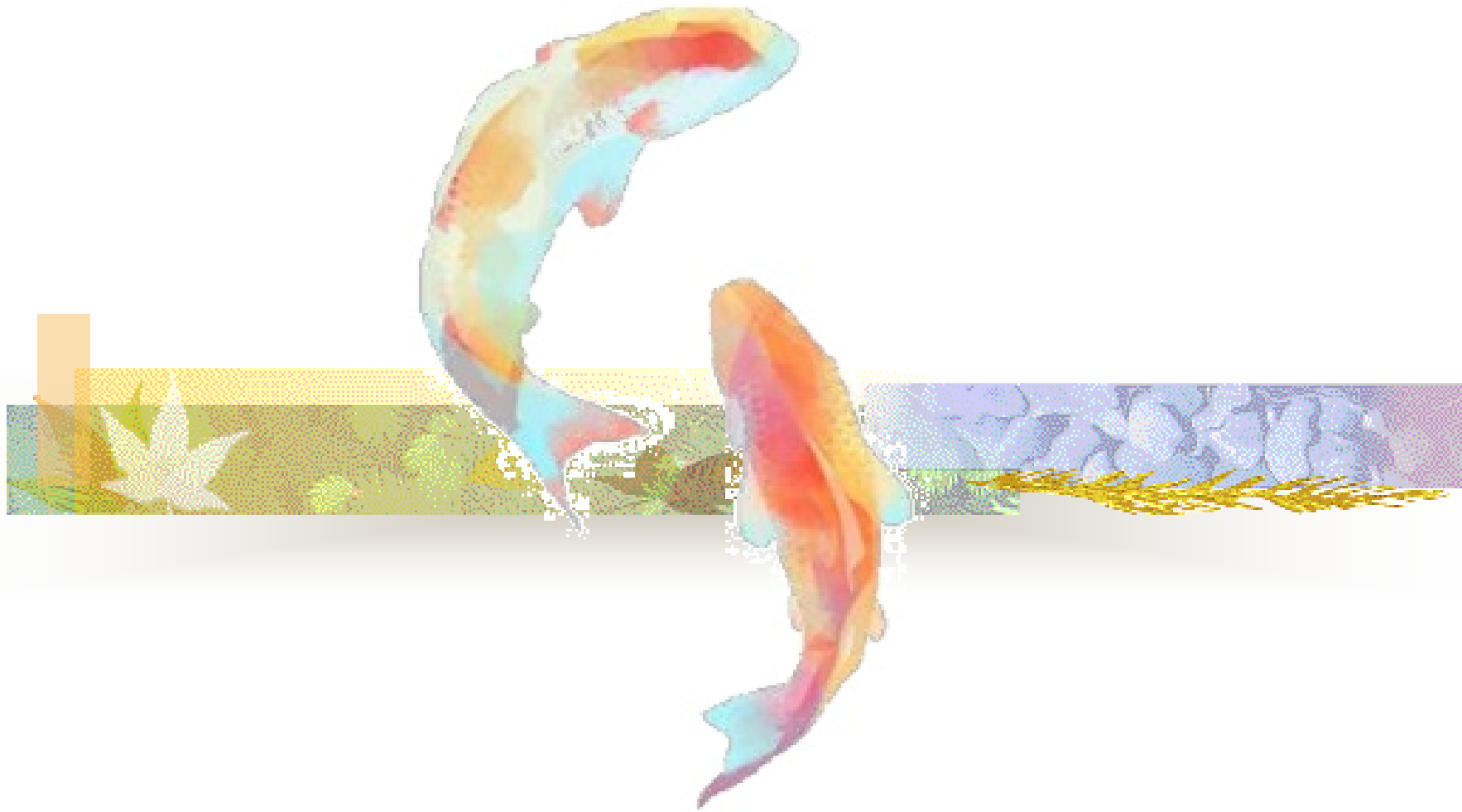


BIOENERGETICS



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What is Bioenergetics?

The study of **energy in living systems** (environments) and the **organisms** (plants and animals) that utilize them.



Energy

- Required by all organisms
- May be Kinetic or Potential energy



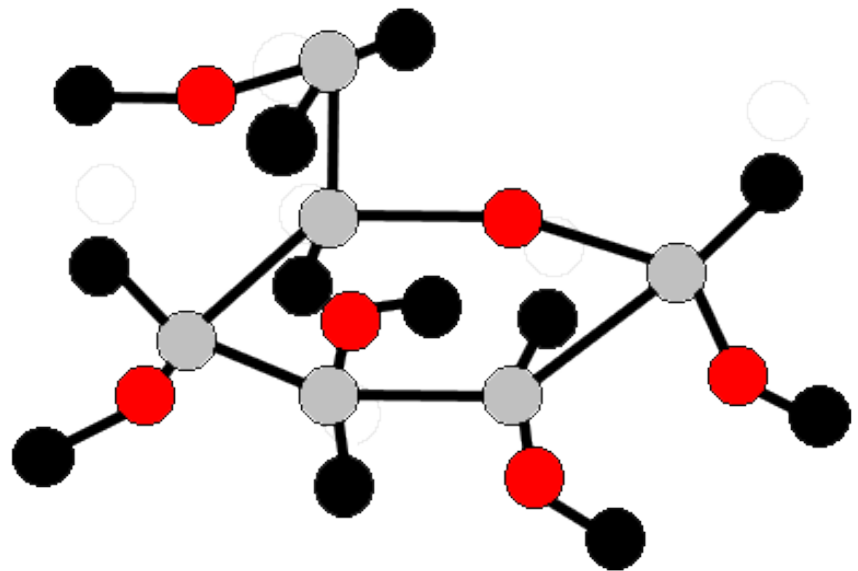
Kinetic Energy


- Energy of Motion
- Heat and light energy are examples



Potential Energy

- Energy of position
- Includes energy stored in chemical bonds



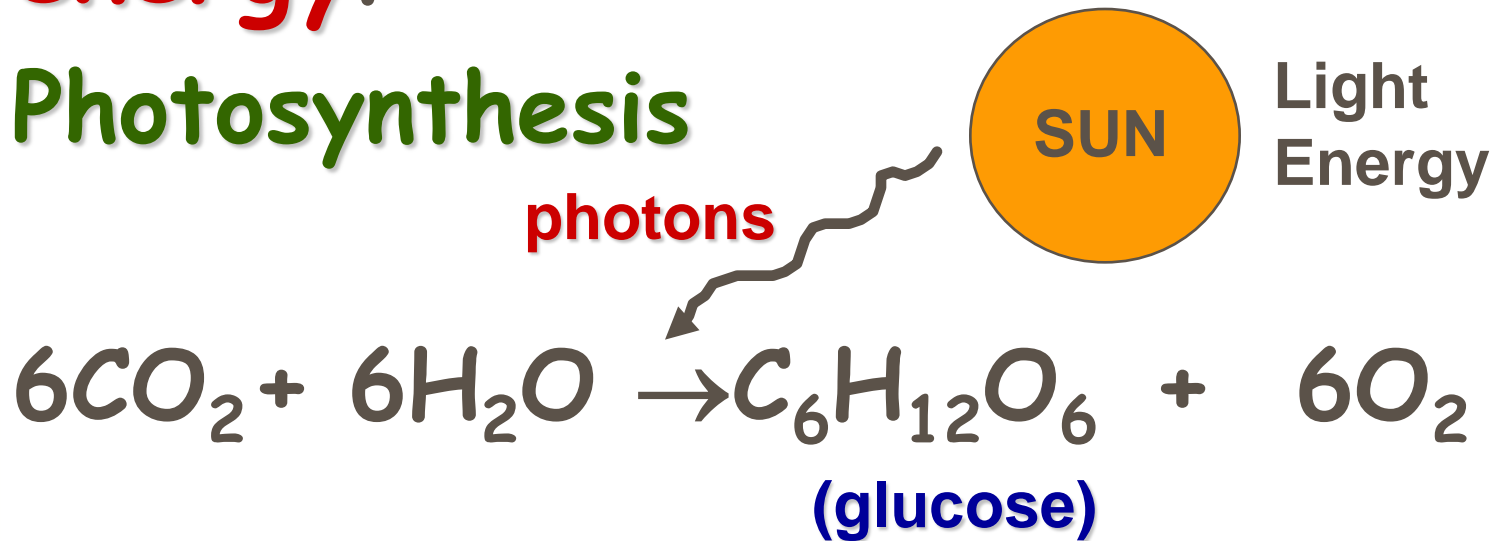


Two Types of Energy Reactions

Endergonic Reactions

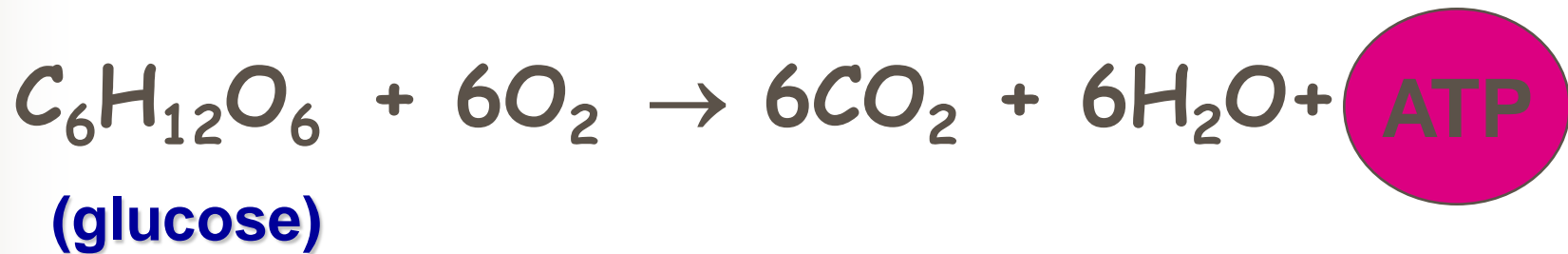
- **Chemical reaction** that requires a net input of **energy**.

- **Photosynthesis**



Exergonic Reactions

- Chemical reactions that **releases energy**
- Cellular Respiration

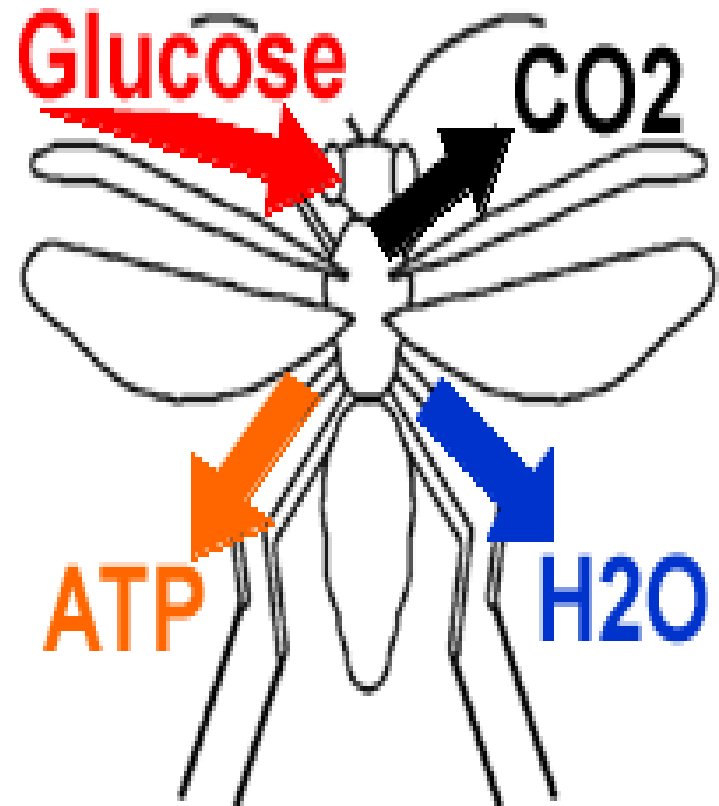




Metabolic Reactions of Cells

What is Metabolism?

