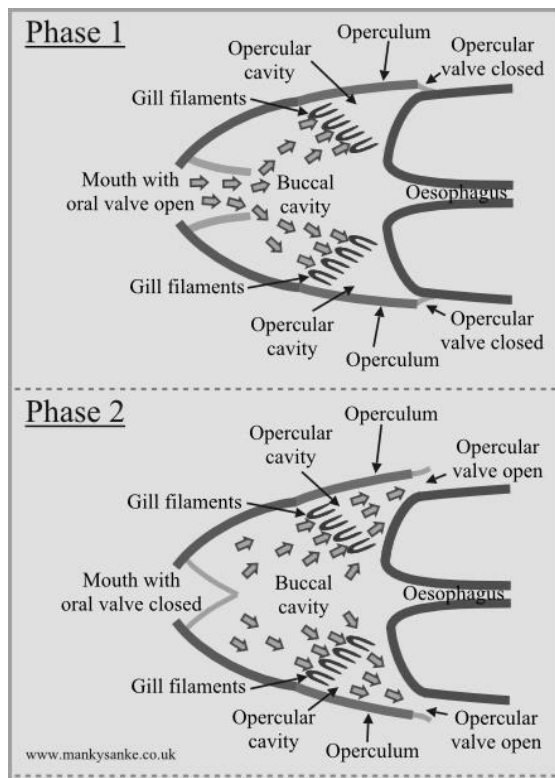
Off each are primary lamella are even more numerous smaller secondary lamellae (gill plates). The tiny blood capillaries are located close to the surface of each secondary lamellae which ensure a short diffusion distance.

The direction of blood flow is opposite to that of water flow. This ensures that the water flowing beside each capillary always has a higher oxygen concentration than that in the blood. In this way oxygen is taken up along the entire length of the secondary lamellae.

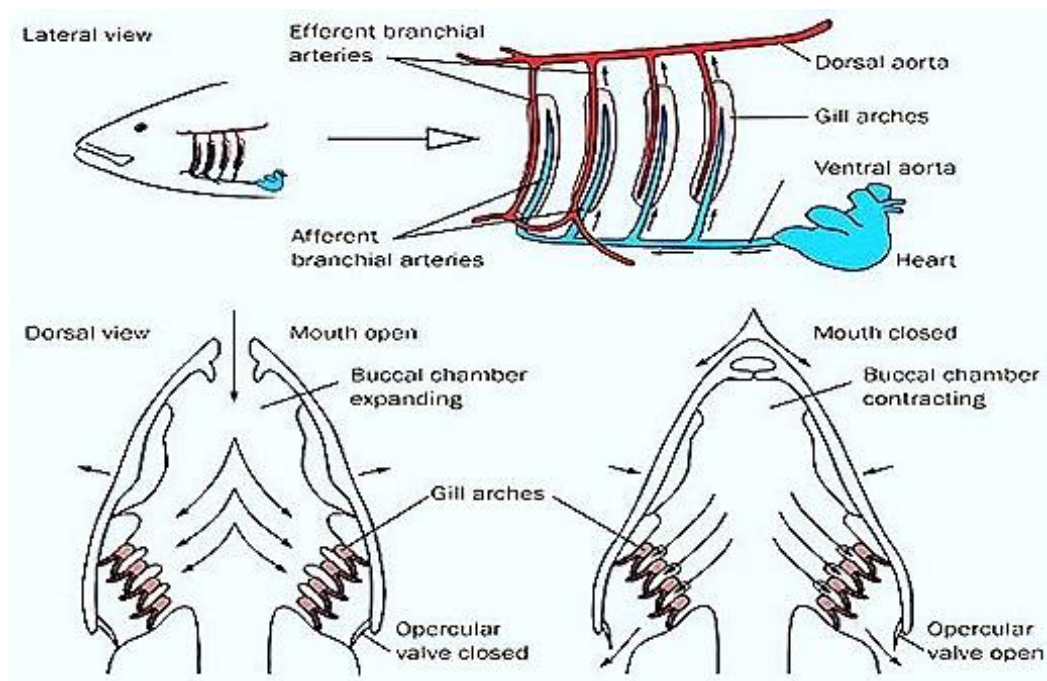
Label the diagrams below.



