

CHAP 9.3 - THE REACTION OF PHOTOSYNTHESIS

Essential Question(s):

Questions:

Light-Dependent Reactions = REQUIRE LIGHT

- The light-dependent reactions produce _____ gas and convert ADP and NADP⁺ into the _____ carriers ATP and NADPH.

- Photosynthesis _____ when pigments in photosystem II absorb light, increasing their _____ level.

- These high-energy electrons are _____ on to the electron transport chain.

- Enzymes on the thylakoid membrane _____ water molecules into:
 - Hydrogen ions
 - Oxygen atoms
 - Energized electrons

The energized _____ from water replace the high-energy electrons that chlorophyll _____ to the electron transport chain.

As plants _____ electrons from water, oxygen is left behind and is _____ into the air.

The hydrogen ions left behind when water is broken apart are released _____ the thylakoid membrane.

Energy from the electrons is _____ to transport H⁺ ions from the stroma into the inner thylakoid _____.

High-energy electrons move through the electron _____ chain from photosystem II to photosystem I.

Pigments in photosystem I use energy from _____ to re-energize electrons.

NADP⁺ then _____ up these high-energy electrons, along with H⁺ ions and becomes NADPH.

As electrons are _____ from chlorophyll to NADP⁺, more H⁺ ions are _____ across the membrane.

Soon, the inside of the membrane _____ up with positively charged hydrogen ions, which makes the _____ of the membrane negatively charged.

The difference in the _____ across the membrane provides the energy to make _____.

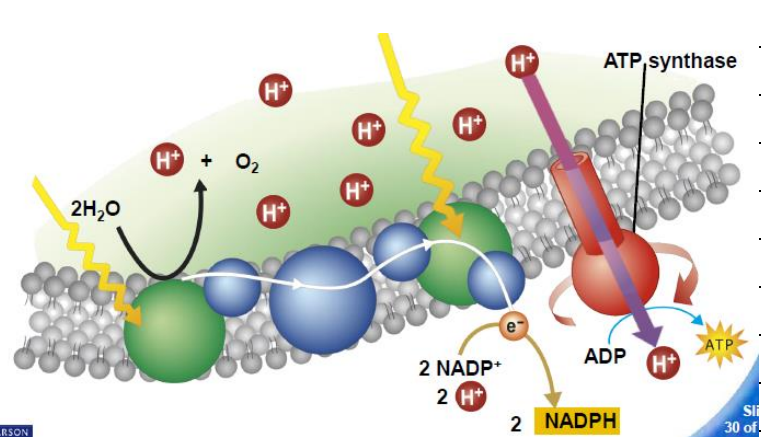
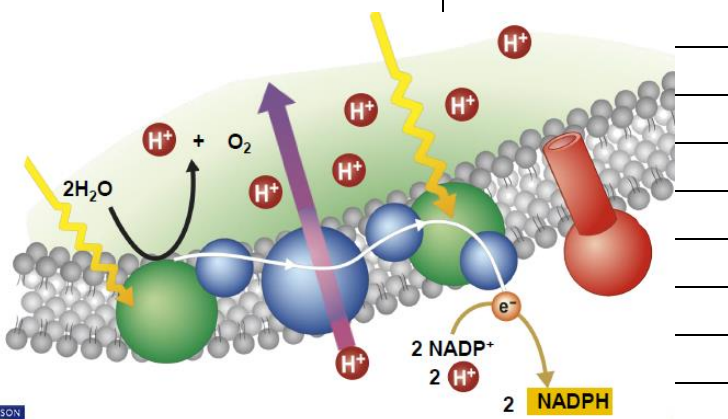
H⁺ ions cannot cross the membrane _____.

The cell membrane contains a protein called **ATP synthase** that _____ H⁺ ions to pass through it.

As H⁺ ions pass through ATP synthase, the protein _____.

As it rotates, ATP synthase binds ADP and a _____ group together to produce ATP.

Because of this system, light-dependent electron transport _____ not only high-energy electrons but ATP as well.



Light Independent Reaction: The Calvin Cycle

The Calvin Cycle _____ ATP and NADPH from the light-dependent reactions to _____ high-energy sugars.

Because the Calvin cycle does _____ require light, these reactions are also called the **light-independent** reactions.

Six carbon dioxide molecules _____ the cycle from the atmosphere and _____ with six 5-carbon molecules.

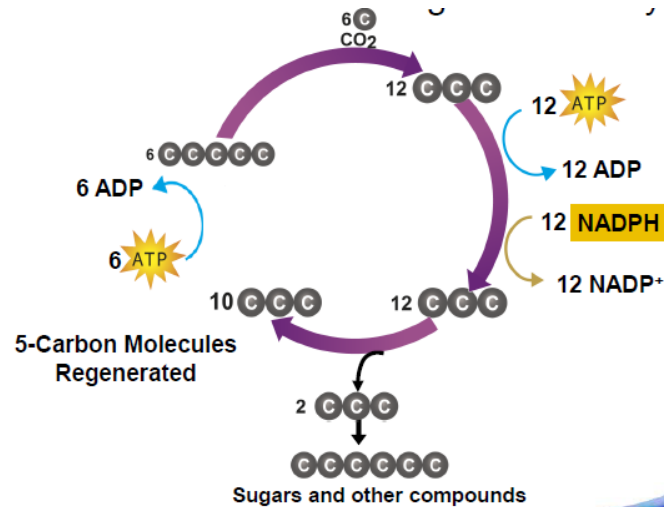
The result is _____ 3-carbon molecules, which are then converted into higher-energy _____.

The energy for this conversion comes from _____ and high-energy electrons from NADPH.

Two of twelve 3-carbon molecules are _____ from the cycle.

The molecules are used to produce sugars, lipids, amino acids & other compounds.

The _____ remaining 3-carbon molecules are converted back into six 5-carbon molecules which are _____ to begin the next cycle.



Summary: _____
