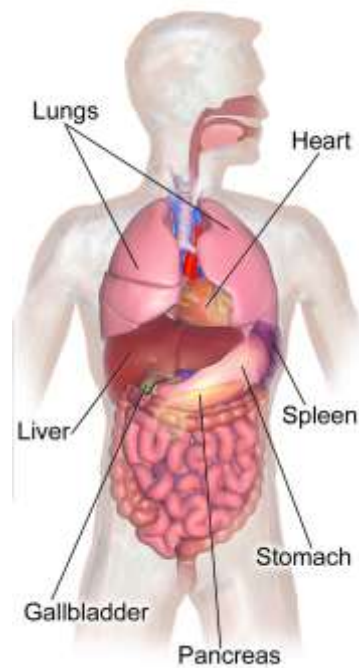




National 5 Biology

Unit 2 Multicellular organisms

2.7 Absorption of Materials



Name _____

Class _____

Teacher _____

Absorption of materials

In the previous booklet we considered the importance of a transport system to animals. The heart pumps, to ensure that blood is transported around the body, delivering useful substances and removing waste substances from body cells. In this booklet, we will consider how these substances are absorbed into and out of the body cells and transported in the bloodstream.

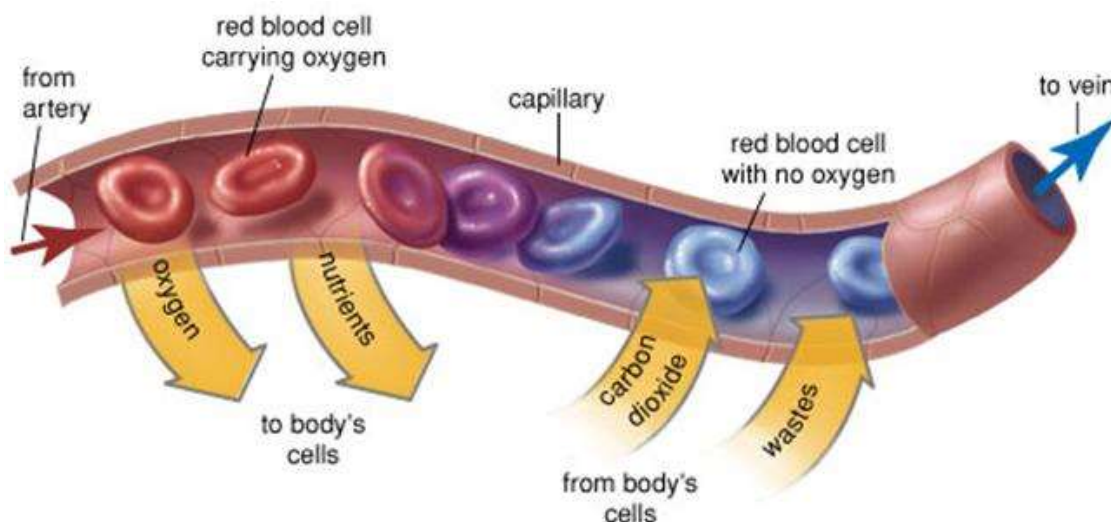
Learning intention

- To find out about the absorption of materials from the bloodstream into cells and from cells into the bloodstream.

Absorption of materials into and out of the bloodstream



_____ and _____ are needed for respiration and are transported to body cells in the bloodstream. The digestive system allows nutrients from food to be broken down into smaller molecules (eg. Glucose, amino acids) that are easily absorbed from the digestive system into the bloodstream. _____ gas enters the blood from the lungs (respiratory system). Carbon dioxide (produced during _____) and waste materials are carried _____ from body cells in the bloodstream (we will consider the details of gas exchange next).



