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| --- | --- |
| **Cellular Respiration** | **Photosynthesis** |
| Aerobic (requires oxygen)  C6H12O6 + 6O2 (enz)->6CO2 +6H2O  Exergonic (releases energy/break down)  3 parts  A)**GLYCOLYSIS:**  - all organisms must undergo this step  - net gain of only 2 ATPS, although 4 are produced, because 2 were used to start it  - occurs in **cytoplasm**  - glucose broken down into 2 pyruvates  - **anaerobic**, because it does not require oxygen  - 2 pyruvates, 2 ATPs, 2 NADHs  B) **KREBS CYCLE** (+PRE-KREBS): **Aerobic**; **Mitochondria**  - breaks down/completely oxidizes pyruvate down into CO2  - occurs in mitochondrial matrix  - produces most NADHs  - 6CO2, 2 ATP, 8 NADH, 2FADH2  C) **ELECTRON TRANSPORT CHAIN** (chemiosmosis)  - Aerobic; takes place in mitochondrial inner membrane  - makes 32-34 ATPs  - electrons from NADH passed down a chain of proteins embedded into membrane  - H+ ions from NADH are pumped across membrane into inner space. When concentration gets high, causes the enzyme ATP Synthase to open. H+ ions flood across membrane. That’s how 32-34 ATP are made  - O2 is the final electron acceptor. O2 + electrons + H’s make H2O.  \***Aerobic Resp makes approximately 36-38 ATP**  **If anaerobic (no oxygen)** :  yeasts -> alcohol fermentation  Animals -> lactic acid fermentation  STUDY DIAGRAMS! | Chloroplast of plants; some protists (like algae) and a few bacteria photosynthesize  6CO2 +6H2O (light/chlorophyll enz)-> C6H12O6 + 6O2  Endergonic (absorbs energy/build up)  2 parts  A) **LIGHT REACTIONS**:  - takes place in **thylakoids of chloroplasts**  - chlorophyll molecule absorbs sunlight  - requires light. Reactions are light dependent  1) Water is split into H’s, electrons and oxygen. **Oxygen is released** through stoma (pores on underside of leaf)  2) Electrons passed down ETC to make ATP. NADP picks up H’s and electrons and becomes NADPH. Both ATP and NADPH go to Calvin cycle.  B) **CALVIN CYCLE**:  - NADPH + ATP go in from light reactions to help build glucose  - takes place in **the stroma** of the chloroplast  - Rubisco (most common enzyme on the planet) grabs CO2 and adds it to a molecule in the cycle. For every 3 CO2 that enter Calvin, 1 G3P (3-carbons) is made. When 2 G3Ps are made, **glucose is produced**.  STUDY DIAGRAMS! |
| Go over enzymes, endergonic vs exergonic | Go over chloroplast structure |

**Photorespiration**

-shuts stoma, so the CO2 can’t get in, & the plant starts trying to put oxygen in Calvin Cycle, but then you can’t make glucose, and the plant…says goodbye

Other things to know:

Greenhouse effect: accumulation of excess CO2 in atmosphere. Mainly due to deforestation (cutting down trees, etc.) on earth. Many believe this has led to global warming

ATP vs ADP+P

\*\*label diagrams of mitochondria & chloroplast

NADH ->respiration, NADPH -> photosynthesis

Know electromagnetic spectrum, wavelengths measured in nanometers, red is the longest, violet the shortest

Plants are green. They absorb red and blue wavelengths of light, reflect green

Pigments; carotenoids (orange), xanthophylls (yellow/red); only see them when the chlorophyll is no longer active

Know autotroph vs heterotroph