

UNIT 4 (CH. 8) ENERGY IN A CELL NOTES

A. ATP – Adenosine Tri Phosphate = Adenosine + (P) + (P) + (P) ^{3 Phosphates}

1. Energy molecule of the cell
2. Energy Stored when phosphate group is added to ADP
3. Energy Released when bond between two Phosphates is broken
- ★ 4. How do cells use energy? Processes that require ATP (energy)?
Active transport, cell division, movement (Cilia & flagella), digestion, maintaining homeostasis, Protein Synthesis

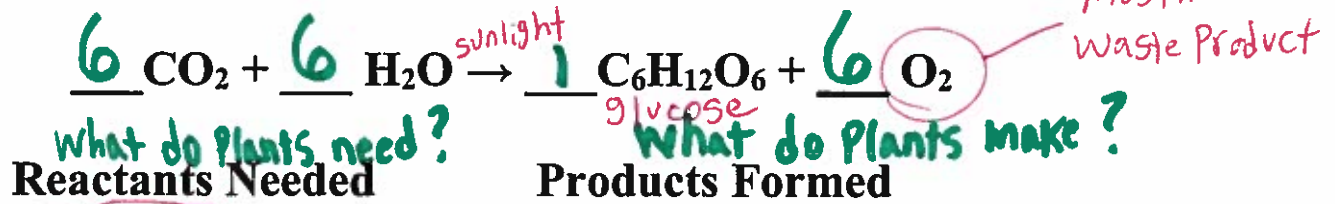
Energy

1. Sun = Ultimate source of energy for all living things
2. Energy is needed to move molecules in all parts of our bodies

B. Photosynthesis = process by which autotrophs use energy to make carbohydrates (sugar)

1. Chloroplast – cell organelle where photosynthesis takes place
2. Chlorophyll – green pigment made in the chloroplast
- main energy trapping molecule in plants

★ 3. General Equation (Reaction)



4. Two stages of photosynthesis (Light & Dark Reactions)

Part 1

- Light-Dependent Reactions – requires sunlight
- takes place in thylakoids of chloroplast
 - uses Sunlight & H₂O ; produces O₂ & some ATP (energy)

Part 2

- Dark Calvin Cycle – uses ATP from Light Reaction to make glucose
- takes place in the Stroma (liquid) of chloroplast
 - uses CO₂ & ATP ; produces glucose C₆H₁₂O₆
- from Part 1

D. Fermentation

- anaerobic process – allows cells to make ATP until O_2 is available *No O_2 required*
- happens when O_2 is lacking

Two Kinds of Fermentation:

1. Lactic Acid Fermentation

- lactic acid develops in muscle tissues (causes fatigue)
- occurs during strenuous exercise *occurs in animals*

Pyruvic acid → Lactic acid

2. Alcoholic Fermentation

- produces ethyl alcohol
- used by yeasts to release energy when O_2 is not present
Fungi

Pyruvic acid → Ethanol

Comparison of Photosynthesis and Cellular Respiration

Photosynthesis	Cellular Respiration
Makes/stores food (glucose)	Food broken down to release energy
Energy from sun stored in glucose	Energy of glucose released
Uses CO_2 , H_2O , and sunlight	Uses O_2 and glucose $C_6H_{12}O_6$
Produces O_2 and glucose $C_6H_{12}O_6$	Produces CO_2 , H_2O , and energy
Occurs in chloroplasts of cells	Occurs in cytoplasm & mitochondria of cells
Happens with sunlight	Happens with and without sunlight
Occurs only in autotrophs	Occurs in both autotrophs & heterotrophs