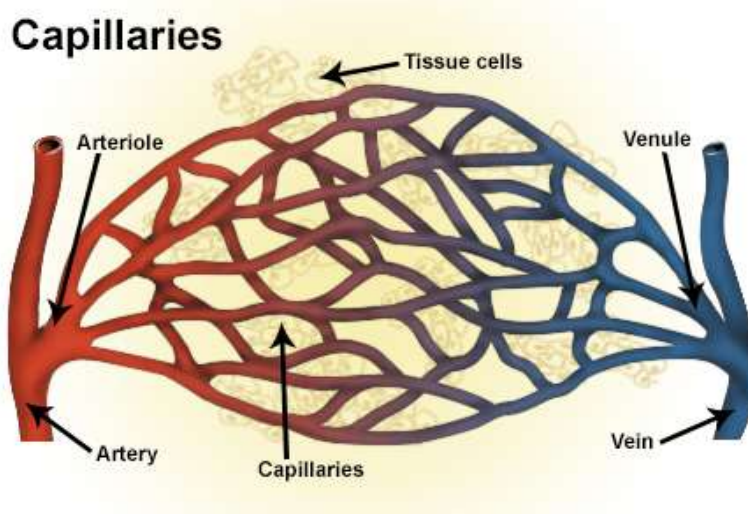
Learning intention

- To find out about the exchange of materials at capillary networks.

Capillary networks



The capillaries are the _____ blood vessels that carry blood to and from the body's cells. Capillaries form _____ in every organ of the body, ensuring that all cells and tissues are close to a capillary for exchange of materials.



The surfaces involved in the absorption of materials have certain features in common:

- Large _____.
- Thin walls.
- Extensive _____.

These increase the efficiency of absorption.

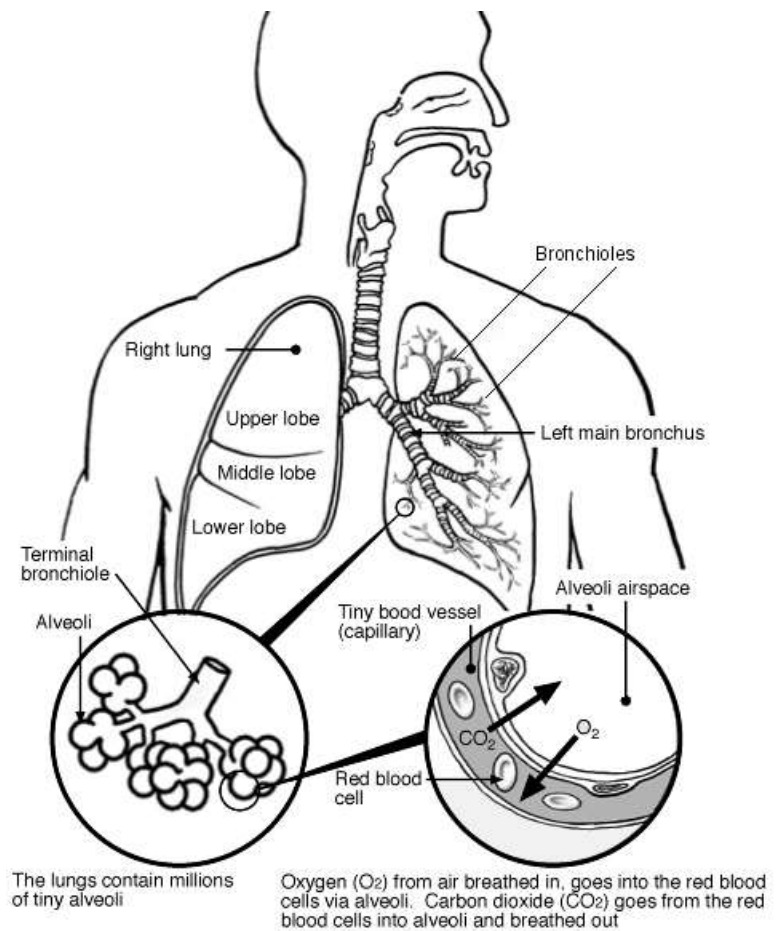
Learning intention

To find out about gas exchange in the lungs.

The Lungs



Lungs are the gas exchange organs of the body. They are composed of many tubes, each ending in microscopic air sacs called _____. Alveoli are found at the end of the bronchioles. They are the site of gas exchange in the lungs. Air passes from the _____ down the trachea, into the bronchus and then bronchioles to reach the alveoli. The lungs consist of a large number of alveoli, which provide a _____ surface area for the efficient diffusion of gases.



Lung showing alveoli

Reminder: Do not look at this diagram and panic! You will do not need to know all of the structures found in the lungs. You just need to understand the structure and function of the alveoli.

