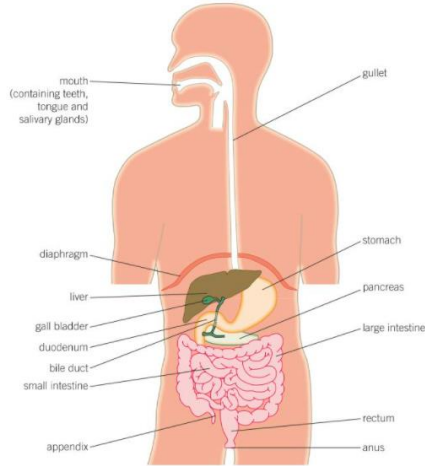
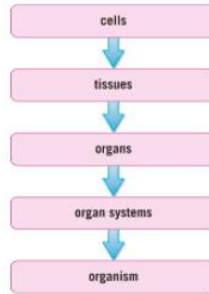


### B3 Organisation and the Digestive system



A tissue is a group of cells with similar structure and function. Organs are collections of tissues performing specific functions. Organs are organised into organ systems, which work together to form organisms.

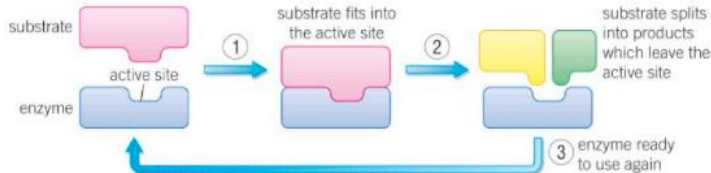


**Carbohydrates** provide us with the fuel that makes all of the other reactions of life possible. They contain the chemical elements carbon, hydrogen, and oxygen.

**Lipids** are fats (solids) and oils (liquids). They are the most efficient energy store in your body and an important source of energy in your diet. Combined with other molecules, lipids are very important in your cell membranes, as hormones, and in your nervous system. Like carbohydrates, lipids are made up of carbon, hydrogen, and oxygen. All lipids are insoluble in water.

**Proteins** are used for building up the cells and tissues of your body, as well as the basis of all your enzymes. Between 15 and 16% of your body mass is protein. Protein is found in tissues ranging from your hair and nails to the muscles that move you around and the enzymes that control your body chemistry. Proteins are made up of the elements carbon, hydrogen, oxygen, and nitrogen. Protein-rich foods include meat, fish, pulses, and cheese.

Enzymes are large protein molecules. The shape of an enzyme is vital for the enzyme to function. The long chains of amino acids are folded to produce a molecule with an **active site** that has a unique shape so it can bind to a specific substrate molecule.



Enzyme activity is affected by temperature and pH. High temperatures denature the enzyme, changing the shape of the active site. pH can affect the shape of the active site of an enzyme and make it work very efficiently or stop it working.

### B4 Organising Animals and Plants

#### Red blood cells

They are biconcave discs. Being concave (pushed in) on both sides, gives them an increased surface area to volume ratio for diffusion.

They are packed with a red pigment called **haemoglobin** that binds to oxygen.

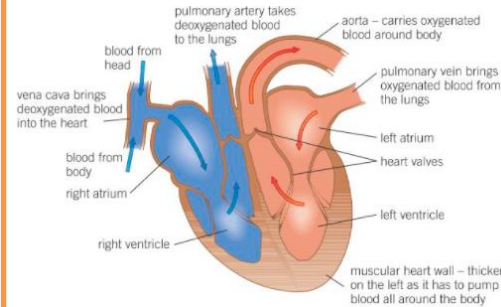
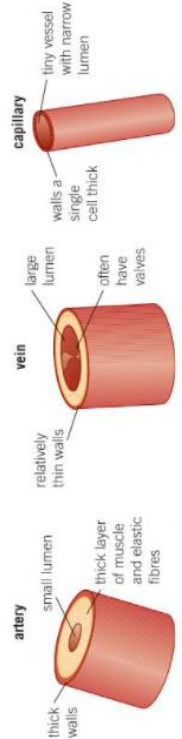
They have no nucleus, making more space for haemoglobin.

#### White blood cells

White blood cells are much bigger than red blood cells and there are fewer of them. They have a nucleus and form part of the body's defence system against harmful microorganisms. Some white blood cells (lymphocytes) form antibodies against microorganisms. Some form antitoxins against poisons made by microorganisms. Yet others (phagocytes) engulf and digest invading bacteria and viruses.

#### Platelets

Platelets are small fragments of cells. They have no nucleus. They are very important in helping the blood to clot at the site of a wound.



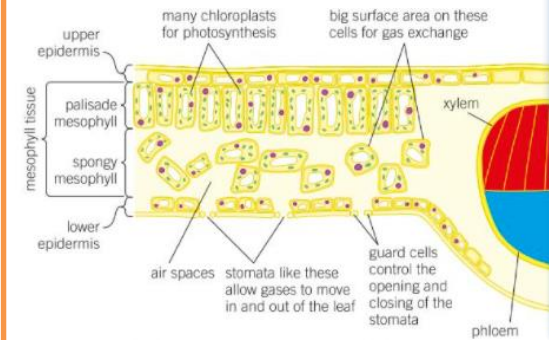
The loss of water vapour from the surface of plant leaves is known as transpiration.

Water is lost through the stomata, which open to let in carbon dioxide for photosynthesis.

The stomata and guard cells control gas exchange and water loss.

Factors that increase the rate of photosynthesis or increase stomatal opening will increase the rate of transpiration. These factors include temperature, humidity, air flow, and light intensity.

Transpiration is more rapid in hot, dry, windy, or bright conditions.



## Vocabulary:

**coronary arteries** the blood vessels that supply oxygenated blood to the heart muscle

**double circulatory system** the circulation of blood from the heart to the lungs is separate from the circulation of blood from the heart to the rest of the body

**guard cells** surround the stomata in the leaves of plants and control their opening and closing

### phloem

the living transport tissue in plants that carries dissolved food (sugars) around the plant

**stent** a metal mesh placed in a blocked or partially blocked artery. They are used to open up the blood vessel by the inflation of a tiny balloon

**Translocation** the movement of sugars from the leaves to the rest of the plant through the phloem

**xylem** the non-living transport tissue in plants that transports water from the roots to the leaves and shoots

**active site** the site on an enzyme where the reactants bind

**amylase** enzyme that speeds up the digestion of starch into sugars

**bile** neutralises stomach acid to give a high pH for the enzymes from the pancreas and small intestine to work well. It is not an enzyme

**Carbohydrases** enzymes that speed up the breakdown of carbohydrates into simple sugars

**denatured** the breakdown of the molecular structure of a protein so it no longer functions

**differentiate** the process where cells become specialised for a particular function

**fatty acids** part of the structure of a lipid molecule

**glycerol** part of the structure of a lipid molecule

**lipase** enzymes that speed up the breakdown of lipids into fatty acids and glycerol

**metabolism** the sum of all the reactions taking place in a cell or the body of an organism

**Proteases** enzymes that speed up the breakdown of proteins into amino acids

**proteins** molecules that contain carbon, hydrogen, oxygen, and nitrogen and are made of long chains of amino acids. They are used for building the cells and tissues of the body and to form enzymes

**simple sugars** small carbohydrate units, for example glucose

**tissue** a group of specialised cells with a similar structure and function

## Videos



## Quizzes

