

# Chapter 8 Photosynthesis

## Section 1: Energy and Life

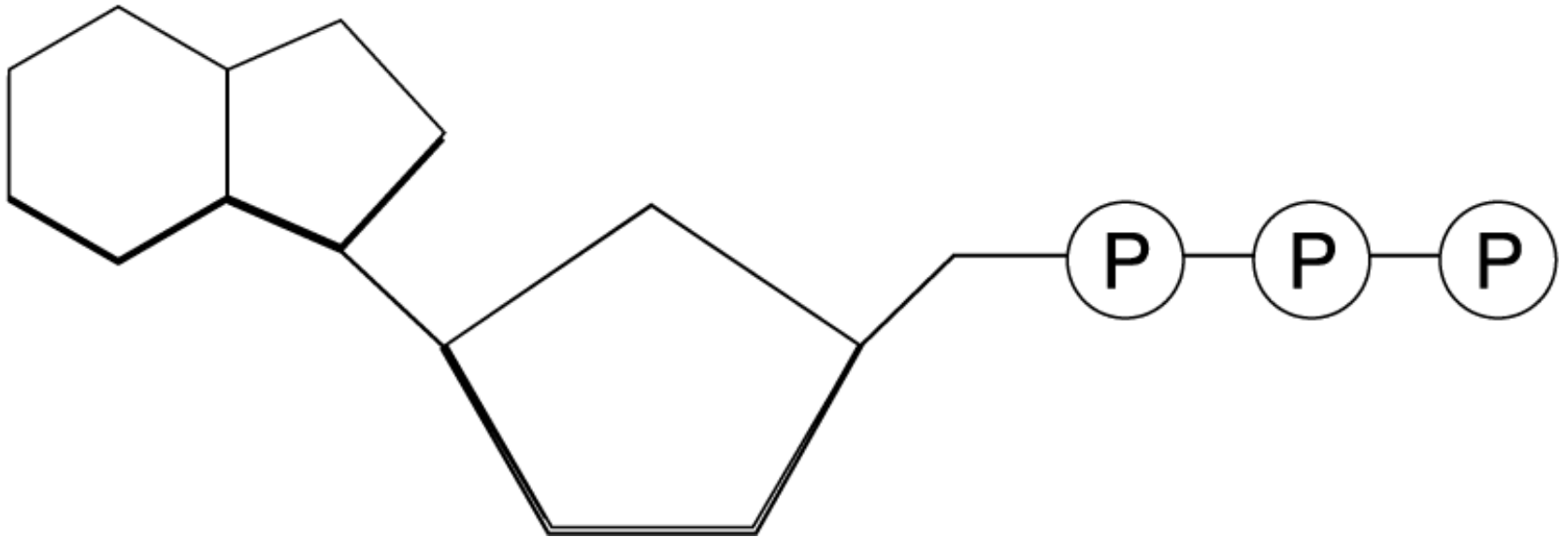
# Chemical Energy and ATP

- What is the principle molecule that a cell stores it's chemical energy?
- ATP.
- What does ATP stand for?
- Adenosine triphosphate.
- What does ATP consist of?
- Adenine, a 5 carbon sugar called ribose, and three phosphate groups.\*