Question 2 - How do fish breathe?



There are different ways you can draw your diagrams

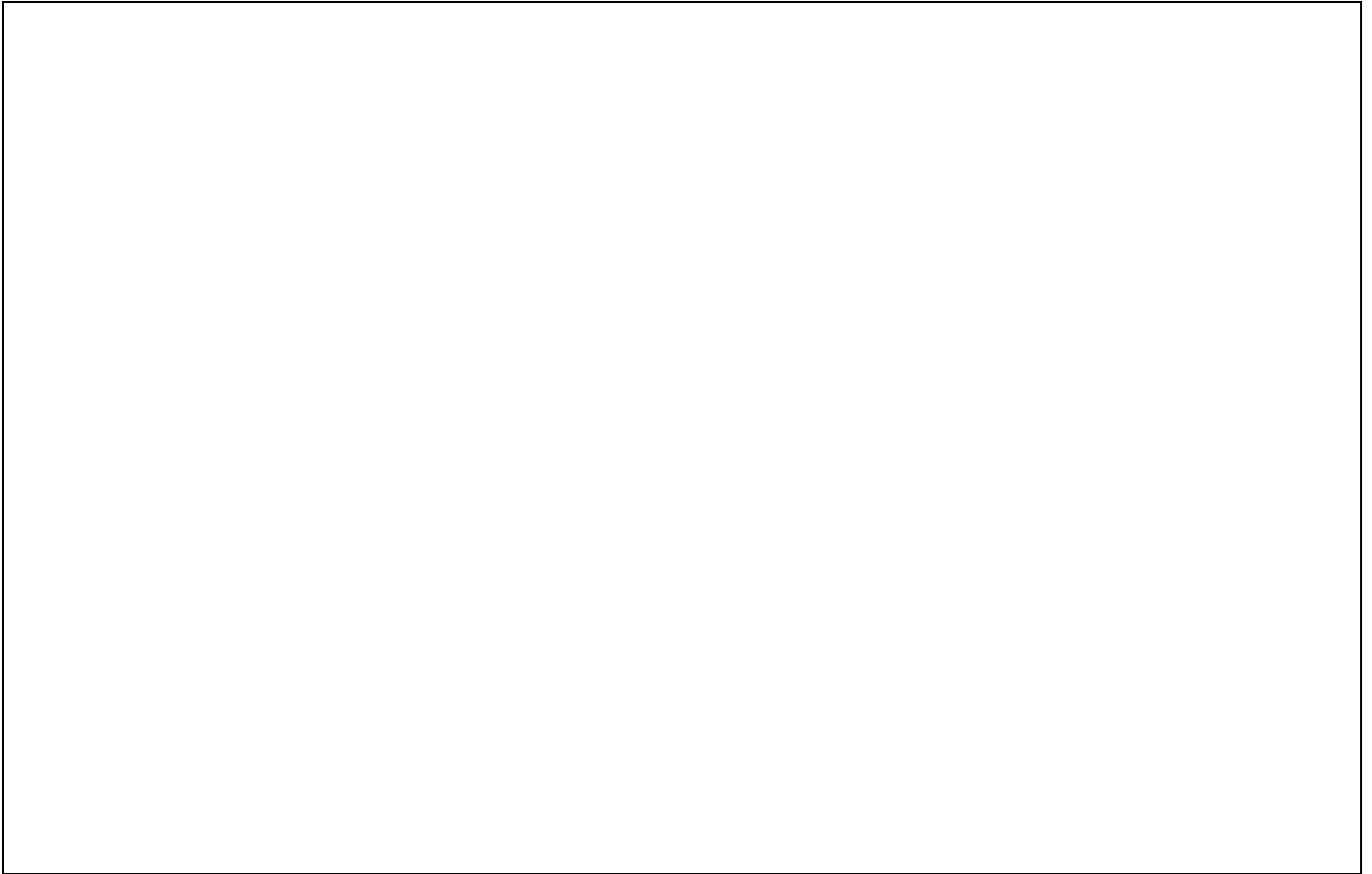


Draw 2D or 3D diagrams for each stage [on the next page] and label each

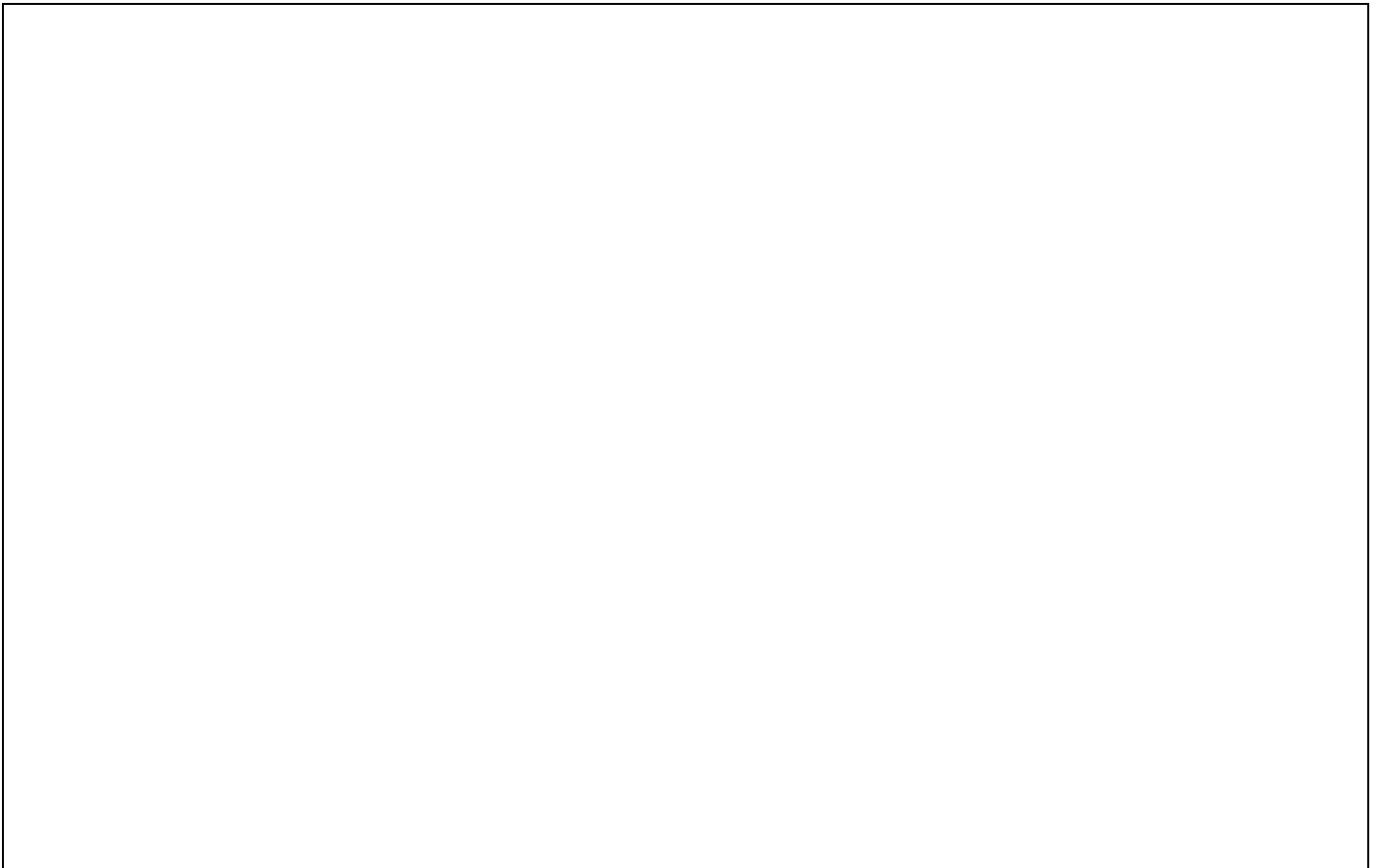
Bony fish ventilation stages	Labelled diagram
<p>Mouth opens (operculum is closed) and the buccal cavity floor is lowered.</p>	
<p>This increases the volume and decreases the pressure of the buccal cavity compared to outside and water rushes into the mouth down a pressure gradient.</p>	
<p>The mouth is now closed and the operculum opens and the buccal cavity floor is raised.</p>	
<p>The pressure inside the buccal cavity is now higher than in the opercular cavity and water moves from the buccal cavity and over the gills into the opercular cavity.</p>	
<p>Water rushes out of the fish through the operculum down a pressure gradient.</p>	

