

Definitions and Concepts for CAIE Biology IGCSE

Topic 6: Plant Nutrition

*Definitions in **bold** are for supplement only*

Carbohydrate - A large molecule that is synthesised from simple sugars.

Chlorophyll - A photosynthetic pigment found in chloroplasts that transfers light energy into chemical energy in molecules.

Chloroplast - An organelle found in plants and algae that is the site for photosynthesis.

Gaseous exchange - The exchange of respiratory gases between an organism and its environment.

Guard cells - Cells that surround the stomata and change shape depending on the volume of water. They control the rate of transpiration by becoming turgid or flaccid, opening or closing stomata.

Hydrogencarbonate indicator - An indicator that changes colour depending on the concentration of carbon dioxide and the resulting pH of the solution.

Limiting factor - **A variable that is in short supply and limits the rate of a particular reaction.**

Lower epidermis - A layer of cells on the leaf's lower surface that contains stomata and guard cells.

Magnesium ions - A type of mineral element required by plants for the production of chlorophyll. If a plant is deficient in magnesium ions its leaves turn yellow in a process known as chlorosis.

Nitrate ions - A type of mineral element required by plants for the production of amino acids. If a plant is deficient in nitrate ions it exhibits stunted growth. Its lower leaves become yellow and its upper leaves turn pale green.

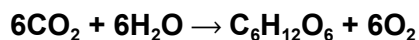
Palisade mesophyll - The main photosynthetic tissue in plants located below the upper epidermis. It receives the most light so contains the greatest concentration of chloroplasts.

Phloem - A transport tissue found in plants that is specialised to transport sugars from the leaves to the rest of the plant in both directions.



Photosynthesis - A reaction that takes place inside photosynthetic organisms (e.g. plants, algae) and manufactures carbohydrates from raw materials using light energy. Overall in the presence of light and chlorophyll:

carbon dioxide + water → glucose + oxygen



Spongy mesophyll - A type of loosely packed mesophyll tissue with air pockets, which is specialised for gas exchange. It contains some chloroplasts for photosynthesis.

Starch - A type of carbohydrate made from many glucose molecules joined together. It serves as an energy store in plants.

Stomata - Small holes found on the surface of a plant (typically leaves) that can be opened or closed by guard cells to control water loss and gas exchange.

Sucrose - A soluble sugar produced from the breakdown of starch in plants. It can be stored, used in respiration or used to synthesise other substances.

Upper epidermis - A layer of transparent cells that allows light to strike the palisade mesophyll tissue.

Vascular bundle - Part of the transport system in vascular plants that consists of xylem and phloem tissue.

Xylem - A transport tissue in plants that is specialised to transport water and dissolved minerals from the roots of the plant to the leaves.