- The sum total of the chemical activities of all cells.

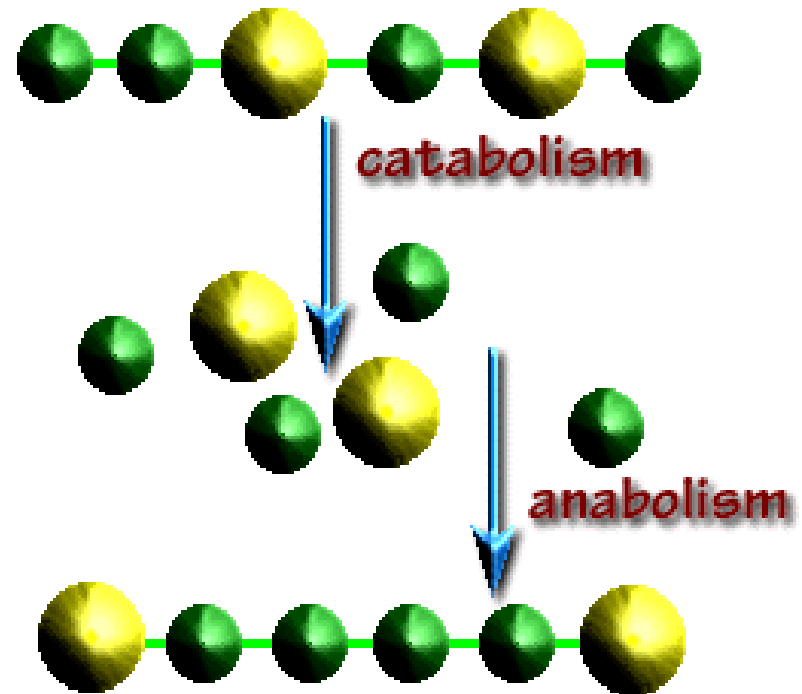


Two Types of Metabolism

- Anabolic Pathways
- Catabolic Pathways

Metabolism

breaking down and building up





Enthalpy & Entropy

The measure of energy in a thermodynamic system is called **enthalpy**. ... The second law of thermodynamics is also sometimes known as the law of disorder, because it describes the concept of **entropy**.

Enthalpy, H , is the sum of internal energy U of a system and the product of the pressure and change in volume of the system at a constant pressure. **Entropy**, S , is a measure of the disorder or randomness of a system.



