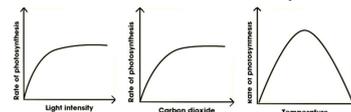


Science Knowledge Organiser – B4- Life processes

B4.1 How do chemical reactions take place in living things?

MRSRGREN	Mnemonic to help remember the seven life processes of all living things. Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition.
Respiration	A series of chemical reactions that release energy by breaking down large food molecules in all living cells.
Photosynthesis	A series of chemical reactions that use energy from sunlight to build large food molecules in plant cells and some microorganisms (e.g. phytoplankton).
Enzyme	Proteins that speed up chemical reactions.
Active site	The part of an enzyme where a reaction takes place.
Lock and Key model	Molecules have to be the correct shape to fit into the active site of the enzyme.
Denatured	A permanent change in the shape of an enzyme that stops it working.
Optimum	Refers to the fastest rate of enzyme activity.
Factors affecting the rate of enzyme activity	Temperature and pH.

B4.2 How do plants make food?

Word equation for photosynthesis	Light energy carbon dioxide + water → glucose + oxygen
Balanced symbol equation for photosynthesis	Light energy $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
Stages in photosynthesis	a. light energy absorbed by the green chemical chlorophyll b. energy used to bring about the reaction between carbon dioxide and water to produce glucose (a sugar) c. oxygen produced as a waste product
Uses of glucose	a. converted into chemicals needed for growth of plant cells, for example cellulose, protein and chlorophyll b. converted into starch for storage c. used in respiration to release energy.
Diffusion	Passive overall movement of molecules from a region of their higher concentration to a region of their lower concentration.
Example of diffusion	The movement of oxygen and carbon dioxide in and out of leaves during photosynthesis.
Osmosis	Osmosis (a specific case of diffusion) is the overall movement of water from a dilute to a more concentrated solution through a partially permeable membrane.
Example of osmosis	The movement of water into plant roots occurs by osmosis.
Active transport	The overall movement of chemicals across a cell membrane requiring energy from respiration.
Example of active transport	Used in the absorption of nitrates by plant roots.
Limiting factor	A factor preventing the rate of photosynthesis from increasing at a particular time.
Limiting factors for photosynthesis	Light intensity, carbon dioxide concentration and temperature. 
Chloroplast	Contain chlorophyll and the enzymes for the reactions in photosynthesis.
Cell membrane	Allows gases and water to pass in and out of the cell freely while presenting a barrier to other chemicals.
Nucleus	Contains DNA which carries the genetic code for making enzymes and other proteins used in the chemical reactions of photosynthesis.
Cytoplasm	Where the enzymes and other proteins are made.

B4.2 How do plants make food? Describe and explain techniques used in fieldwork to investigate the effect of light on plants.

Light meter	Device for measuring light intensity.
Quadrat	Square grid of known area used to survey plants at a location.
Use of identification key	Descriptions or pictures used to compare to a specimen to identify it.
How to make a transect	A straight line through a location. Animal/plant distribution surveyed at regular intervals.

B4.3 How do living organisms obtain energy?

Word equation for aerobic respiration	glucose + oxygen → carbon dioxide + water (+ energy released)
Balanced symbol equation for aerobic respiration	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$
Uses of energy	a. movement b. synthesis of large molecules c. active transport
Synthesis of large molecules	a. synthesis of polymers required by plant cells such as starch and cellulose from glucose b. synthesis of amino acids from glucose and nitrates, and then proteins from amino acids in plant, animal and microbial cells
Anaerobic respiration	Takes place in animal, plant and some microbial cells in conditions of low oxygen or absence of oxygen, to include: a. plant roots in waterlogged soil b. bacteria in puncture wounds c. human cells during vigorous exercise
Word equation for anaerobic respiration in animal cells/some bacteria	glucose → lactic acid (+ energy released)
Word equation for anaerobic respiration in plant cells and some microorganisms (yeast)	glucose → ethanol + carbon dioxide (+ energy released)

B4 Diagrams

<p>Recall the structure of a typical plant cell</p> <p>Recall structure of typical animal cell</p> <p>Recall structure of typical microbial cells (bacteria and yeast)</p>	
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