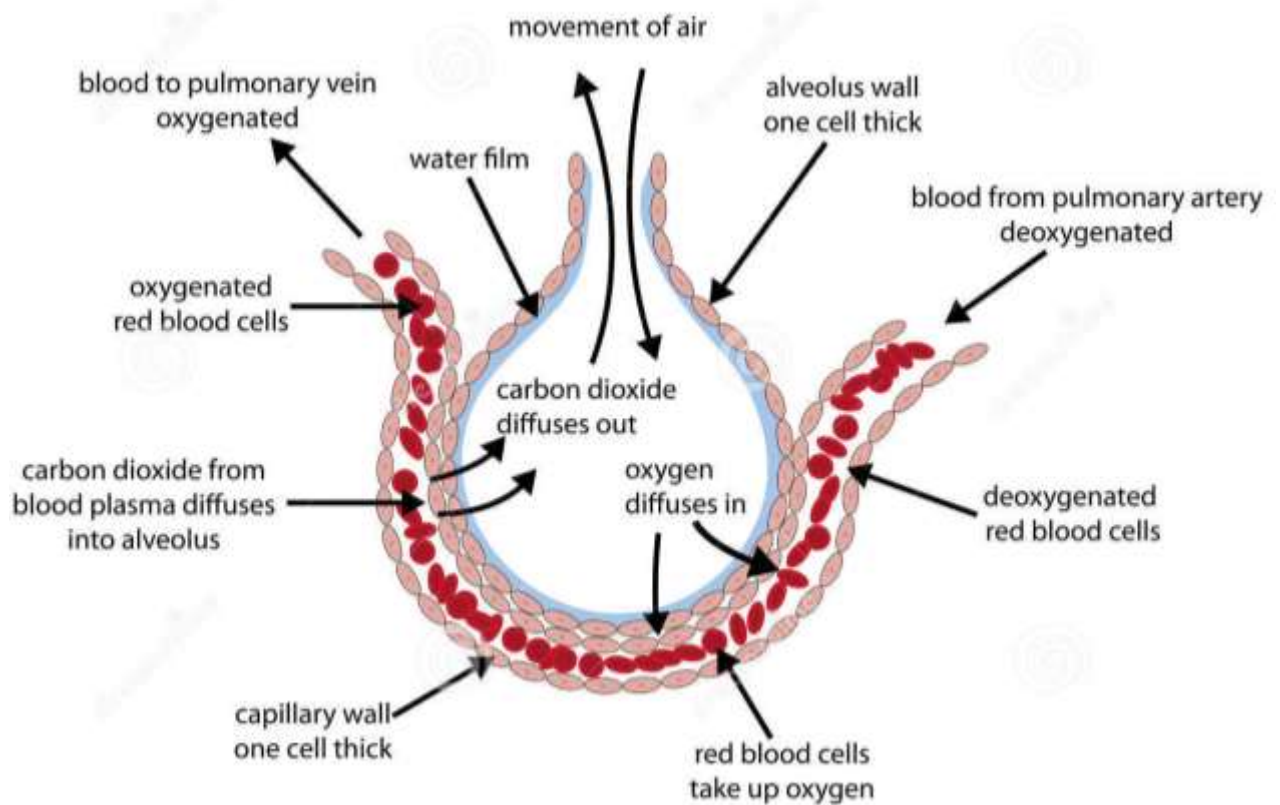
Alveoli

The alveoli are lined with mucus and are surrounded by blood capillaries. Oxygen and carbon dioxide are absorbed through the thin alveolar walls to or from the many blood capillaries.

The alveoli have three main features that make them **more efficient for the diffusion of gases**:



- A _____ surface area.
- _____ walls.
- An _____ blood supply.



Learning intention

To find out how digested food is passes into the bloodstream.