Question 3 What are the adaptations of the Gill structures?

Labelled diagram of primary lamella



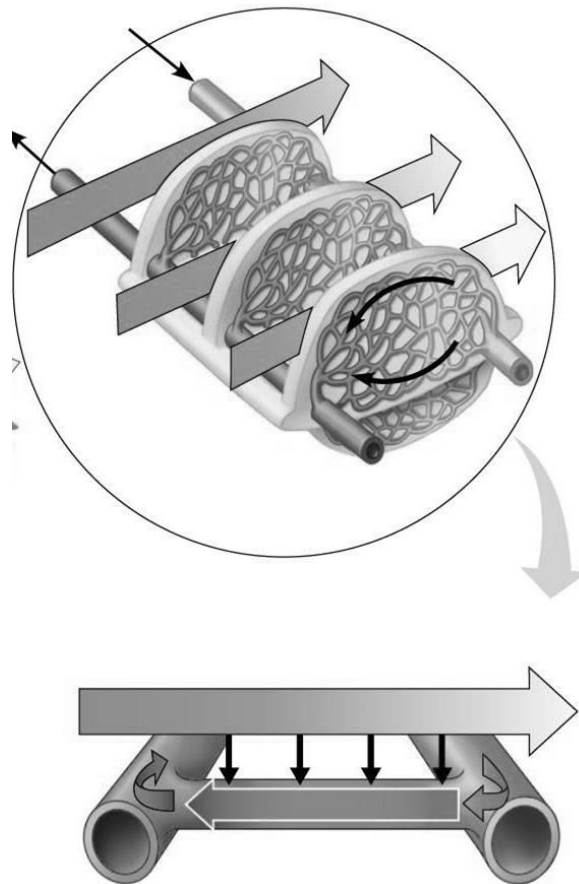
Labelled diagram of secondary lamella



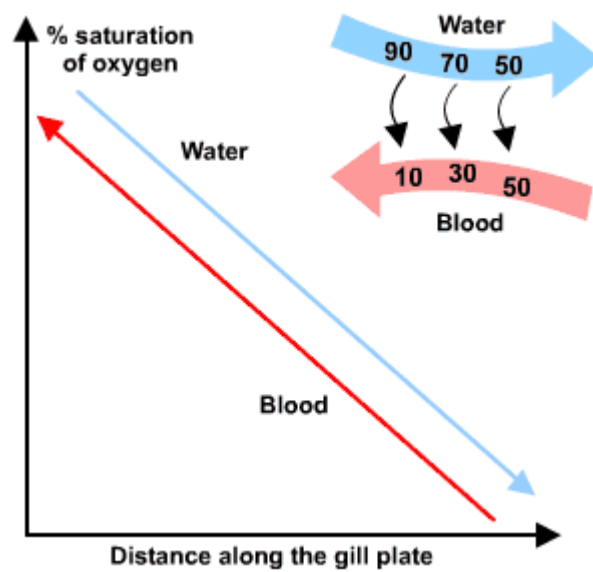
Question 4 What is the counter current flow between the water and the blood in the fishes' gills? *[annotate the diagrams in detail this time to explain]*

<https://physicsmadeeasy.wordpress.com/biology-notes/gas-exchange/>

<https://www.s-cool.co.uk/a-level/biology/gas-exchange/revise-it/gas-exchange-in-fish>



Question 5. How does counter current flow maintain a concentration gradient in a fishes' gills? Explain the diagram.