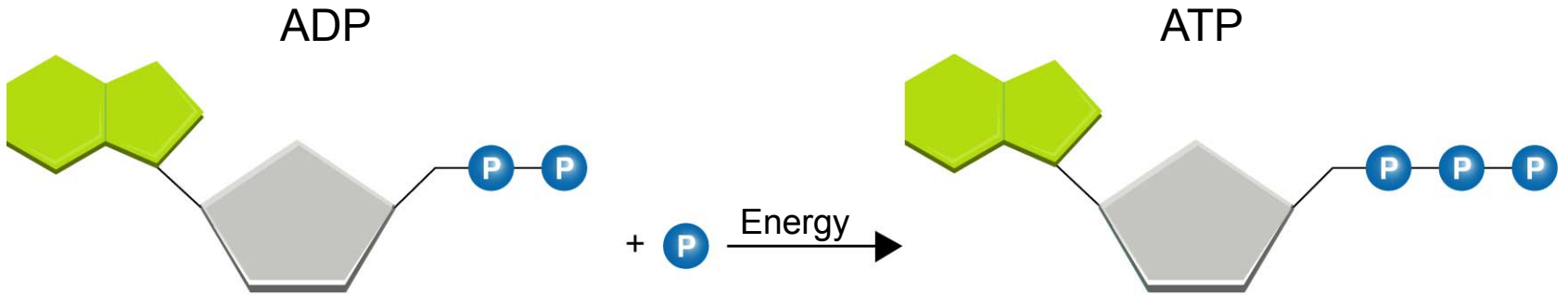
Adenine

Ribose

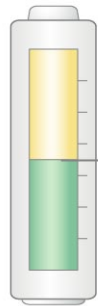
3 Phosphate groups



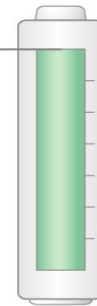
- What is ADP?
- Adenosine diphosphate.
- What is the difference between ATP and ADP?
- ATP has an extra phosphate group.
- How does a cell store energy?
- Converting ADP to ATP.
- How does a cell release the energy it stored?
- Converting ATP to ADP and a phosphate group.
- 🔑 The characteristics of ATP make it an exceptionally useful molecule that is used by all types of cells as their basic energy source.\*



Adenosine diphosphate (ADP) + Phosphate  $\xrightarrow{\text{Energy}}$  Adenosine triphosphate (ATP)



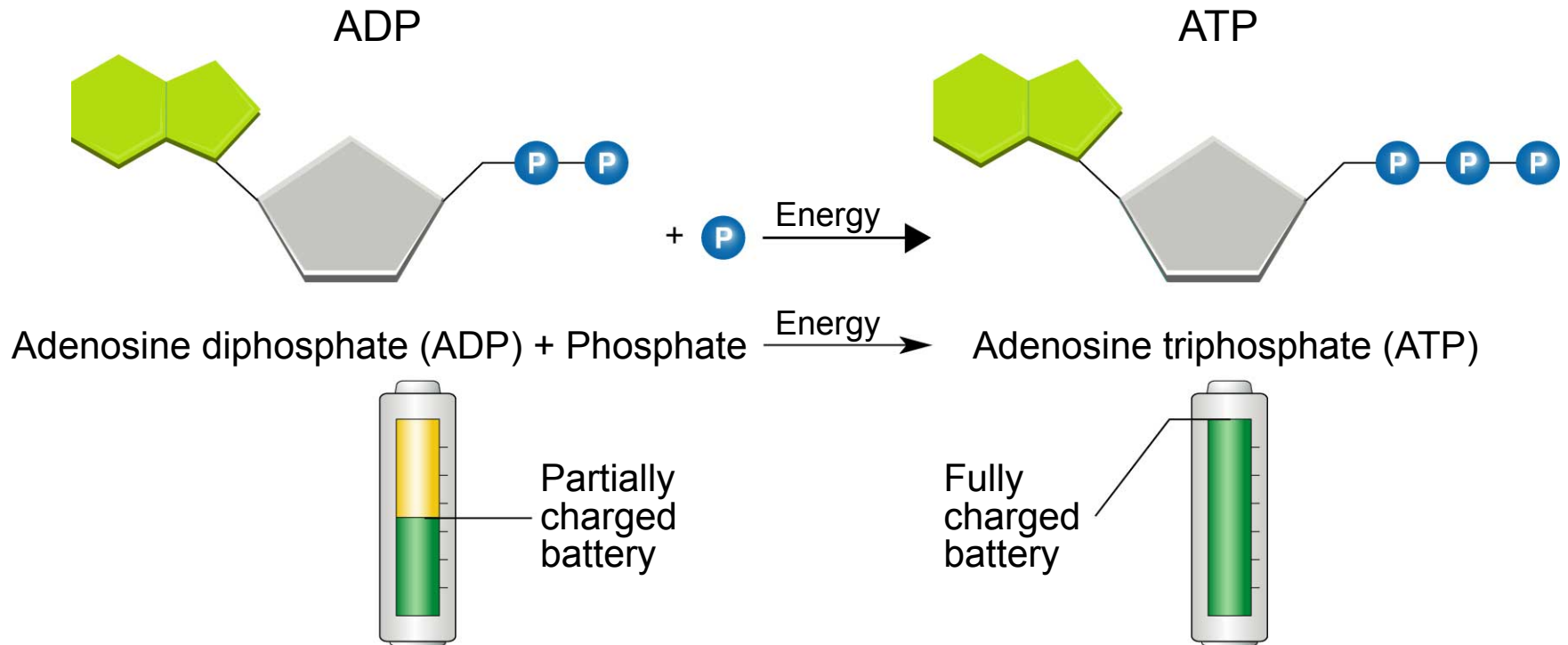
Partially  
charged  
battery



Fully  
charged  
battery



# Comparison of ADP and ATP to a Battery



# 8-1 Section Review

- What is the ultimate source of energy for plants?
- What is ATP and what is its role in the cell?
- Describe cellular activities that use the energy released by ATP.

