

Cellular Respiration (p. 104 – 110)

I. Cellular Energy

- Define the term cellular respiration.

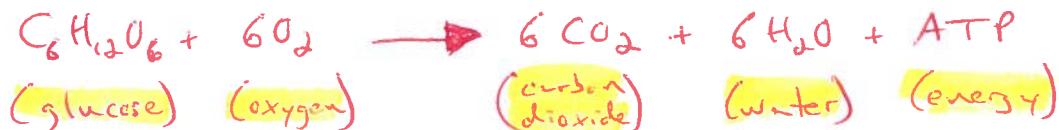
Cellular Respiration – cell transfer of energy in organic compounds to ATP (harvesting of cellular energy)

- Differentiate between aerobic and anaerobic respiration.

Aerobic Respiration : Metabolic process requiring oxygen

Anaerobic Respiration : Metabolic process that does not require oxygen

- Write out the equation for cellular respiration. (Label your formula reactants & products)



- Where does cellular respiration occur in the following?

Eukaryotes : Mitochondria Prokaryotes : Cell Membrane

II. Stage One : Breakdown Of Glucose (Glycolysis)

- List four substances that can be broken down to make ATP.

1. Glucose 2. Fats 3. Protein 4. Nucleic Acids

- Define the term glycolysis.

Glycolysis – enzyme-assisted anaerobic process that breaks down one six-carbon molecule of glucose into two three-carbon pyruvate ions

- Where does glycolysis occur in the cell? cytoplasm

- List the four steps of glycolysis.

- Phosphate groups from (2) ATP molecules are transferred to a glucose molecule.
- Resulting 6-carbon molecule is broken down to (2) 3-carbon compounds (each with a phosphate group)
- (2) NADH molecules are produced; Another phosphate group is transferred to each 3-carbon molecule. Each 3-carbon compound is converted into 3-carbon pyruvates (four ATP molecules produced)

Uses
2 ATP

Produces
4 ATP
NET ATP
2 ATP
~ NADH

III. Stage Two : Production Of ATP (Aerobic Respiration)

1. Where does aerobic respiration occur in the cell? mitochondria

2. What is produced when each pyruvate is converted into a 2-carbon compound?

1 - CO_2 1 - NADH 1 - acetyl CoA

3. List the five steps of the Kreb's Cycle.

- P (106)
1. Acetyl-CoA forms a 6-carbon compound (combines with a 4-carbon compound)
 2. CO_2 released; (Creates a 5-carbon compound)
 3. CO_2 released; (Creates a 4-carbon compound)
 4. 4-carbon compound converted to new 4-carbon compound
 5. 4-carbon compound converted to original 4-carbon compound

4. What happens to NADH and FADH_2 in an electron transport chain?

P (107)

Donate electrons (H^+ ions) to make ATP
(Concentration gradient established)

5. What is the final electron acceptor of H^+ ions? O_2 (oxygen)

6. What is the end result of the electron transport chain? H_2O (water)

IV. Respiration In The Absence Of Oxygen (Anaerobic Respiration)

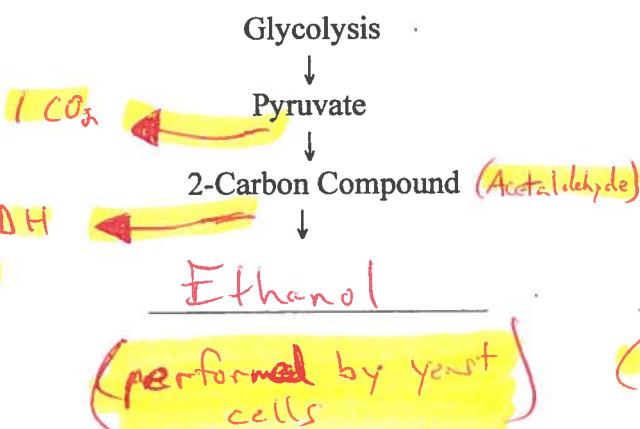
1. Define the term fermentation.

Fermentation - recycling of NAD^+ using an organic hydrogen acceptor to produce cellular energy

2. What is absent that causes fermentation to occur? oxygen

3. What is the electron acceptor during fermentation? organic hydrogen acceptor

4. Fill in the blanks.

Alcoholic Fermentation (2X)Lactic Acid Fermentation (2X)