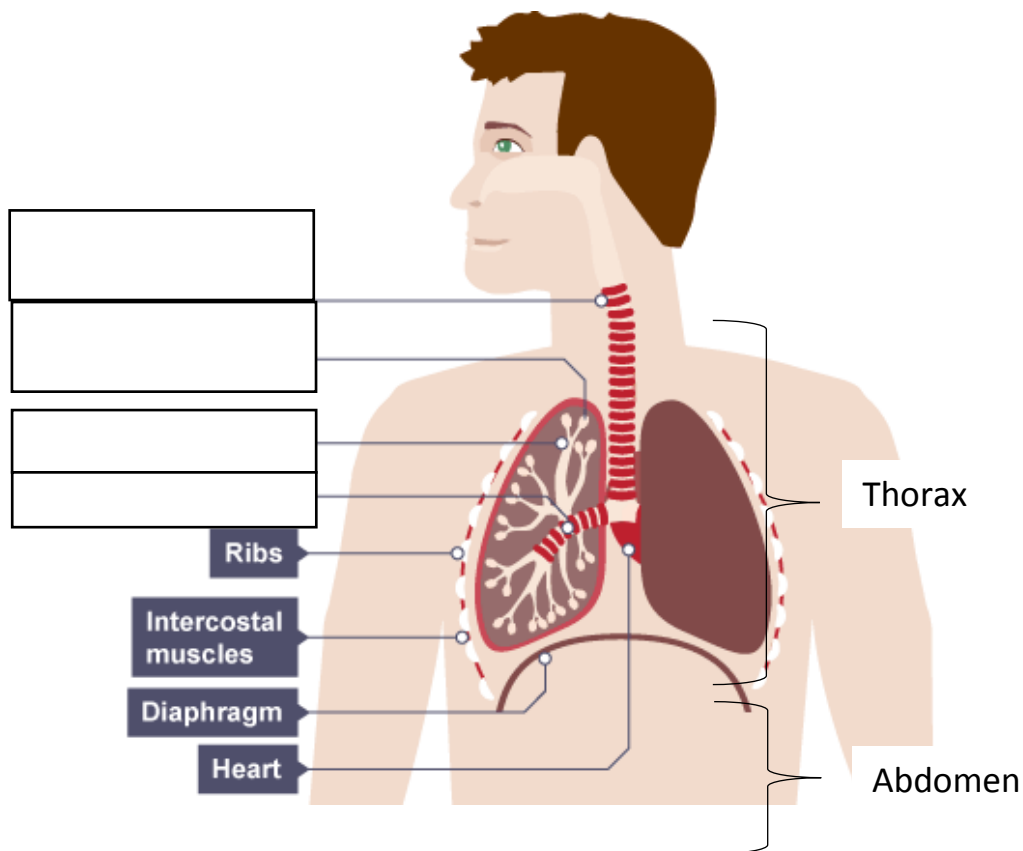


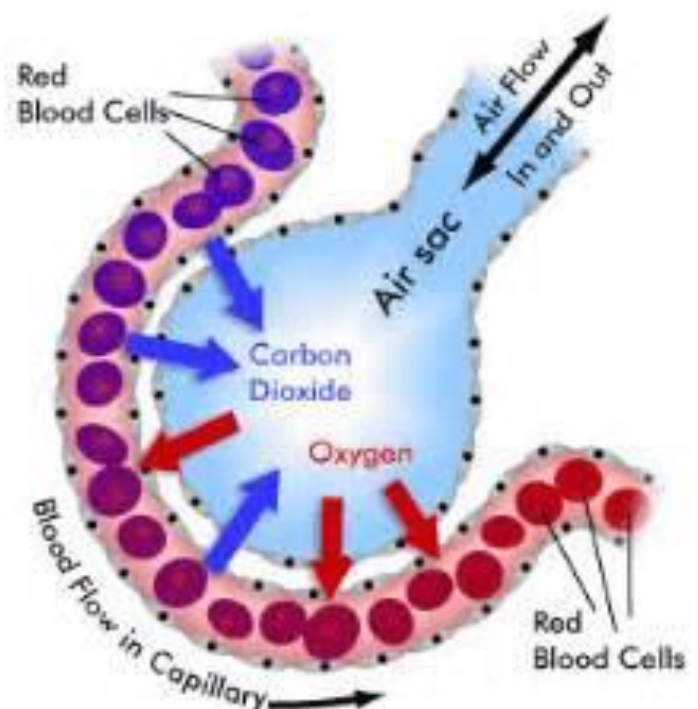
Gas Exchange and Blood

Our lungs are specially adapted to help us exchange gas quickly and efficiently. Inside the lungs the diffuses from the air into the blood and the diffuses from the blood into the air.



