

Key

Photosynthesis and Cellular Respiration Comparison

Photosynthesis		Cellular Respiration	
Overall Reaction	$6CO_2 + 12H_2O + \text{light} \rightarrow C_6H_{12}O_6 + 6H_2O + 6H_2O$	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy (ATP)}$	
Occurs in what types of eukaryotic cells	Autotrophic cells	All eukaryotic cells & some prokaryotes	
Catabolic/Anabolic Oxidation/Reduction	Anabolic   water-oxidized Sugar-reduced	Catabolic   sugar-oxidized Oxygen-reduced	
Where it takes place	Thylakoid membrane	Cytosol of the cell	Mitochondria
Starting Reactants	light, H <sub>2</sub> O	glucose 4 ATP	Pyruvate, NADH Coenzyme A
Ending Products	O <sub>2</sub> ATP, NADPH	G3P → glucose	NADH, ATP Acetyl CoA
Energy Input	light energy	NADPH & ATP	none
Net ATP formed	2	2	2
e-transport chains where	thylakoid membrane	no	no
what's pulling on e-	0.700 v PE NADP <sup>+</sup> → NADPH		
H <sup>+</sup> concentration gradients -- where	H <sup>+</sup> conc. in thylakoid ↓ H <sup>+</sup> stroma	N/A	N/A
ATP Synthase used	yes	no	no
Type of phosphorylation	Photophosphorylation	N/A	oxidative phosphorylation
High Energy Electron Carriers - type	NADP <sup>+</sup>	N/A	NAD <sup>+</sup>
Carbon rearrangement, release, or NA	N/A	Carbon rearrangement	Carbon release