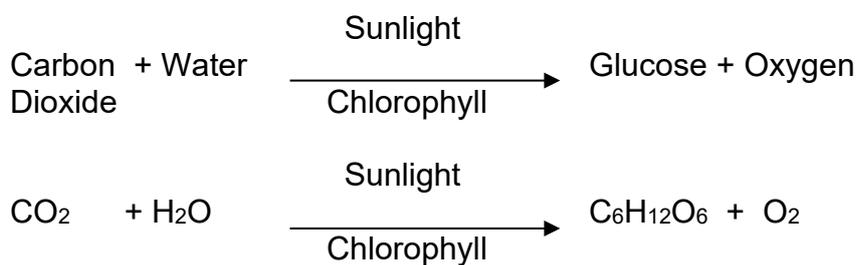
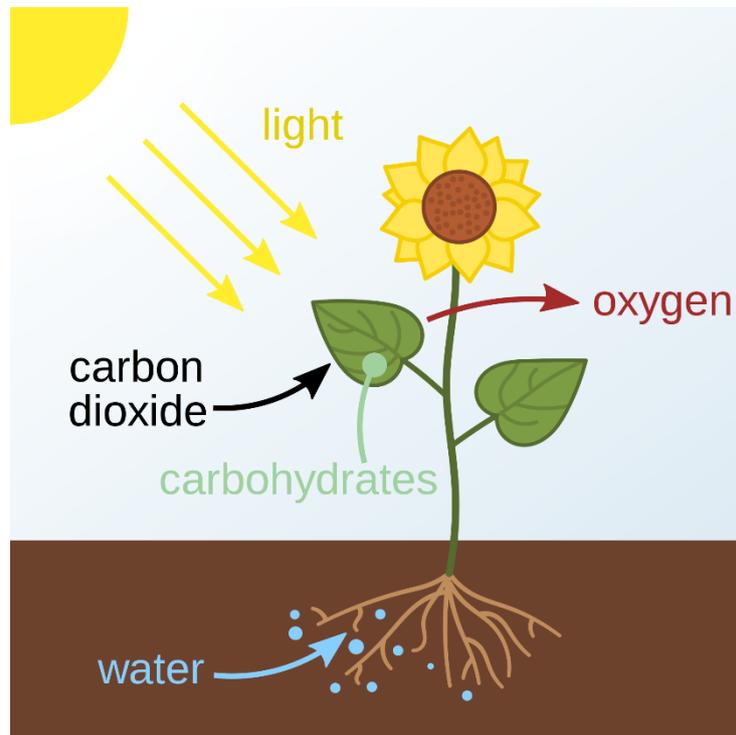


# PHOTOSYNTHESIS REACTION



- Photosynthesis is an endergonic reaction.
- The part of the visible light spectrum that is mostly used is blue and red light. These are absorbed by the green chlorophyll which reflects green light.
- There are 2 photosynthetic reactions:
  1. Photophosphorylation or Light-Dependent Reaction ('Light' Reaction) – This occurs on the membranes in chloroplasts. Light that is 'trapped' by chlorophyll drives reactions that produce ATP and NADPH for the next 'dark' reaction. Oxygen is also produced but is released as a by-product.
  2. Carbon Fixation or Light-Independent Reaction ('Dark' Reaction) – This is also called the Calvin-Benson Cycle, and does not require light. It occurs in the stroma of chloroplasts. The NADPH and ATP from the 'Light' Reaction are used to convert carbon dioxide to glucose.

# FACTORS AFFECTING PHOTOSYNTHESIS

- Light Intensity – The rate of photosynthesis \_\_\_\_\_ with light intensity until a certain level is reached.
- Light Wavelengths – Green light is least absorbed, since it is reflected by leaves, which is why leaves appear their \_\_\_\_\_ colour. Red-orange and violet colours are those more readily absorbed by chlorophyll.
- Carbon Dioxide Levels – Increases in CO<sub>2</sub> concentration \_\_\_\_\_ the rate of photosynthesis until it levels off.
- Temperature – As the temperature increases slightly, the rate of photosynthesis also \_\_\_\_\_. However, if the temperature drops too low, plants are unable to make chlorophyll, the leaves turn yellow as in autumn, and they are unable to photosynthesise. If the temperature rises too high, photosynthesis \_\_\_\_\_.
- Amount of Water – As the photosynthesis reaction requires water, a lack of water decreases the plant's ability to photosynthesise.
- C<sub>3</sub> and C<sub>4</sub> Plants - In C<sub>3</sub> plants, up to 50% of CO<sub>2</sub> trapped by chlorophyll is released before being converted to sugar. C<sub>4</sub> plants have a different enzyme to trap CO<sub>2</sub> and are more efficient in conditions of higher CO<sub>2</sub> concentrations such as that formed by the Greenhouse Effect. Examples of C<sub>4</sub> plants include corn, sorghum and sugarcane.