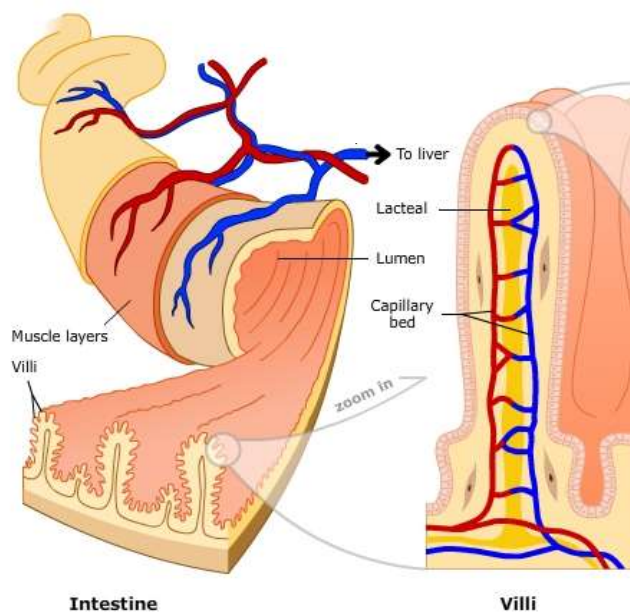
Digestion and the small intestine



The process of digestion is completed in the small intestine. The purpose of digestion is to breakdown _____ insoluble particles of food, to _____ soluble particles.

This allows food to be _____ into the bloodstream and transported to cells. This occurs in the small intestine, which has many microscopic, finger like structures called villi. The small intestine is very long (about 6m) and the inner surface is highly folded. Each fold has thousands of finger-like _____ to increase the surface area.

- Villus: singular, villi: plural



The Villus

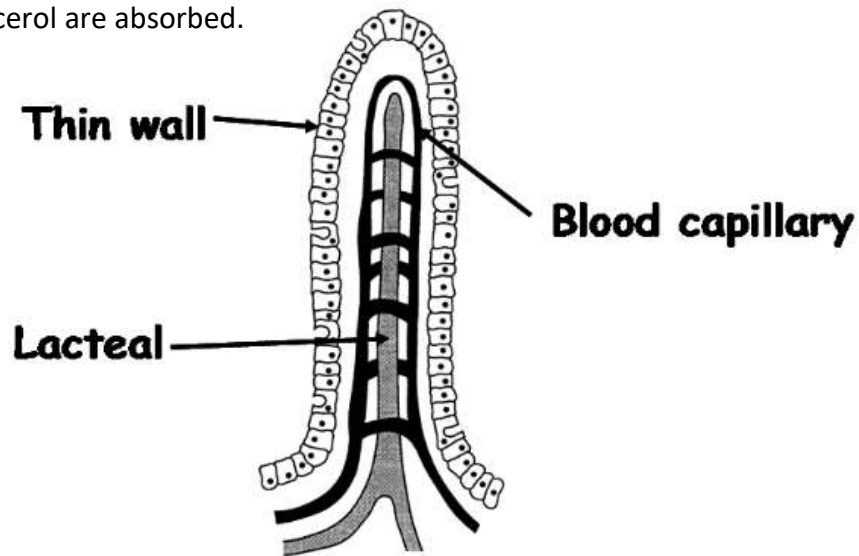
The villi have several important features:



- They cover a _____ surface area.
- The lining of each villus has very _____ walls (only one cell thick) allowing the products of digestion to diffuse through easily.
- They contain a network of blood capillaries to absorb _____ and amino acids.
- The central part of the villus contains a lacteal (this forms part of the lymphatic system) to absorb fatty acids and _____ (the products of fat digestion).



Annotate the diagram with a colour key to indicate where glucose and amino acids, and fatty acids and glycerol are absorbed.



I can:	
State that oxygen and nutrients from food must be absorbed into the bloodstream to be delivered to cells for respiration.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that waste materials, such as carbon dioxide, must be removed from cells into the bloodstream.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that tissues contain capillary networks to allow the exchange of materials at cellular level.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that surfaces involved in the absorption of materials have certain features in common: large surface area, thin walls and/or an extensive blood supply.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that features such as: a large surface area, thin walls and extensive blood supply all increase the efficiency of absorption.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that lungs are gas exchange organs.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that lungs consist of a large number of alveoli providing a large surface area.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that oxygen and carbon dioxide are absorbed through the thin alveolar walls to or from the many blood capillaries.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that nutrients from food are absorbed into the villi in the small intestine.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that the large number of thin walled villi provides a large surface area.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
State that each villus contains a network of capillaries to absorb glucose and amino acids and a lacteal to absorb fatty acids and glycerol.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>