# Chapter 8

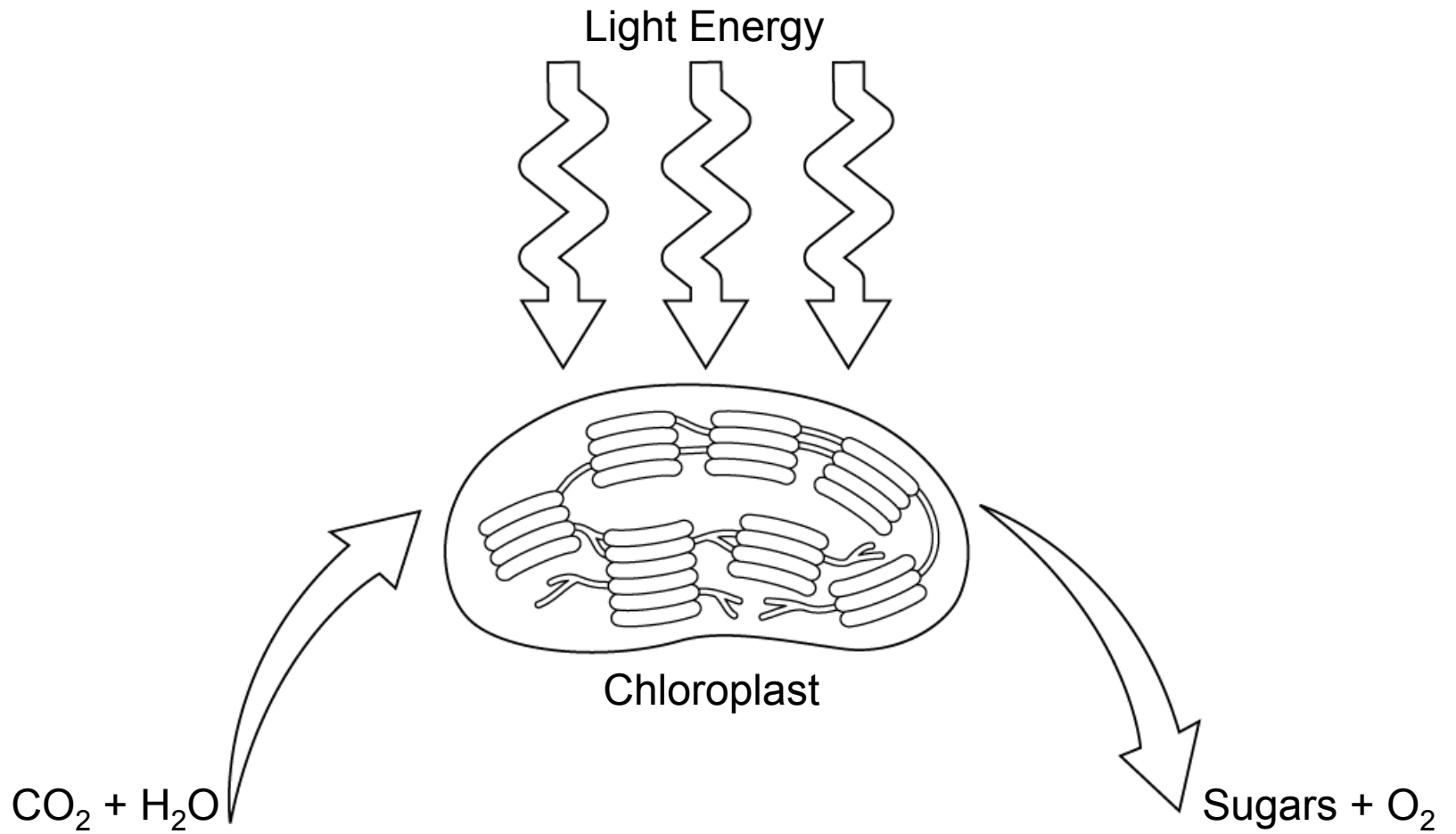
## Section 2 - Photosynthesis: An Overview




