Name_____Date_____Per_____

Chapter 10.2 – The Process of Cellular Respiration

Essential Question(s): _____

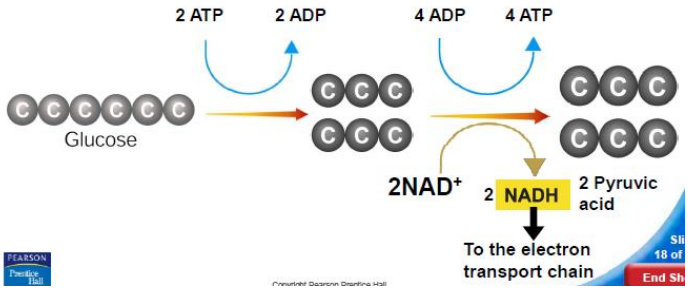
_____

_____

- **Glycolysis takes place in the _____.**
- **The Krebs cycle and electron transport take place in the _____.**

What happens during the process of glycolysis?

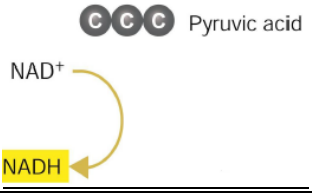
- Glycolysis is the process in which _____ molecules of glucose is broken in _____, producing two molecules of pyruvic acid, a 3-carbon compound.
- **ATP Production**
  - At the beginning of glycolysis, the cell _____ up 2 molecules of ATP to _____ the reaction.
  - When glycolysis is complete, 4 ATP molecules have been _____.
  - This gives the cell a net _____ of 2 ATP molecules.
- **NADH Production**
  - One reaction of glycolysis removes 4 high-energy _____, passing them to an electron carrier called NAD+
  - Each NAD¬+ _____ a pair of high-energy electrons and becomes an and NADH molecule.
  - The NADH molecule _____ the electrons until they can be transferred to _____ molecules.
- **The Advantage of Glycolysis**
  - The process of glycolysis is so _____ that cells can produce thousands of ATP molecules in a _____ milliseconds.
  - Glycolysis does NOT require oxygen.



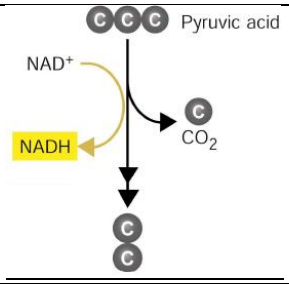
<u>The Krebs Cycle</u> – pyruvic acid is _____ down into carbon dioxide in a series of energy-extracting _____. Because citric acid is the first compound formed in this _____ of reactions, it is also referred to as *the citric acid cycle.*

The Krebs cycle begins when pyruvic _____ produced by glycolysis enters the _____.

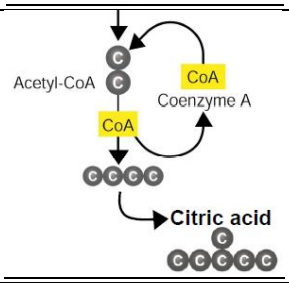
One _____ molecule is removed, forming CO_2 and electrons are _____, changing NAD^+ to NADH.



Coenzyme A joins the 2-carbon molecule, _____ acetyl-CoA



Acetyl-CoA then _____ the 2-carbon acetyl group to a 4-carbon _____, forming citric acid.

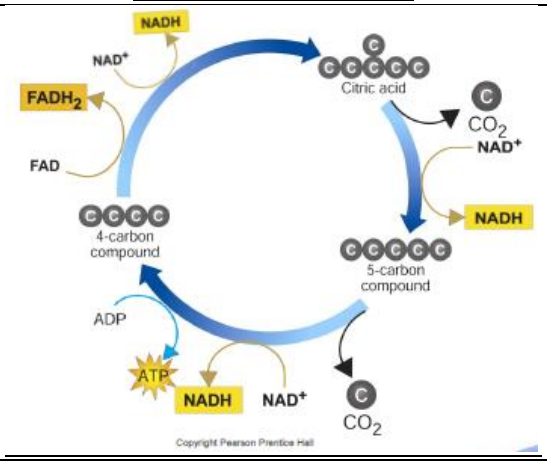


Citric acid is broken down into a ____-carbon compound, then into a _____-carbon compound.

Two more molecules of CO_2 are _____ and electrons join NAD+ and FAD, forming NADH and $FADH_2$.

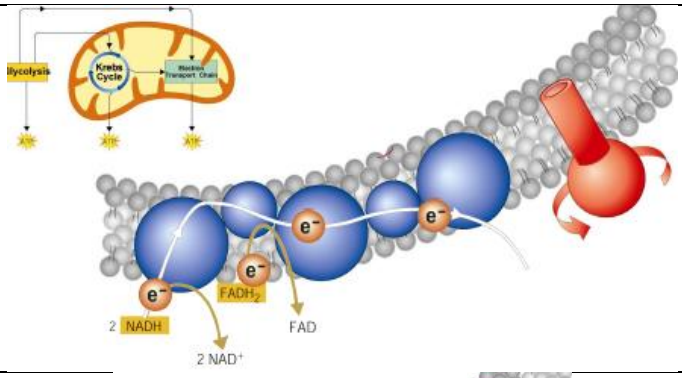
In addition, _____ molecule of ATP is generated.