Task 7 Circulation types AL level biology bridging work Name: _____

In this task you will be researching three different types of circulatory system:

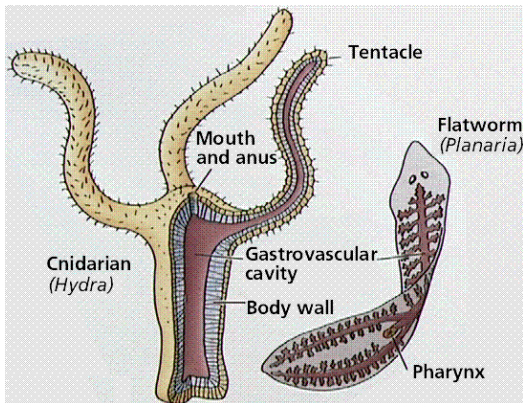
1. No circulatory system,
2. Open circulatory system
3. Closed circulatory system and 4. Single circulatory system

You will need to be able to describe each type of circulation

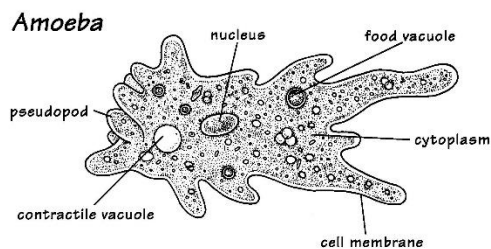
Suggest advantages of the system and discuss limitations

1. No circulatory system - Watch the introductory Video to start you off

<https://www.youtube.com/watch?v=OWwKVg0SVAc>



Describe the No circulatory system



List and describe 3 examples of organisms without a circulatory system

Describe the advantages of not having a circulatory system

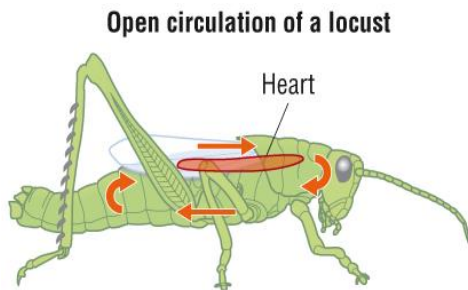
What are the limitation of not having a circulatory system?

2. Open circulatory systems

<https://byjus.com/biology/difference-between-open-and-closed-circulatory-systems/>

<https://www.youtube.com/watch?v=fM179O0rT9A>

<https://www.youtube.com/watch?v=OWwKVg0SVAc>



Describe the Open circulation

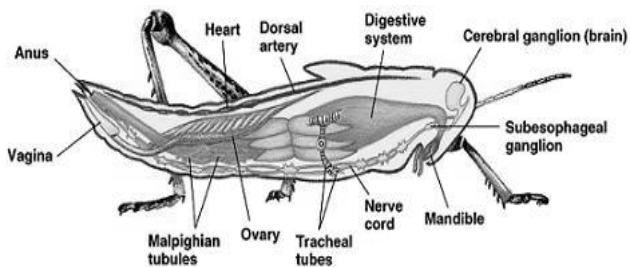
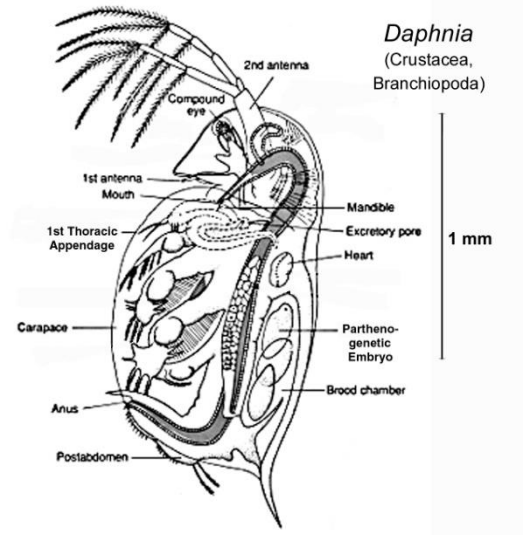
List and describe 3 examples of organisms an open circulatory system

Describe the advantages of having an open a circulatory system

What are the limitation of an open circulatory system?