- The photosynthesis equation:
- $6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{w/light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- Carbon dioxide + water w/light  $\rightarrow$  sugar + oxygen
- Photosynthesis uses the energy of sunlight to convert water and carbon dioxide into oxygen and high-energy sugars.\*



# Photosynthesis: Reactants and Products



# Light and Pigments

-  In addition to water and carbon dioxide, photosynthesis requires light and chlorophyll, a molecule in chloroplasts.
- What are pigments?
- Light absorbing molecules of a plant.
- What is the principal pigment of plants?
- Chlorophyll.
- Light is used for energy and chlorophyll converts light to high energy electrons to make photosynthesis work.\*

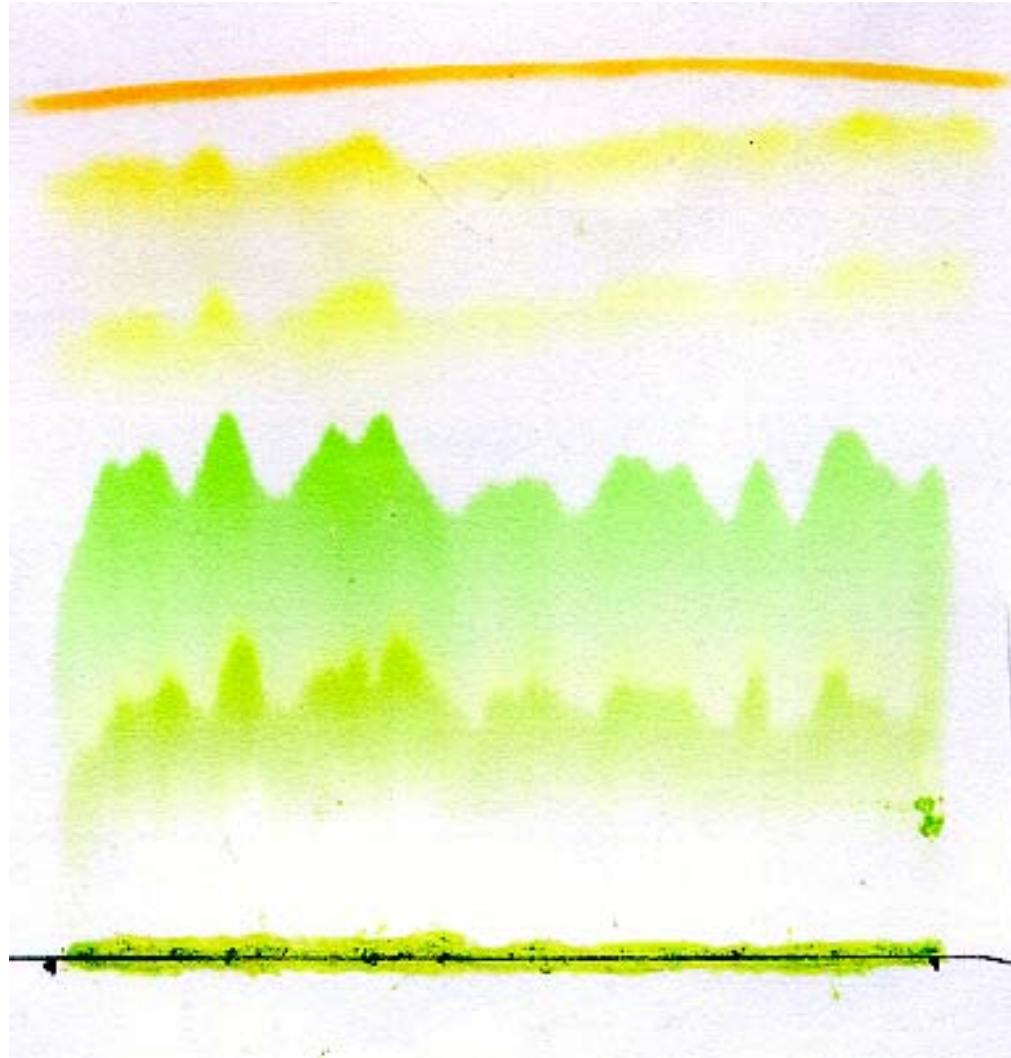
## 8-2 Section Review

- What did van Helmont, Priestley, and Ingenhousz discover about plant growth?
- Describe the process of photosynthesis including the reactant and products.
- Why are light and chlorophyll needed for photosynthesis?
- Why are plants green?
- How well would a plant grow under pure yellow light?