The energy tally from _____ molecule of pyruvic acid is:
4 NADH 1$FADH_2$ 1 ATP



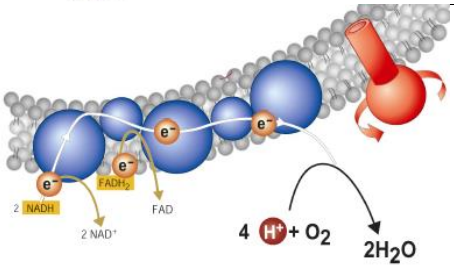
<u>Electron Transport Chain</u> – uses the high-energy _____ from the Krebs cycle to _____ ADP to ATP.

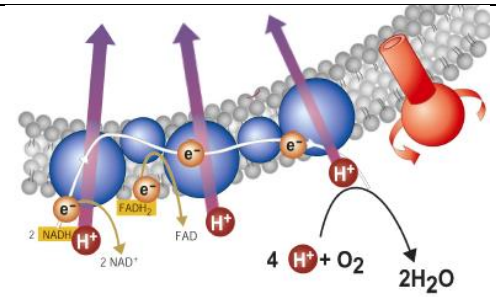
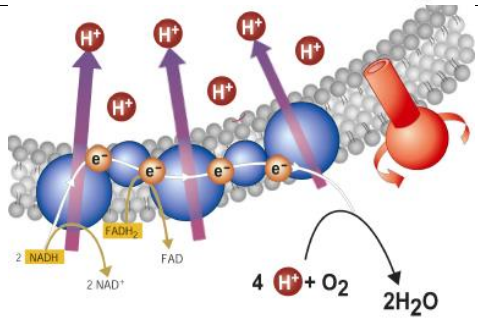
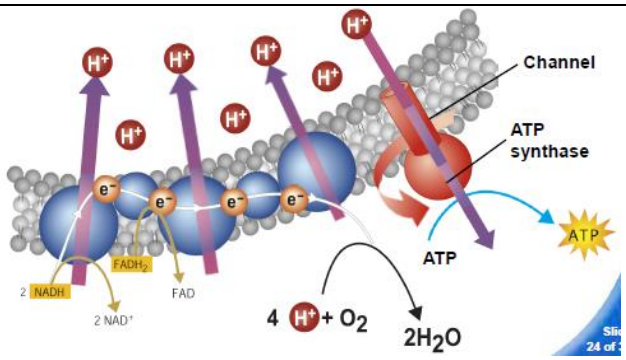
High-energy electrons from NADH and $FADH_2$ are _____ along the electron transport chain from one carrier _____ to the next.



At the end of the chain, an _____ combines these electrons with _____ ions and oxygen to form _____.

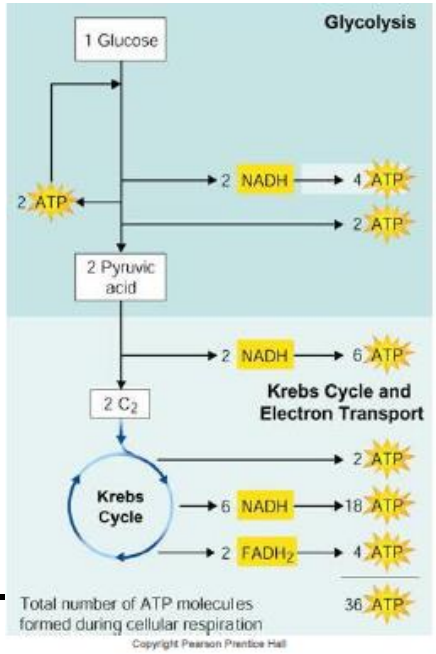
As the _____ electron acceptor of the electron transport chain, _____ gets rid of the low-energy electrons and _____ ions.



When 2 high-energy electrons _____ down the electron transport chain, their _____ is used to move hydrogen ions (H^+) _____ the membrane.	
During electron transport, H^+ ions _____ up in the intermembrane space, so it is _____ charged. The other side of the membrane, from which those H+ ions were _____, is now _____ charged.	
The _____ membranes of the mitochondria contain protein spheres called ATP synthases. As H^+ ions _____ through channels into these proteins, the ATP synthase _____. As it _____, the enzyme grabs a low-energy ADP, attaching a phosphate, forming high-energy _____.	

The Totals

- Glycolysis produces just _____ ATP molecules per molecule of glucose.
- The complete breakdown of _____ through cellular respiration, including glycolysis, results in the _____ of 36 molecules of ATP.



Summary: