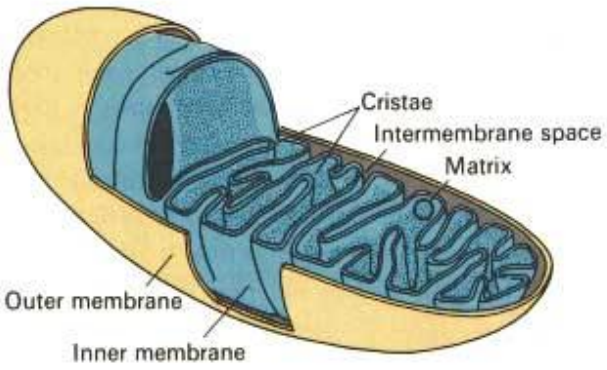
Cellular Respiration - Guided Notes



Mitochondria

The location of cellular respiration in eukaryotic cells.

Function of mitochondria:

_____
_____
_____
_____

The Equation

How do the equations of photosynthesis and cellular respiration compare? _____

Write them here:

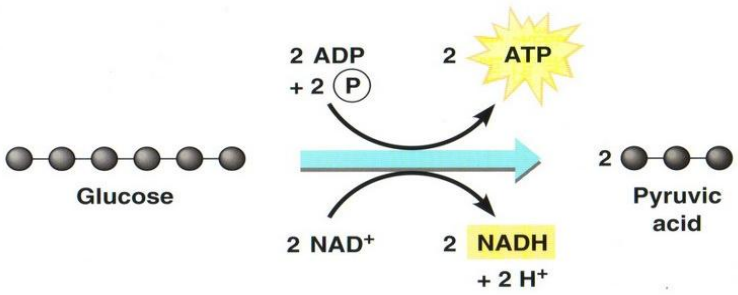
- Photosynthesis:
- Cellular Respiration:

Glycolysis

- Literally means _____
- _____ stage in _____
- Occurs in the _____
- Process in which 1 molecule of _____ is broken in _____, producing _____ molecules of _____

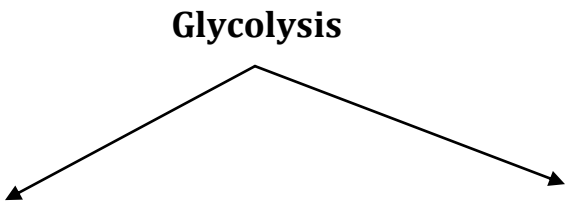
And it keeps going...

- Requires _____ ATP, but produces _____ATP → *net gain of* _____
- NAD^+ given electrons and becomes _____
  - _____- for cellular respiration
- *Super fast!* Produces _____ of ATP molecules in just a few *milliseconds*



- You only have so many NAD+ available, so this process can't keep happening

Path of Cellular Respiration



Fermentation

- Anaerobic – follows Glycolysis when _____
- Not how the normal process of CR is supposed to go! _____-
- _____-___ releases _____ from food molecules by producing ATP in absence of O2
- The electrons stored in NADH are returned to _____, letting the NAD+ go back to _____ and keep making ATP
    - _____ fermentation
    - _____ fermentation

Alcoholic Fermentation

- Used by _____ → why bread rises
- Converts sugar into _____

Equation:

Lactic Acid Fermentation

- In many cells, the pyruvic acid that accumulates from _____ can be converted into _____
- Produced in your body during _____
- Causes _____

Equation:

Krebs Cycle

- In the presence of _____, cellular respiration proceeds from _____ to the *Krebs Cycle*
- Breaks down _____
- Occurs in _____

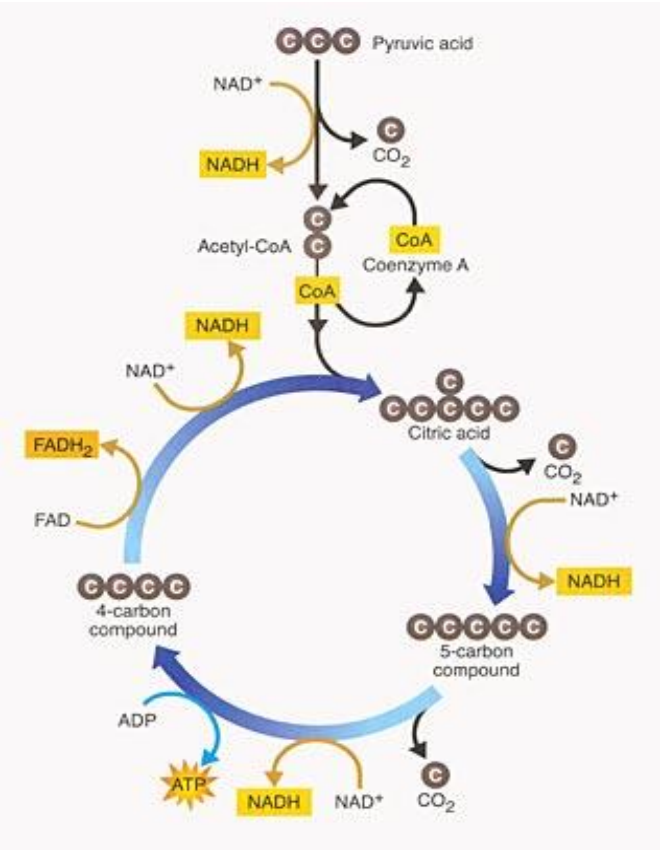
Krebs Cycle

- Discovered in _____by Hans Krebs - biochemist
- The basic definition of Krebs Cycle: _____ _____

Steps of the Krebs

Before the cycle starts "turning"

- **Step 1 →** _____ enters the mitochondria
- **Step 2 →** _____ carbon molecule from pyruvic acid breaks off to form _____
- **Step 3 →** other two carbon atoms tack onto _____ – this molecule becomes acetyl coenzyme A



- **Step 4 →** Acetyl CoA adds the two carbon acetyl group to a 4 carbon molecule…

THIS NEW 6 CARBON MOLECULE IS

_____

Now the cycle starts turning

- **Step 1 →** _____ _____
  - That carbon becomes a _____
  - NAD+ picks up _____

Moving along...

- **Step 2 → _____**
    - That carbon becomes a _____ molecule
    - NAD+ picks up _____
    - _____ formed (only 1)

Finishing up...

- **Step 3 → the _____ is ready to start the cycle again!**
    - FAD picks up _____
    - NAD picks up one last set of electrons and H+

End Result

One turn of the Krebs Cycle gives you these products: _____

Electron Transport

- The ETC uses high-energy electrons from the Krebs cycle to convert _____
- In eukaryotes, the ETC is a series of carrier proteins located in the _____

  _____ of the mitochondria
- In prokaryotes, the ETC is in the _____

Electron Transport Chain

- 2 _____ are transported through the ETC
    - Their energy helps transport _____
- At the end of the ETC an enzyme (named _____) is waiting patiently to snatch up the electrons and a couple H+
    - The enzyme combines the electrons, H+, and O_2 to make _____
- H+ escape to _____ space
    - H+ builds up in the intermembrane space, making it _____
    - The H+ rush back to the _____ membrane side
    - As they pass, they cause _____ to spin and make ATP

Total it up!

- In the presence of oxygen – _____
    - _____ of the total energy of glucose
    - What happened to the remaining **62%?** _____