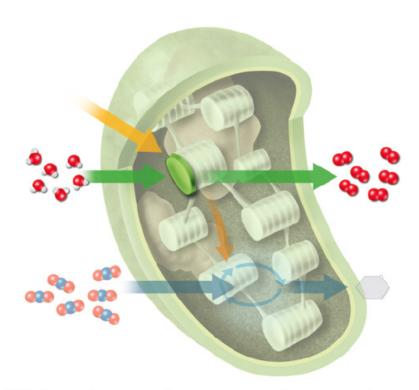
#### **KEY CONCEPT**

Photosynthesis requires a series of chemical reactions.

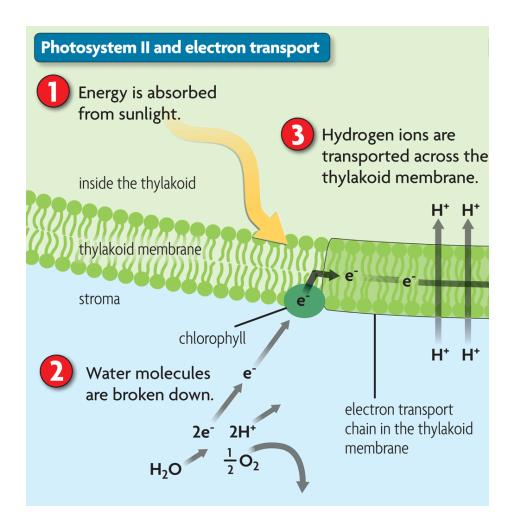


- The first stage of photosynthesis captures and transfers energy.
  - The light-dependent reactions include groups of molecules called photosystems.

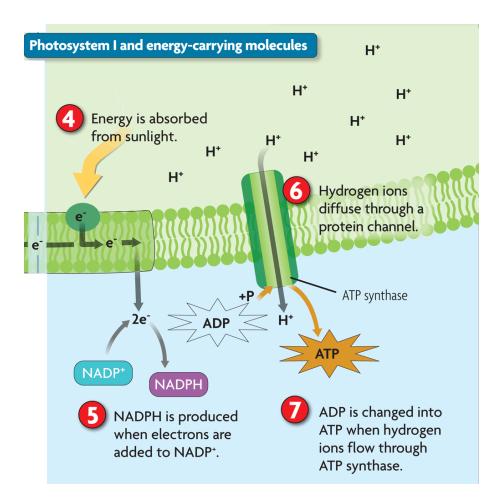


Light-dependent reactions take place in and across the thylakoid membrane.

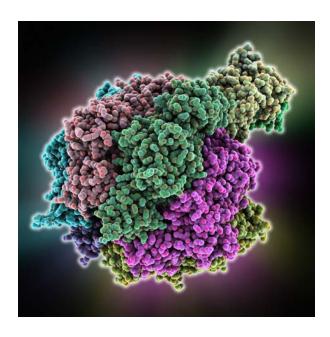
- Photosystem II captures and transfers energy.
  - chlorophyll absorbs energy from sunlight
  - energized electronsenter electrontransport chain
  - water molecules are split
  - oxygen is released as waste
  - hydrogen ions are transported across thylakoid membrane



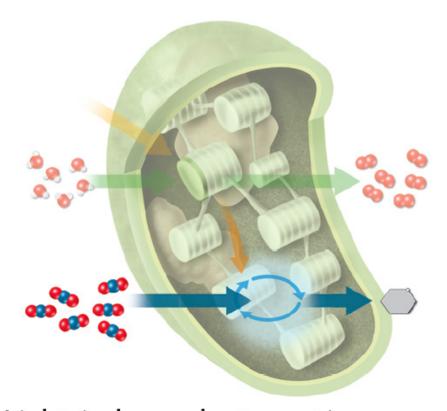
- Photosystem I captures energy and produces energy carrying molecules.
  - chlorophyll absorbs
    energy from sunlight
  - energized electrons are used to make NADPH
  - NADPH is transferred to light-independent reactions



- The light-dependent reactions produce ATP.
  - hydrogen ions flow through a channel in the thylakoid membrane
  - ATP synthase attached to the channel makes ATP

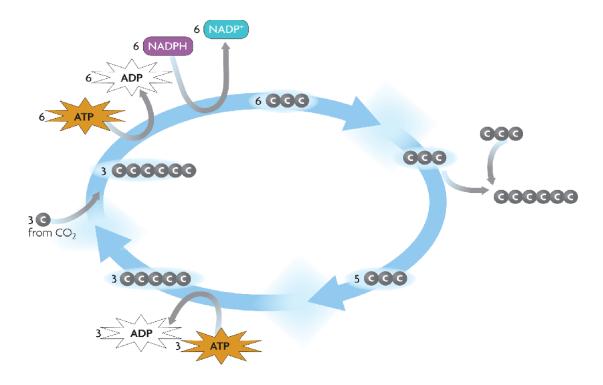


- The second stage of photosynthesis uses energy from the first stage to make sugars.
  - Light-independent reactions occur in the stroma and use CO<sub>2</sub> molecules.



Light-independent reactions take place in the stroma.

- A molecule of glucose is formed as it stores some of the energy captured from sunlight.
  - carbon dioxide molecules enter the Calvin cycle
  - energy is added and carbon molecules are rearranged
  - a high-energy three-carbon molecule leaves the cycle



- A molecule of glucose is formed as it stores some of the energy captured from sunlight.
  - two three-carbon molecules bond to form a sugar
  - remaining molecules stay in the cycle

