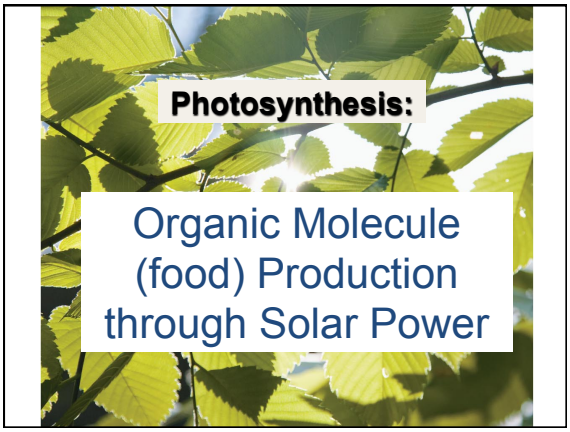
Important Latin Roots

Auto	Throph	Photo	Hetero		
• Self	• Feeding	• Light	• Other		



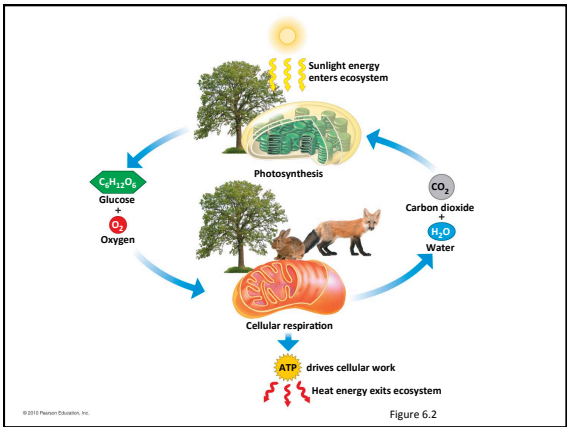


Figure 6.2

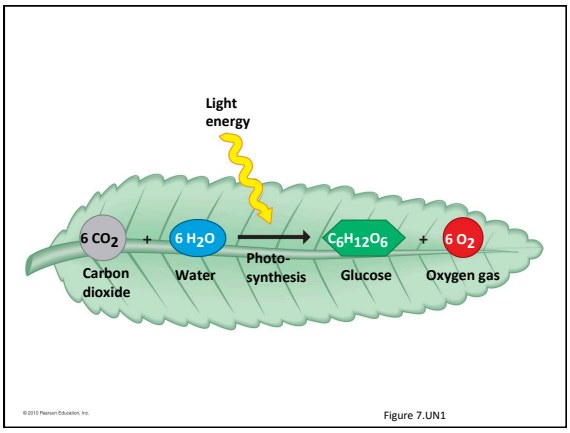
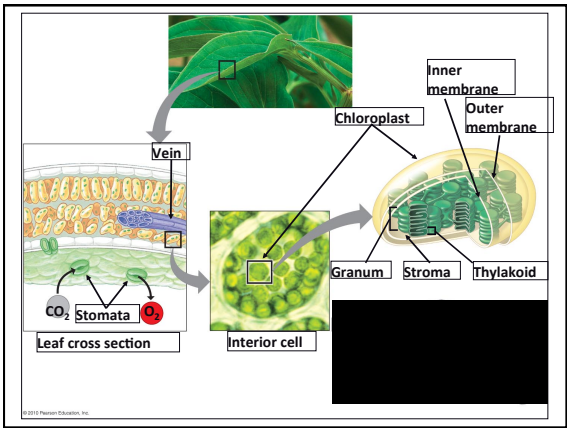
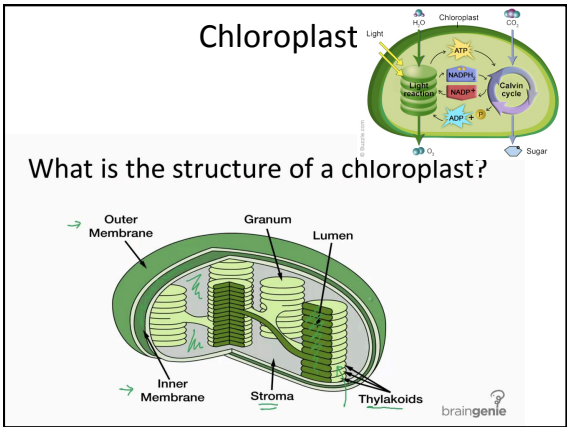

Light energy
6 CO_2
6 H_2O
$C_6H_{12}O_6$
6 O_2
Carbon dioxide
Water
Photo-synthesis
Glucose
Oxygen gas

