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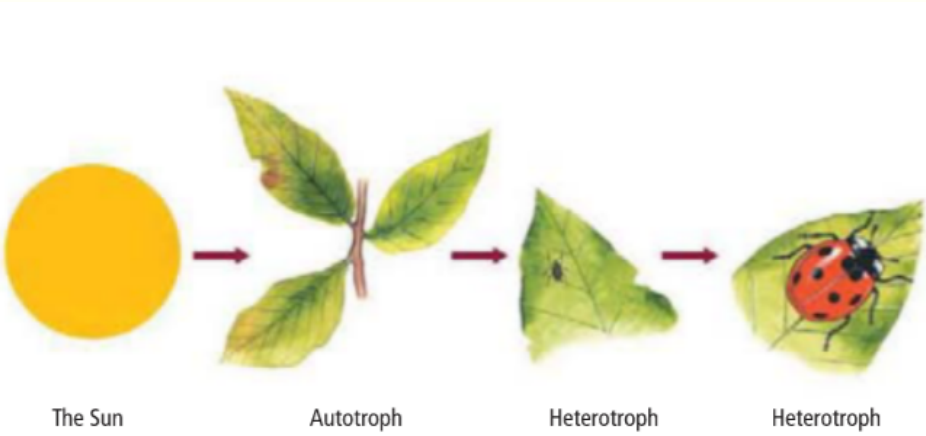


HOW ORGANISMS OBTAIN ENERGY

Written by Vasco Esquivel

Before we discuss about how organisms obtain energy i think me must define energy first. Energy is the ability to perform tasks or do work, without energy we wont be able to perform actions. Another thing i should tell you is the study of the flow and transformation of energy which is Thermodynamics.

Thermodynamics:1

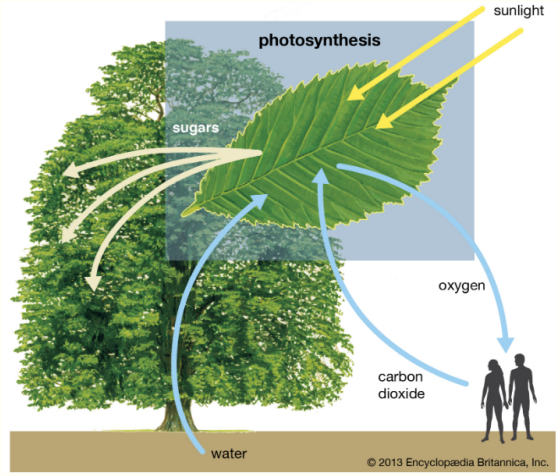
The first law, also known as Law of Conservation of Energy, states that energy cannot be created or destroyed, but it can change from one form to another. The second law of thermodynamics states that energy cannot be converted without loss of usable energy. The third law of thermodynamics states that the entropy of a system approaches a constant value as the temperature approaches absolute zero.

autotrophs and heterotrophs:2&3

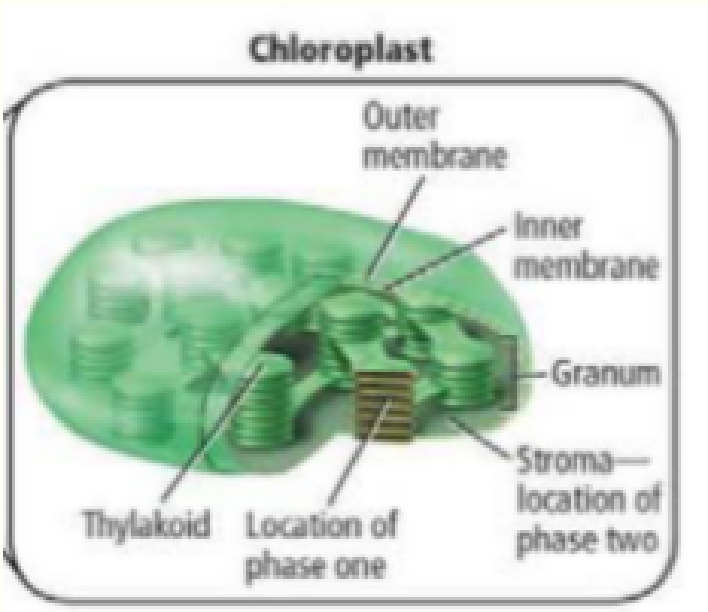
Now lets talk about how organisms obtain energy. Firstly, there are 2 types of of organisms autotrophs and heterotrophs. Autotrophs are organisms that make their own food such as plants, trees, grass, etc there is also an example in the photo above for all those visual learners. Next lets talk about heterotrophs these animals need to ingest food in order to get energy.

PHOTOSYNTHESIS, LIGHT & DARK REACTIONS

Written by Vasco Esquivel



Photosynthesis is the process where green plants and certain other organisms transform light energy into ATP(adenosine tri phosphate). During photosynthesis in green plants, light energy is captured and used to convert water, carbon dioxide, and minerals into oxygen and energy-rich organic compounds.