gain heat

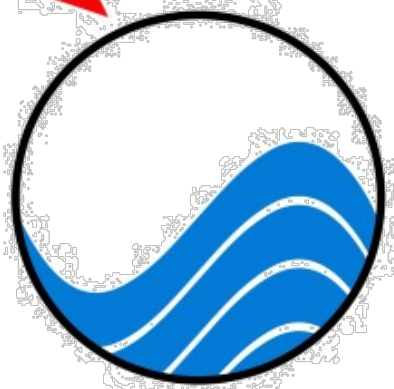


melting

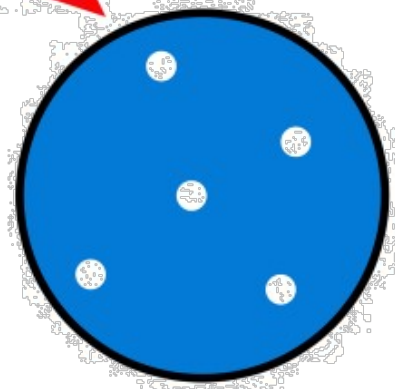
vaporisation



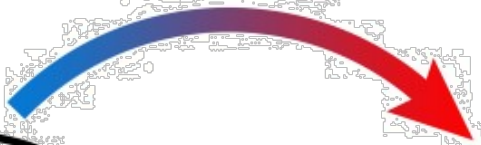
SOLID



LIQUID



GAS



freezing

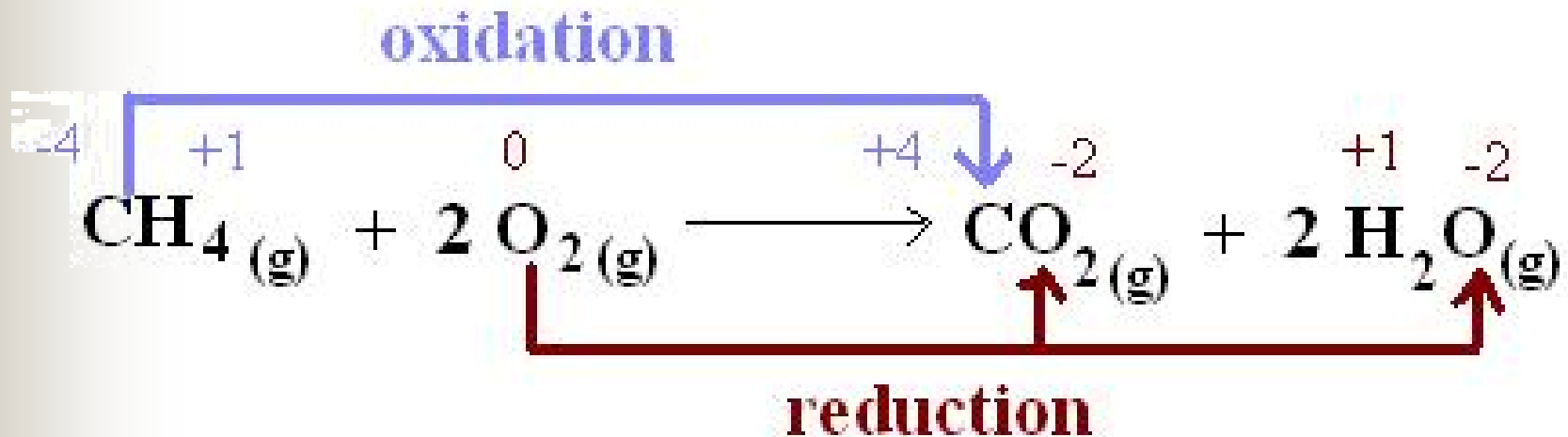
condensation

lose heat



Reduction potential -

Reduction potential (also known as redox potential, oxidation / reduction potential) is a measure of the tendency of a chemical species to acquire electrons and thereby be reduced. Reduction potential is measured in volts (V), or millivolts (mV).

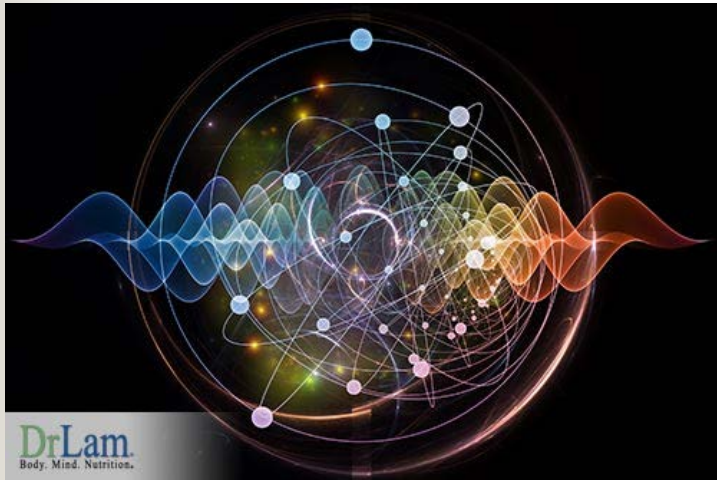




Standard Reduction Potential

The standard reduction potential (E_0) is measured under standard conditions: 25 °C, a one activity for each ion participating in the reaction, a partial pressure of 1 bar for each gas that is part of the reaction, and metals in their pure state. The standard reduction potential is defined relative to a standard hydrogen electrode (SHE) reference electrode, which is arbitrarily given a potential of 0.00 V.

Secrets of Bioenergetics





**Good, better, best. Never let it
rest. 'Til your good is better and
your better is best.**

St. Jerome



Thank You....