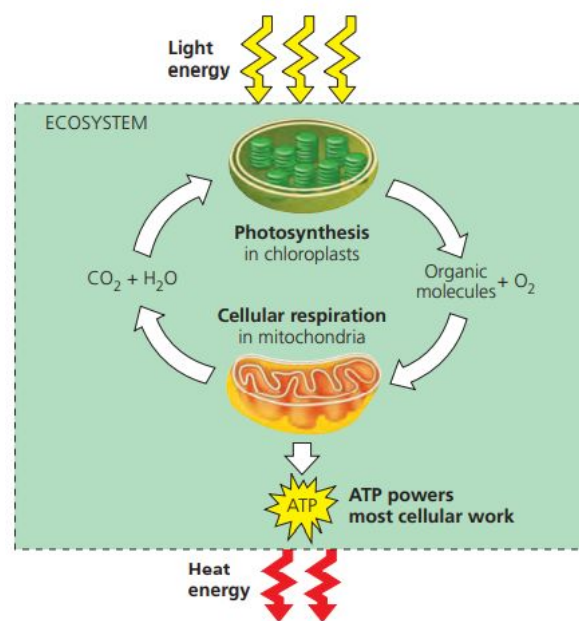


Cellular respiration



- carried out by both autotrophs and heterotrophs

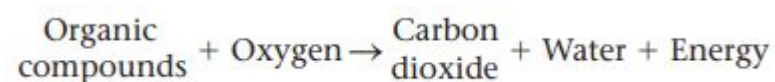
Cellular respiration consists both anaerobic respiration (the respiration carried out with the presence of oxygen) and fermentation (which happens without the presence of oxygen)

- the degradation of sugars

-catabolic process: sugar glucose and other organic fuels are broken down in the presence of oxygen to carbon dioxide and water

-cellular respiration consumes chemical energy

-cellular respiration is a type of exergonic process- it lowers the total free energy of the system

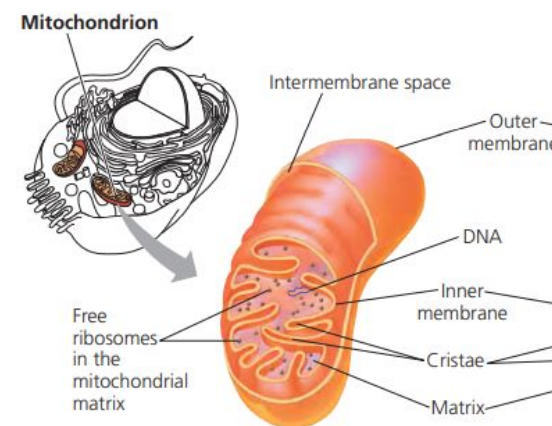


As a type of redox reaction, the energy fuel (typically sugar molecules) becomes oxidized (lose electrons) and the oxygen, on the other hand, becomes reduced (gain electrons)- this whole process happens with the help of coenzymes, typically NAD+.

The energy stored in sugar molecules is harvested through three steps: Glycolysis (breaking glucose into pyruvate)- pyruvate oxidation (into acetyl CoA) and citric acid cycle (the glucose are completely broke down into carbon dioxide)- Electron transport (the passing of electrons to form water molecules) and oxidative phosphorylation (the formation of ATP from ADP with energy).

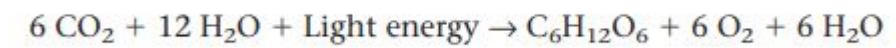
- Breaking down organic fuels into inorganic compounds (H₂O and CO₂)

-The mitochondria is the site for cellular respiration.



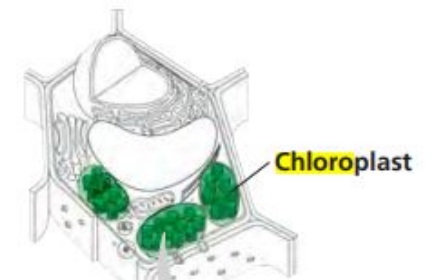
Photosynthesis uses anabolic pathways- the process which consume energy to build complicated molecules from simpler ones.

In the presence of light, photosynthesis produce organic compounds from carbon dioxide and water



As a redox reaction: Both involving redox processes, the cellular respiration transport electrons associated with hydrogen atoms to oxygen atoms, with the electrons losing their potential energy and the formation of water molecules as a by-product; in contrast, during photosynthesis, the process is reversed: electrons are transferred from water molecules, along with hydrogen ions, to carbon dioxide, with the electrons increase their potential energy.

Photosynthesis takes place in chloroplasts within plant cells



- There is also stages for photosynthesis: during the first stage, light reactions, it converts light energy into chemical energy with the aid from the acceptor NADP+, generating ATP from ADP; during the Calvin cycle, carbon atoms are reduced to carbohydrates, with the energy acquired from light.

- Compounding inorganic materials (H₂O and CO₂) into organic compounds (glucose)

- photosynthesis accumulates chemical energy, converts light energy to chemical energy

- one of the major energy-obtaining means for autotrophs, organisms that feed themselves.

Photosynthesis