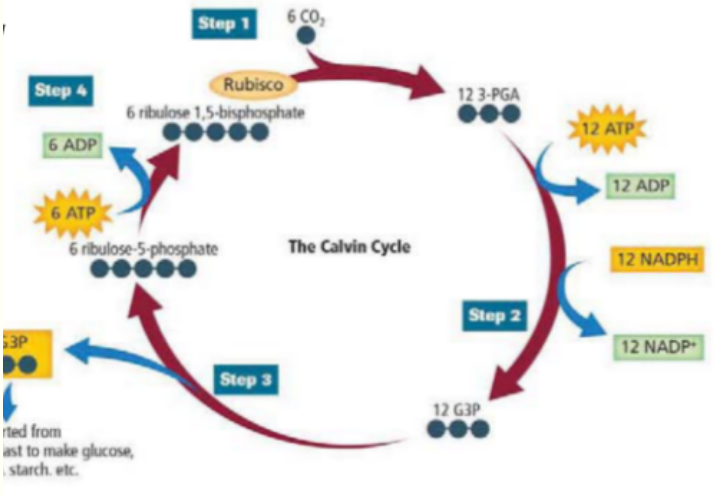


Chloroplasts:1

Next lets talk about chloroplasts, these play a vital role in the process of photosynthesis. Chloroplasts allow plants to capture the energy of the Sun in energy-rich molecules. these chloroplasts have a 2 compartments that are named Thylakoids that are flattened saclike membranes that are arranged in stacks called grana and stroma the 2nd compartment which is the fluid filled space that is outside the grana.

Electron Transport:2

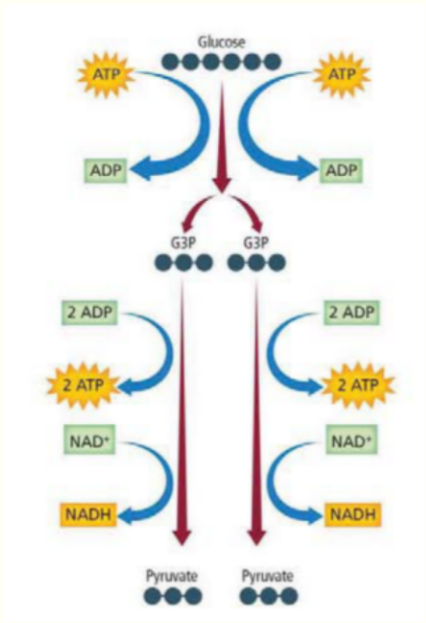
Electron transport is a series of redox reactions that resemble a relay race or bucket brigade in that electrons are passed rapidly from one component to the next, to the endpoint of the chain where the electrons reduce molecular oxygen, producing water.

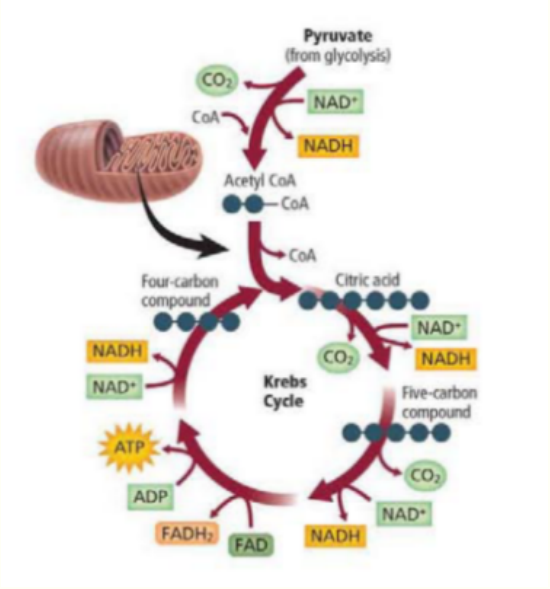


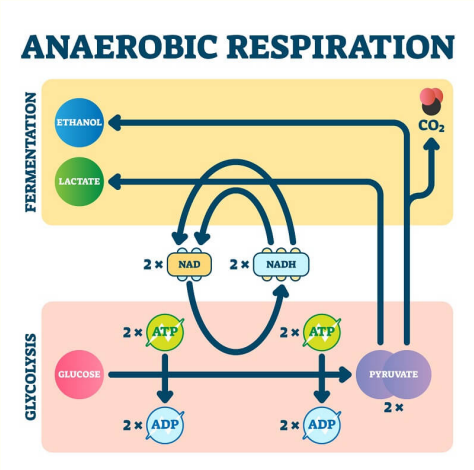
Calvin Cycle:3

The Calvin cycle has four main steps: carbon fixation, reduction phase, carbohydrate formation, and regeneration phase. Energy to fuel chemical reactions in this sugar-generating process is provided by ATP and NADPH, chemical compounds which contain the energy plants have captured from sunlight.

CELLULAR RESPIRATION







Photosynthesis and cellular respiration are connected through an important relationship. This relationship enables life to survive as we know it. The products of one process are the reactants of the other. If you would like to see the chemical formula for both Photosynthesis and Cellular respiration it is at the bottom of the news letter.

Glycolysis:1

Glycolysis is a series of reactions that extract energy from glucose by splitting it into two three-carbon molecules called pyruvates. Glycolysis is an ancient metabolic pathway, meaning that it evolved long ago, and it is found in the great majority of organisms alive today.

The Krebs cycle:2

The Krebs cycle is a series of chemical reactions used by all aerobic organisms to generate energy through the oxidization of acetate—derived from carbohydrates, fats, and proteins —into carbon dioxide. Theoretically there are several alternatives to the TCA cycle, but the TCA cycle appears to be the most efficient.

Anaerobic Respiration:3

In anaerobic respiration, glucose breaks down without oxygen. The chemical reaction transfers energy from glucose to the cell. Anaerobic respiration produces lactic acid, rather than carbon dioxide and water. Unfortunately this can lead to painful muscle cramps.

Cellular Respiration: $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

Photosynthesis: $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

REAL WORLD APPLICATION

Written by Vasco Esquivel

My real world application is related to the 2nd law of thermodynamics which states that energy cannot be converted without loss of usable energy. A real world application is that for us humans we cannot perform actions with out losing energy otherwise if that was possible then we would never need to rest, sleep, eat, etc because those are all sources of energy.

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