# Chapter 8

## Section 3 - The Reactions of Photosynthesis

# Spinach Leaf Chromatography



# Inside the Chloroplast

- Where in the cell does photosynthesis take place?
- Inside the chloroplast.
- What are the sack-like photosynthetic membranes called?
- Thylakoids.
- Stacks of thylakoids are called what?
- Grana (singular: granum)
- Define stroma.
- The space outside of the thylakoids.\*

# Plant Cell Chloroplast

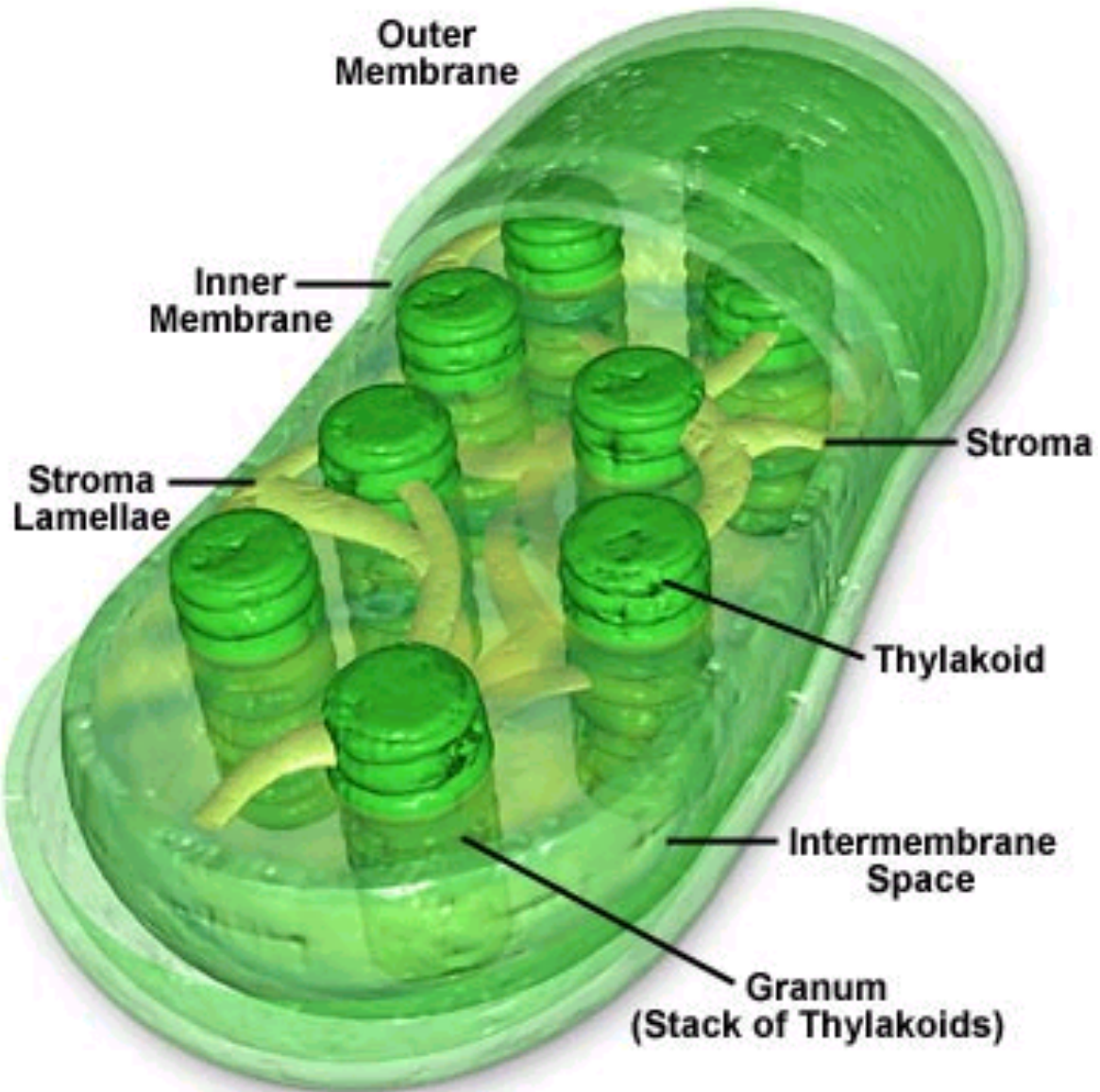
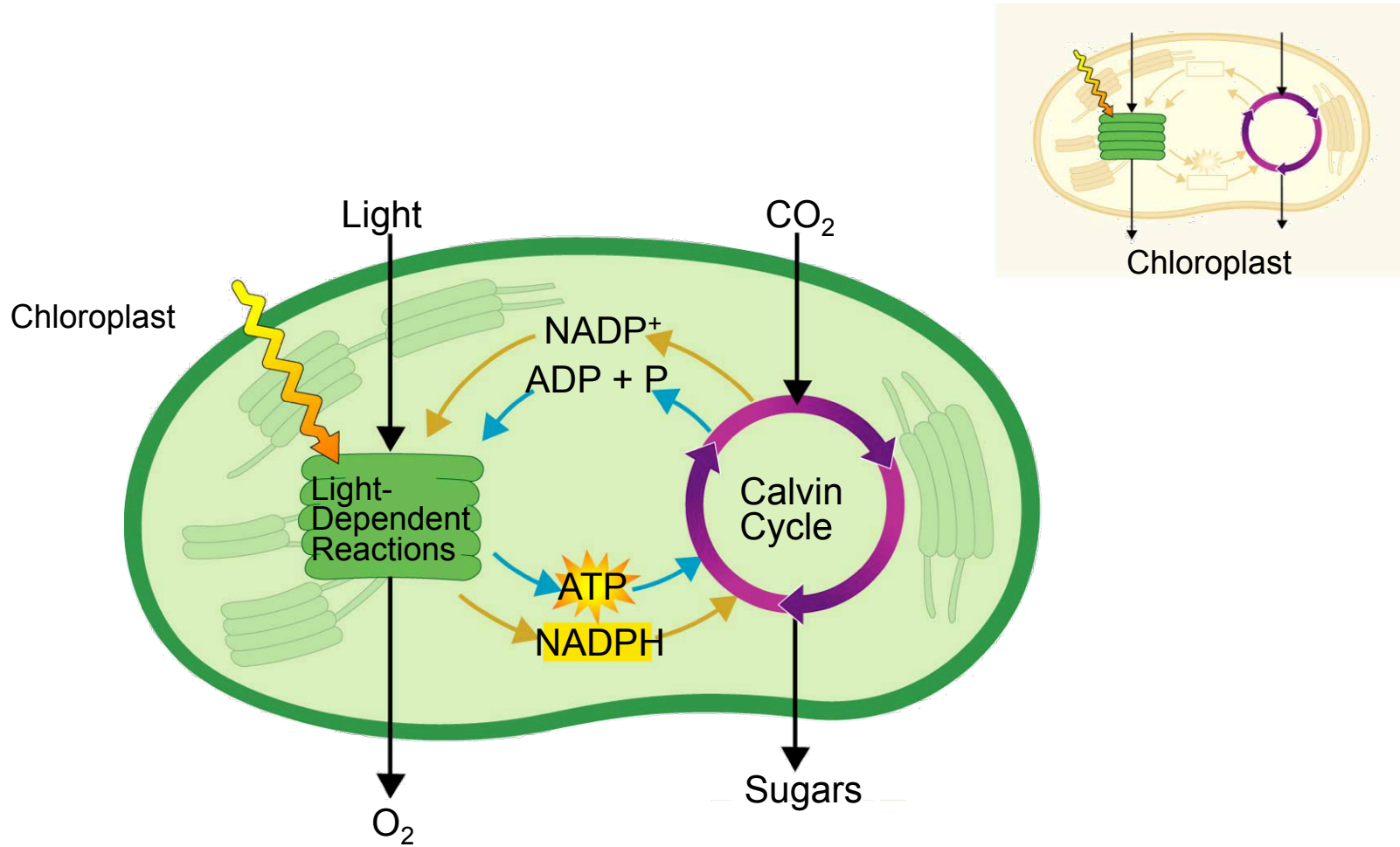


Figure 1



# Figure 8-7 Photosynthesis: An Overview



# Factors Affecting Photosynthesis

- What are some of the factors affecting the rate of photosynthesis.
- Water. A shortage of water can slow or even stop the rate of photosynthesis.
- What adaptations do some plant leaves have to stop dehydration?
- Waxy coatings.
- Temperature. Above 35 or below 0 enzymes are adversely affected.
- Intensity of light. Increase light intensity increases photosynthesis until the maximum rate has been achieved.\*

# Section 8.3 Review

- How is light energy converted into chemical energy during photosynthesis?
- What are the three major factors affecting the rate of photosynthesis?\*