

CHAPTER 5	Flow of Energy Between Photosynthesis and Cellular Respiration Answer Key	BLM 5.3.6A
ANSWER KEY		

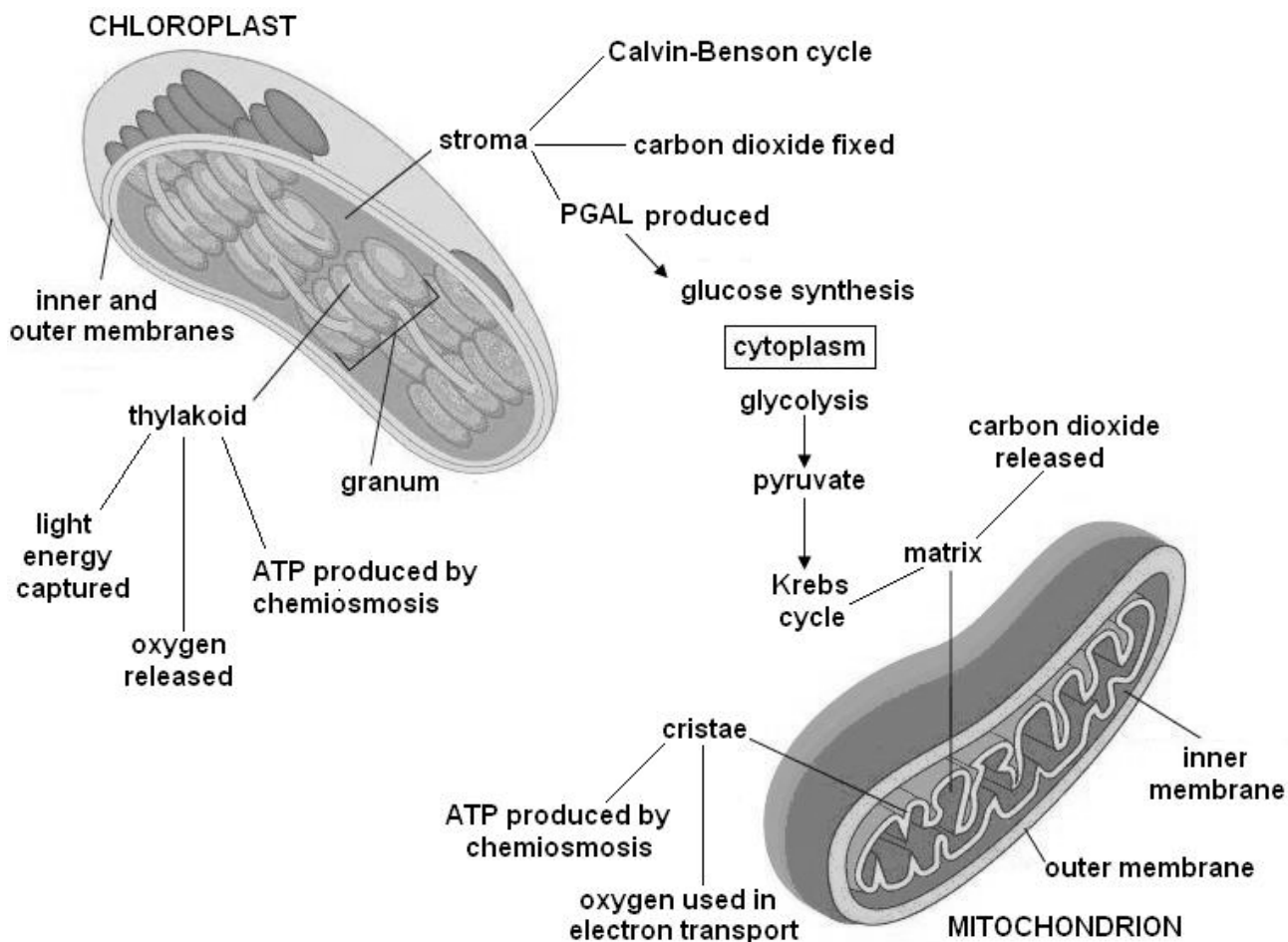
1.

The Energy Processes

Photosynthesis			Cellular Respiration		
Energy Used or Released	Reactions	Location	Energy Used or Released	Reactions	Location
Light energy captured	Water splits, forms oxygen; NADP reduced to form NADPH	Thylakoid membrane	Small amount of ATP produced	Glycolysis	Cytoplasm
Energy stored in proton gradient used to synthesize ATP	Chemi-osmosis	Thylakoid membrane	Energy used to reduce NAD to NADH	Pyruvate is used to make acetyl CoA	Matrix
ATP and NADPH from light-dependent reactions used	Synthesis of PGAL	Stroma	Small amount of ATP produced; Large amount of NAD reduced to NADH	Krebs cycle	Matrix
ATP from the light-dependent reactions used	Synthesis of RuBP from PGAL	Stroma	Many ATP produced using energy from proton gradient	Chemi-osmosis	Inner membrane

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2. Diagrams should resemble the following:



3. The flow chart should resemble the following:

light energy absorbed by thylakoid membranes → used to make ATP and NADPH (light reactions of photosynthesis) → energy from ATP and NADPH used to fix CO₂ (from Krebs cycle) and form PGAL (Calvin-Benson cycle) → PGAL used to make glucose (energy storage) → glucose broken down to form pyruvate (glycolysis) → pyruvate broken down into CO₂ and acetyl CoA in matrix → acetyl CoA enters Krebs cycle → used to make NADH → NADH from Krebs cycle and O₂ from light reactions of photosynthesis used in electron transport to create proton gradient across inner membrane → proton gradient used to make ATP (chemiosmosis) → ATP used to power cellular functions