

## Photosynthesis Vs. Cellular Respiration Review

Complete the following chart to compare these two processes:

	<b>Photosynthesis</b>	<b>Cellular Respiration</b>
Overall word equation:	Carbon dioxide and water → sugar and oxygen	Oxygen and sugar → water and carbon dioxide
Overall chemical equation:	$6\text{CO}_2 + 6\text{H}_2\text{O} + \text{light} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$	$6\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{energy}$
Reactants:	$\text{CO}_2$ and $\text{H}_2\text{O}$ and light energy	$\text{C}_6\text{H}_{12}\text{O}_6$ and $\text{O}_2$ and ATP
Products:	$\text{C}_6\text{H}_{12}\text{O}_6$ (or G3P) and $\text{O}_2$ and ATP	$\text{CO}_2$ and $\text{H}_2\text{O}$ and energy (ATP)
Occurs in which organisms?	Occurs in plants, protista (algae), and some bacteria.	Occurs in all living organisms (plants and animals).
Occurs in which organelle?	Chloroplasts	Mitochondria (Glycolysis occurs in cytoplasm)
Inner membrane of organelle:	Thylakoid membrane	Cristae (with Matrix "filler" inside of it)
Energy released or required?	Requires energy	Releases energy
Main function?	Production of food. Energy Capture.	Breakdown of food. Energy release.
Stages:	2 stages: The light dependent reaction and light independent reaction (calvin cycle).	4 stages: Glycolysis, Pyruvate oxidation, Krebs cycle, Electron Transport Chain (oxidative phosphorylation).
Production of ATP?	Yes; goes into calvin cycle to fuel production of g3p.	Yes; theoretical yield is 38 ATP molecules per glucose but actual yield is only about 30-32.
What powers ATP synthase?	$\text{H}^+$ gradient across thylakoid membrane into stroma. High $\text{H}^+$ concentration in the thylakoid lumen.	$\text{H}^+$ gradient across the inner mitochondria membrane into matrix. High $\text{H}^+$ concentration in the intermembrane space
Electron source:	Oxidation $\text{H}_2\text{O}$ at PSII	Glucose, NADH + , FADH <sub>2</sub>
Final electron acceptor in E.T.C.:	NADP <sup>+</sup> (forms NADPH )	$\text{O}_2$ (Oxygen gas)