Figure 7.UN1


Inner membrane
Outer membrane
Chloroplast
Vein
Granum
Stroma
Thylakoid
CO_2
Stomata
O_2
Leaf cross section
Interior cell


Chloroplast
What is the structure of a chloroplast?
Outer Membrane
Granum
Lumen
Inner Membrane
Stroma
Thylakoids
braingenie

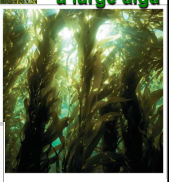
AUTOTROPHS:

"Self Eaters"

- Plants (mostly on land)
- Some Protists (aquatic)
- Some Bacteria (aquatic)

Forest plants

Kelp, a large alga



Cyanobacteria

Fig 7.1

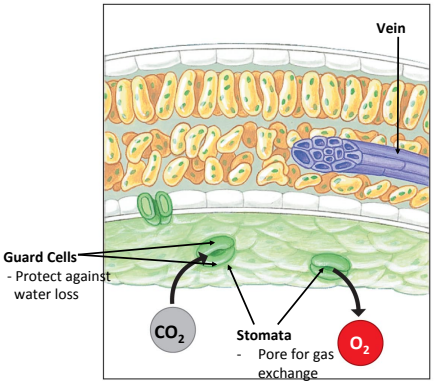
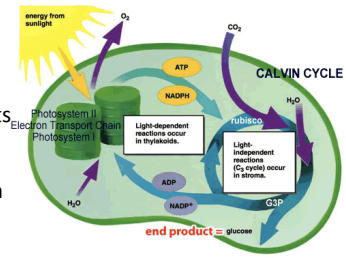


Figure 7.2a

A Photosynthesis Road Map

Photosynthesis occurs in two stages:

1. The **Light Reactions** convert solar energy to chemical energy
2. The **Calvin cycle** uses the products of the light reactions to make sugar from carbon dioxide



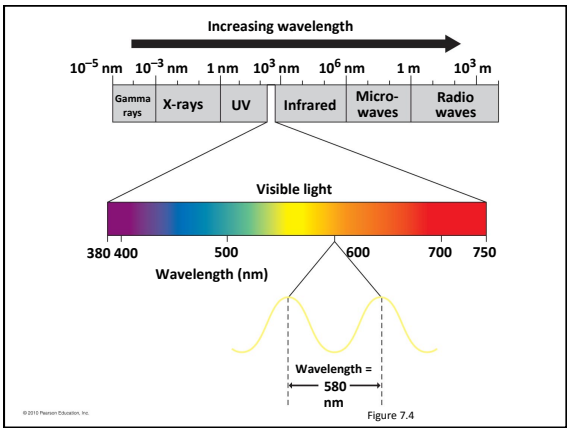


Figure 7.4

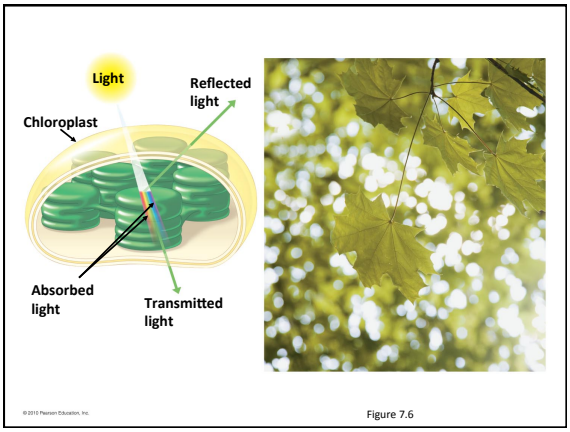


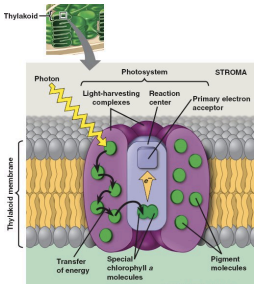
Figure 7.6

Lots of different Pigments are capable of photosynthesis


Figure 7.7

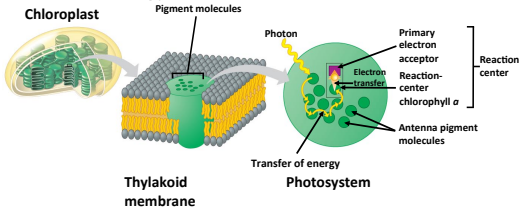
Photosystem

A **photosystem** is a group of chlorophyll and other molecules in the thylakoid membrane that function as a light-gathering antenna.