Read the learning list on the next page and then add labels to this diagram to show how the alveoli are adapted for gas exchange.

An Alveolus (al-VEE-oh-lus)



Learning List – Gas Exchange

1. The trachea is the widest tube that splits into the left and right bronchi.
2. The bronchi split into smaller tubes called bronchioles.
3. Bronchioles lead to small bags called the alveoli.
4. The alveoli are where gas exchange happens.
5. Oxygen diffuses from alveoli into the blood.
6. Alveoli are 1 cell thick.
7. Alveoli have a rich supply of blood capillaries.
8. Alveoli have a large surface area because there are lots of them.
9. You breathe in oxygen rich air.
10. Maintaining a steep concentration gradient increases the rate of diffusion.

Revision tips. *Chunk these facts into groups, such as facts about the lungs or facts about the alveoli. Write the facts out on A5 post card and add labelled diagrams.*

Or you could write a question for each fact on one side of a post card and the answer on the other then test yourself (repeat it to see if can you improve your score...how do you score a few days later?!)

Model Answers for Adaptations of Exchange Surfaces.

Using model answers can really help you see how to improve and how much detail is expected. They should form a key part of your revision. You could read, cover and re-write and then check your work. Repeating it until you can write model answers on your own!

Read the key points below. Which would you use (a or b) to create a model answer to the two questions below and why? Highlight the detail that makes these A grade answers.

QUESTION 1: Describe and explain how the alveoli are adapted for gas exchange.

a) There are alveoli to give a large surface area.

or

b) There are many, tiny alveoli to give a large surface area so there is a faster rate of diffusion.

a) The alveoli wall (and the capillary wall) is only one cell thick so there is only a short distance over which diffusion takes place (short diffusion pathway) so there is a faster rate of diffusion of oxygen from alveoli into the blood.

or

b) The alveoli wall (and the capillary wall) is only one cell thick so there is a faster rate of diffusion.

a) There are many capillaries around every alveoli. This good blood flow maintains a steep concentration gradient between the oxygen (and carbon dioxide) in the alveoli and the blood so that the rate of diffusion is faster.

or

b) There are capillaries around every alveoli. This good blood flow means more oxygen moves into the blood from the alveoli.

- a) You breathe in air. Breathing in and out (a ventilation mechanisms) maintains a steep concentration gradient between the oxygen (and carbon dioxide) in the alveoli and the blood.

or

- b) You breathe in oxygen rich air. Breathing in and out (a ventilation mechanisms) maintains a steep concentration gradient between the oxygen (and carbon dioxide) in the alveoli and the blood so that the rate of diffusion is faster.

Gas Exchange Summary

Name as many exchange surfaces as you can. You should include mammals, fish, and plants.

Complete the missing words:

Common features of all exchange surfaces are:

1. surface area – created through shape (folds) or having **lots** of them
2. Short diffusion pathway – created through walls (often just one cell thick)
3. concentration gradient – created through high blood supplies and ventilation

Revision tips. Repeat writing out the model answers and these facts until you have memorised all of the key features and adaptations of gas exchange surfaces!

Read the information below. (*Revision Tip – when faced with lots of complicated information split it up into smaller chunks and add pictures to help you understand key sentences.*)

Large multicellular organisms, such as humans and fish, have a small surface area to volume ratio. This means that they cannot absorb enough substances, like oxygen and glucose, through their surface to meet the demand of their body. Therefore they have evolved special exchange surfaces (like alveoli) and transport systems (like blood, blood vessels and the heart) that allow them to absorb and then transport these vital substances to each and every cell that needs it. Blood is a tissue that transports many of these vital substances around your body, for example oxygen absorbed from alveoli travels in the blood around the body to a muscle cell so that the muscle cell can use the oxygen in aerobic respiration.

Learning List – Blood

1. The four components of blood are red blood cells, plasma, platelets and white blood cells.
2. Red blood cells carry oxygen
3. Red blood cells contain haemoglobin, a red pigment made from iron and protein that oxygen binds to.
4. Red blood cells do not have a nucleus.
5. Red blood cells have a biconcave shape.
6. Plasma is a yellow liquid.
7. Plasma transports:
 1. Carbon dioxide
 2. Urea
 3. Hormones
 4. Glucose
 5. Amino acids and proteins
 6. Antibodies and antitoxins
8. White blood cells defend the body against harmful microorganisms.
9. Platelets help the blood to clot at a wound.
10. They are small fragments of cells and have no nucleus.