Cellular Respiration + Photosynthesis

- Cellular Respiration – Opposite of photosynthesis, Humans go through this process.
  - Occurs in 3 stages: Glycolysis, Citric Acid Cycle, Electron transport Chain.

★ Equation for Cellular Respiration ★:

Reactants: what you Need → Products: (What you make)

Oxygen + glucose → Carbon dioxide + Water + Heat Energy

★ $6O_2 + C_6H_{12}O_6 \rightarrow 6CO_2 + 6H_2O$ + Heat Energy/ATP ★

Reactants
What you need

Products
What you make w/ the Reactants

Glycolysis – It's Anaerobic (No oxygen is needed)
- Occurs in the cytoplasm of cell.
- Glucose is broken down into pyruvic Acid. Ex: Sprinting, Heavy lifting, Jumping.
- Produces 2 ATP
- If oxygen continues to not be present/or too low, Lactic Acid Fermentation will occur.

- Lactic Acid Fermentation – Makes muscles tired, and Heavy.
- Results in 2 ATP molecules.

Citric Acid Cycle: Its Aerobic (Oxygen is Needed/Present) AKA: Krebs Cycle
- Occurs in the mitochondria (combining oxygen + glucose to make ATP) ★
- 2 ATP + $2CO_2$ are produced.
- This process is step 1 of 2.

Electron Transport Chain (ETC) – It's Aerobic, electrons are passed between proteins. • Produces the most ATP – 32 ATP's. (Alot of energy)

Ex: Jogging, biking, walking

• ATP - Quick USABLE source of energy. (Adenosine Tri- Phosphate)

Tri- phosphate (3)

- Represents a full battery
- Energy is stored between the 2nd + 3rd phosphate

Similar to: After eating (Recharged body)

• ADP - Used up Energy, Between the 2nd + 3rd phosphate bond is broken, and loses its energy. Like having a low battery

Di- phosphate (2)

← 3rd phosphate is missing, now energy is gone.

- Similar to body after an extracurricular activity: feeling tired and need food.

Photo synthesis

- The process of using light energy to make sugar (glucose)
- Autotrophs (AKA Producers) - Ex: Plants, Algae, + Bacteria
  - All organisms that make their own energy (self-feeding)

Auto = Self, Troph = eating

*opposite of cellular Respiration!

Photosynthesis - Converts energy from the sun (light energy) into chemical energy in the form of carbohydrates (glucose).

Reactants (what you need)	Equation	Products (what you make)
Sun + Carbon dioxide (6) + Water (6)	makes →	glucose + oxygen (6)
Sun + $6CO_2$ + $6H_2O$	Makes →	$C_6H_{12}O_6$ + $6O_2$

Photosynthesis - Occurs in 2 Stages: Light Reaction & Dark Reaction

1) Light Reaction/Light dependant (Requires light)
   - Hydrolysis occurs - Water (H_2O) broken down to Oxygen (O_2) • Occurs in Thylakoids
2) Dark Reaction/Light independant Reaction/Calvin Cycle: (Doesn't Require light)
   - Takes place in the Stroma, CO_2 (Carbondioxide) broken apart into glucose ($C_6H_{12}O_6$)

2 Main Parts of Chloroplast

1) Thylakoids: Look like green pancakes
   - Light Reaction and Hyarolysis occurs here (Thylakoids)
2) Stroma: Space around the Thylakoids.
   - Dark reaction occurs CO_2 turns into $C_6H_{12}O_6$