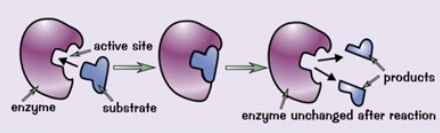
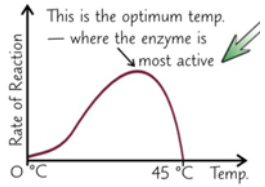
Year 9 Biology : Human Biology Knowledge Organiser

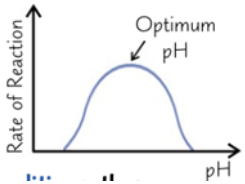
Enzymes

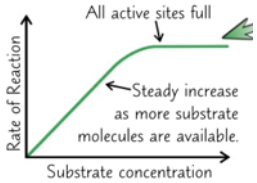
Enzymes are complex protein molecules which catalyse (speed up) chemical reactions in the body.
Enzymes have specific shapes so they can catalyse reactions



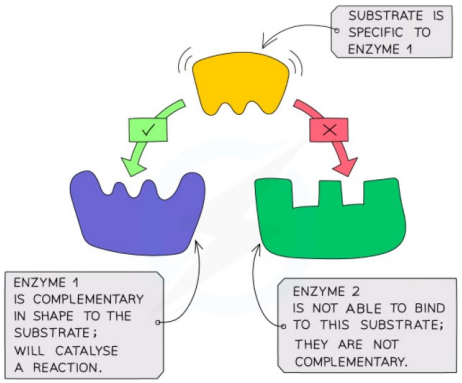
Temperature, pH and substrate concentration affect the rate of reaction.







More Enzymes



1. Enzymes and substrates **randomly** move about in solution

2. When an enzyme and its complementary substrate randomly **collide** - with the substrate fitting into the active site of the enzyme - an **enzyme-substrate complex** forms, and the reaction occurs.

3. A product (or products) forms from the substrate(s) which are then released from the active site. The enzyme is unchanged and will go on to catalyse further reactions.

Active Transport

Active transport is the movement of particles across a membrane against a concentration gradient (i.e. from an area of lower concentration to an area of higher concentration) using energy transferred during respiration.

Homeostasis

Homeostasis is the regulation of a constant internal environments

Conditions are maintained to ensure optimum conditions for metabolism

Homeostasis regulates the blood glucose, temperature,

Diffusion

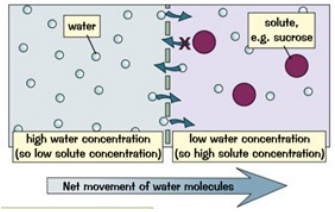
Diffusion is the net (overall) movement of particles from an area of higher concentration to an area of lower concentration.

Diffusion happens in both liquids and gases (fluids) – that's because the particles in these substances are free to move about randomly.

Only very small molecules can diffuse though cell membranes – such as glucose, amino

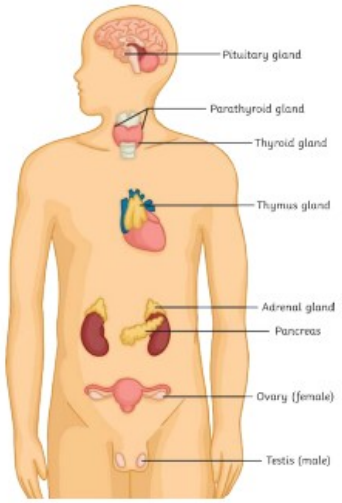
Osmosis

Osmosis is the net movement of water molecules across a partially (semi) permeable membrane from a region of higher water concentration to a region of lower water concentration.



Hormones

Hormones are chemical messengers transported in the blood to an effector where they can activate a response



Gland	Hormone re-
Pituitary	ADH, growth
Thyroid	Thyroxine
Adrenal	Adrenaline
Pancreas	Insulin
Ovary	Oestrogen and
Testes	Testosterone

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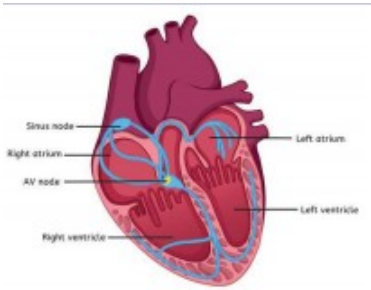
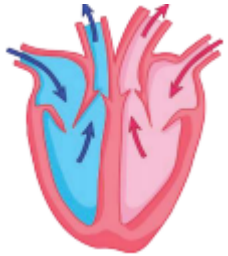
8. Circulatory System

The heart is a large muscular organ which pump blood carrying



Vena cava—>right atrium —> right ventricle —> pulmonary artery —> lungs- —> left atrium —> left ventricle —> aorta



Blood vessels

	Artery	Vein
direction of blood flow	away from the heart	towards the heart
oxygenated or deoxygenated blood?	oxygenated (except the pulmonary artery)	deoxygenated (except the pulmonary vein)
pressure	high	low (negative)
wall structure	thick, elastic, muscular, connective tissue for strength	thin, less muscular, less connective tissue
lumen (channel inside the vessel)	narrow	wide (with valves)

9. Respiration

Aerobic Respiration

Respiration is a series of reactions that takes place in the cells of animals and plants. Energy is released in the reaction. The mitochondria, found in the cell cytoplasm, is where respiration happens

Glucose + Oxygen → Carbon Dioxide + Water (+energy)

'Energy' is in brackets because it is not a substance. This type of respiration, where oxygen is used, is known as aerobic respiration. Oxygen (from breathing) is carried from the lungs to all the cells of the body in the blood. The waste products (carbon dioxide and water) are taken away from the cells by the blood and breathed out from the lungs.

Anaerobic Respiration

Although anaerobic respiration does release some energy, it does not release as much as aerobic respiration does.

Glucose → Lactic Acid (+energy)

The lactic acid produced during anaerobic respiration builds up in muscles. This can be felt as an aching in muscles during or after exercise

10. Key vocabulary

Respiration - Process in living things in which oxygen is used to release the energy from food

Aerobic respiration—respiration that requires oxygen

Anaerobic respiration—respiration that does not require oxygen

Mitochondria—structures in the cytoplasm of all cells where aerobic respiration takes place

Lactic acid—a chemical produced during anaerobic respiration

Oxygen debt—the amount of extra oxygen required by the body for recovery after vigorous exercise