Daphnia: is a small crustacean which lives in ponds with its 'heart' on its back.
 Blood cells are easily visible through the transparent body as they flow rapidly through the body cavity. At 20 °C, its heart rate is around 200 beats per minute, and slows down at lower temperatures.

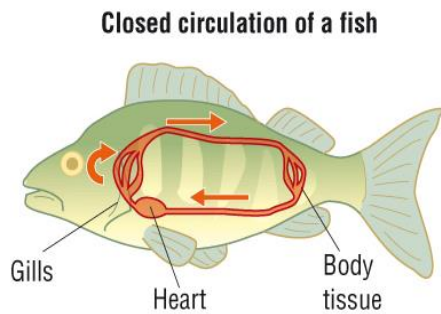
How does this circulatory system work in *Daphnia* and what are the limitations?



https://www.youtube.com/watch?v=KCC_FrbuR3U

What is transported in the open circulation in a migratory locust and what is the role of this system?

3. Closed circulatory system



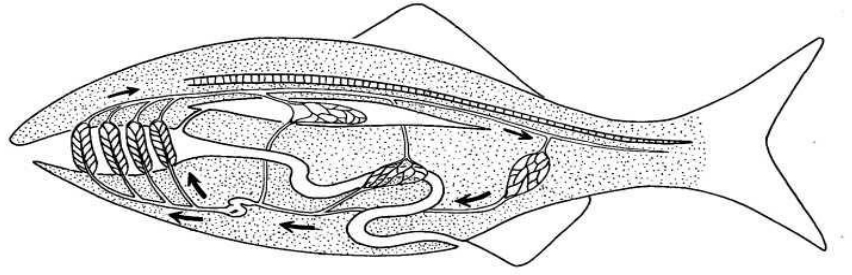
Describe a closed circulatory system

List and describe 3 examples of organisms with a closed circulatory system

Describe the advantages of having a closed circulatory system

What are the limitation of closed circulatory system?

4. Single circulatory system



Describe the single circulatory system of a fish

List and describe 3 examples of organisms with a single circulatory system

Describe the advantages of having a single circulatory system

What are the limitation of single circulatory system?

Describe the difference open and closed circulatory systems

Bridging work for Biology A level

Course: OCR Biology A

Specification H021

OCR Revise Biology ISBN: 9781789080353

Web resources to help you

<https://alevelnotes.com/notes/biology>

<http://www.a-levelnotes.co.uk/ocr-biology-notes.html>

<http://astarbiology.com/ocr/exchange-surfaces/>

<https://www.revisely.co.uk/alevel/biology/ocr/>

<https://alevelbiology.co.uk/ocr/>

<https://www.ocr.org.uk/Images/209191-mechanisms-of-ventilation-and-gaseous-exchange.pdf>

<https://studywise.co.uk/a-level-revision/biology/>

Youtube videos

SnapRevise

https://www.youtube.com/watch?v=iGcUcK7Vm_o

<https://www.youtube.com/watch?v=3HvTKcdCulA>

Cell structure

<https://alevelbiology.co.uk/notes/organelle-structure-function/#1---the-nucleus-->

<https://www.youtube.com/watch?v=dLJdRs5w4u4>

<https://www.youtube.com/watch?v=URUJD5NEXC8>

Crash course biology

<https://www.youtube.com/watch?v=cj8dDTHGJBY>

Cell structure task 2

<https://alevelbiology.co.uk/notes/organelle-structure-function/#1---the-nucleus-->

<https://www.youtube.com/watch?v=0tS1NG589HU>

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<https://www.youtube.com/watch?v=Cqlux4fqrEw>

<https://www.nature.com/scitable/topicpage/photosynthetic-cells-14025371/>

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Cells structure Task 3

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<https://www.youtube.com/watch?v=dLJdRs5w4u4>

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Cells final summary

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https://www.youtube.com/watch?v=9UvlqAVCoqY&list=PLNyeng9CrBLdH0yhxt2ABSt2aMucE_9vP&index=2