Sadiq Public School

Do the right, fear no man

Subject: Biology **Class: S2** **Day: Saturday (16-11-2024)**

Lesson

This lesson is about mechanism of photosynthesis (light & dark reaction)

A: Inquiry

We studied that oxidation-reduction reactions take place in living organisms. Each of these reactions are important for the living organism. One of the most important redox process is Photosynthesis that occurs in plants and plant-like protists. It involves different reactions named as light and dark reactions.

This lesson will enable the students to:

- Understand the light reactions of photosynthesis.
- Describe mechanism of light and dark reactions in photosynthesis.

B: Information

Light Reactions

The summary of the events of light reactions is as follows;

• When chlorophyll molecules absorb light, their energy level increases and their electrons are emitted.

• Electrons are passed to electron transport chain to produce ATP.

• Light also breaks water molecule (photolysis) and oxygen is released. The hydrogen atoms of water give electrons to chlorophyll and become ions.

• The electrons of chlorophyll, after the production of ATP, and the hydrogen ions of water are used for the reduction of NADP+ into NADPH.

*The whole series of light reactions is called Z-scheme due to its Z-shaped flow chart.

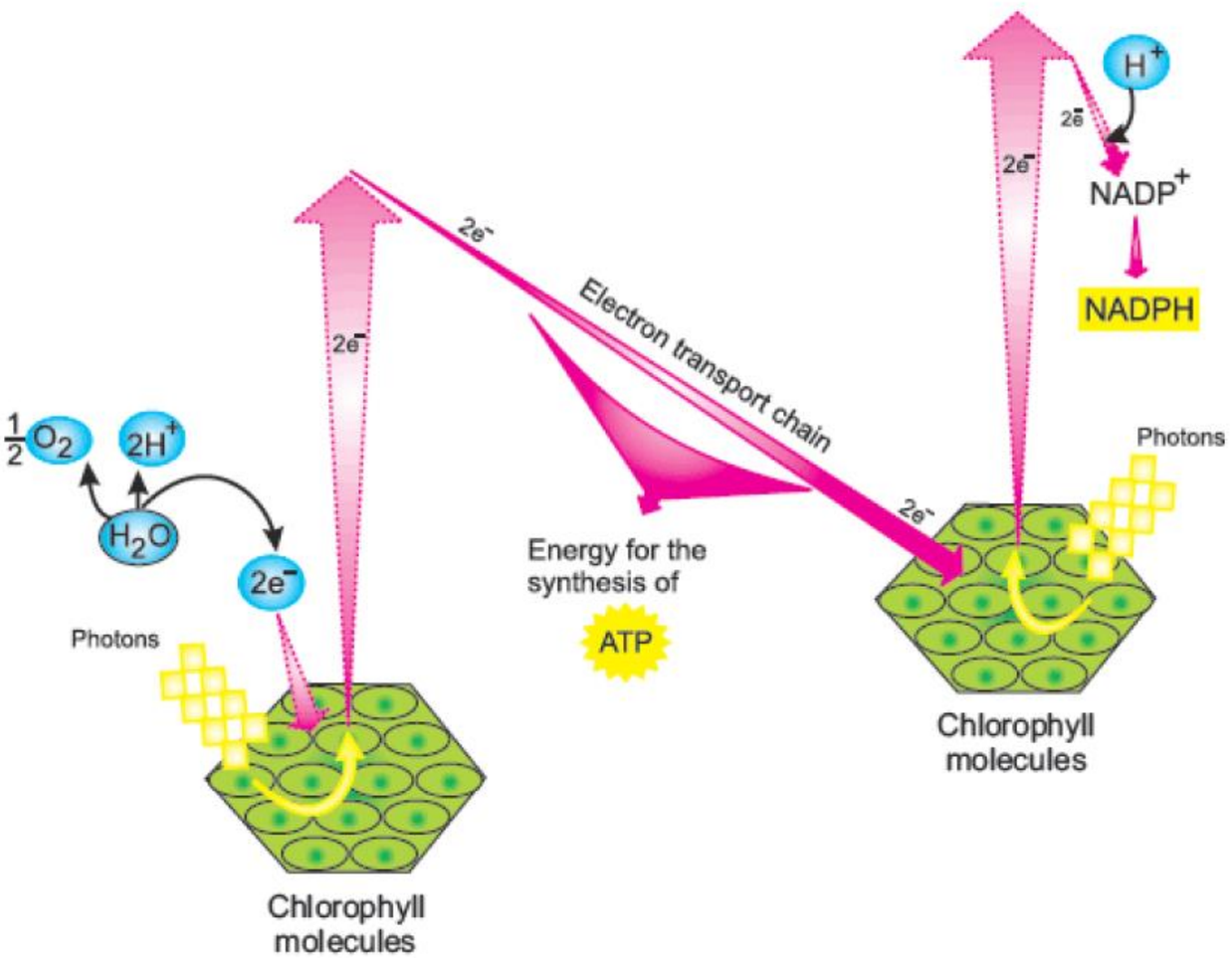

Fig: Light Reactions of Photosynthesis

Dark Reactions (Calvin Cycle)

The details of dark reactions were discovered by **Malvin Calvin** and his colleagues at the University of California. The summary of the events of dark reactions, also known as Calvin cycle is as follows;

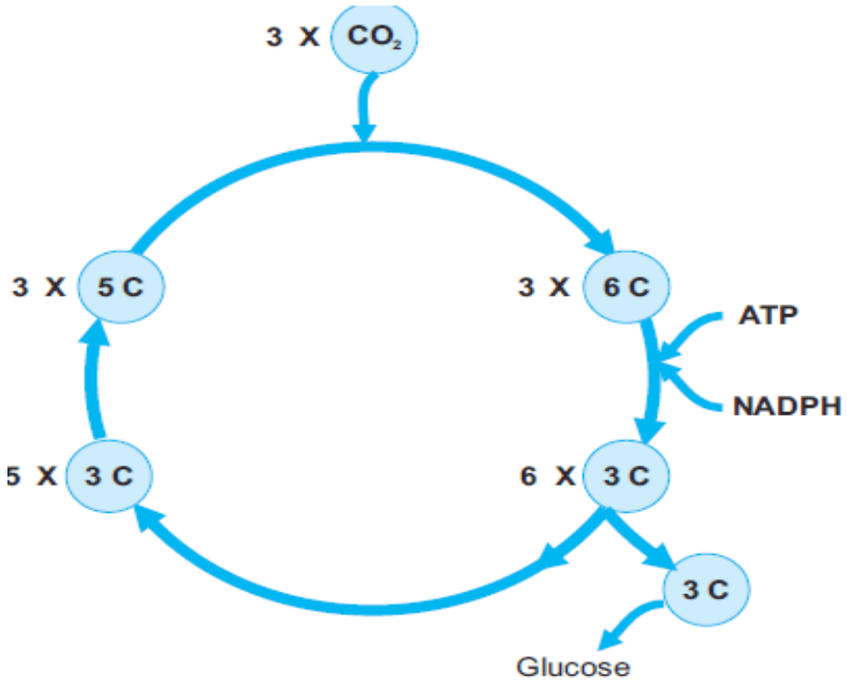

Fig: Dark Reactions of Photosynthesis

• CO2 molecules are combined with 5-carbon compounds to form 2 temporary 6-carbon compounds, each of which splits into two 3- carbon compounds.
• The 3-carbon compounds are reduced to 3-carbon carbohydrates by using ATP and hydrogen from NADPH. The 3-carbon carbohydrates are used to manufacture glucose.
• The 3-carbon carbohydrates are also used to regenerate the original 5-carbon compounds. This step also utilizes ATP.

C: Synthesis/absorbing the information

Write your own notes in your notebooks based on information about mechanism of photosynthesis.

Watch this video to review your concept related to mechanism of photosynthesis.

https://youtu.be/CMiPYHNNg28

D: Practicing:

- Why light reactions are named as Z-scheme?
- List down two differences between light and dark reactions.
- Sketch diagram to show light reactions.
- Describe the mechanism of light and dark reactions in photosynthesis.