How Photosystems Harvest Light Energy

- Light behaves as discrete packets of energy.
- Chlorophyll molecules absorb photons.
  - **Electrons** in the pigment gain **energy**.
    - These electrons go down an ETC, releasing energy



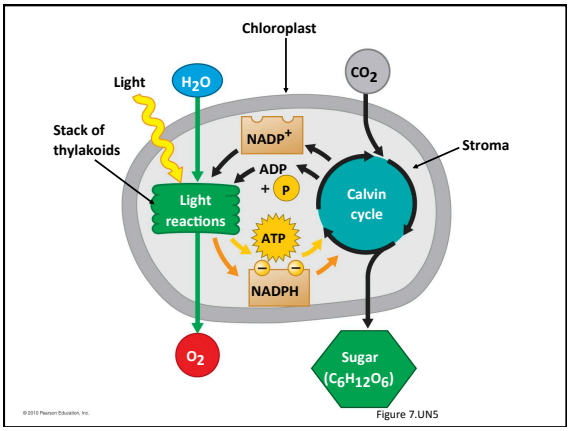
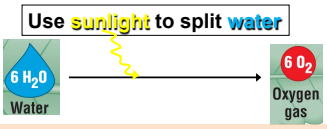


Figure 7.UN5

How the Light Reactions Generate ATP and NADPH

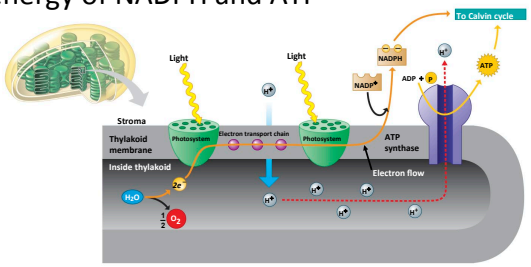
- Two types of photosystems cooperate in the light reactions:
  1. The water-splitting photosystem



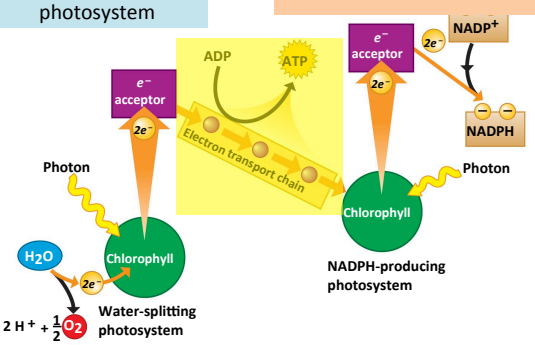
  2. The NADPH-producing photosystem

The water-splitting photosystem

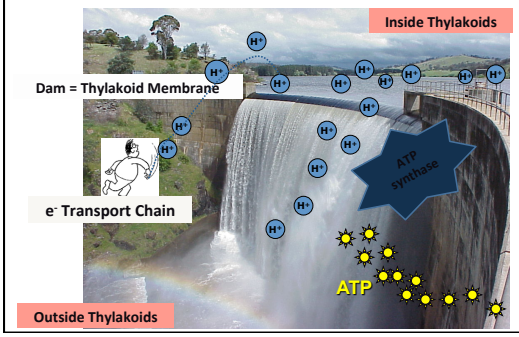
Figure 7.11 How the thylakoid membrane converts light energy to the chemical energy of NADPH and ATP



1. The water-splitting photosystem
2. The NADPH-producing photosystem



ETC works like a Dam

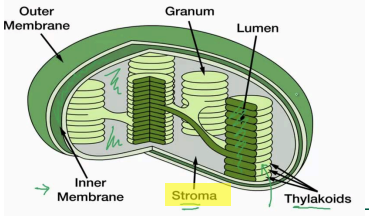


1. Light- Dependent Reactions Gave Us:

Still no CO_2 used!

THE CALVIN CYCLE: MAKING SUGAR FROM CARBON DIOXIDE

- The Calvin cycle:
  - –Functions like a sugar factory within the **stroma** of a chloroplast



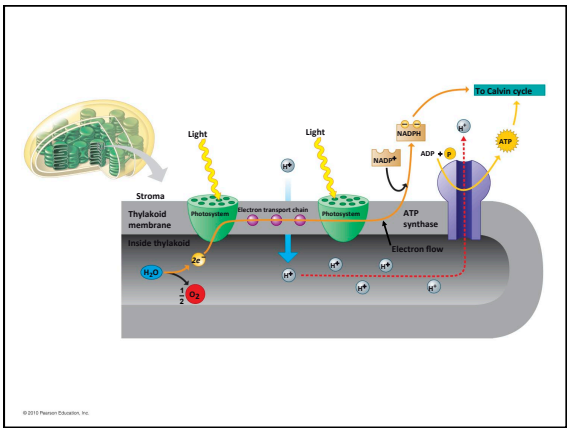
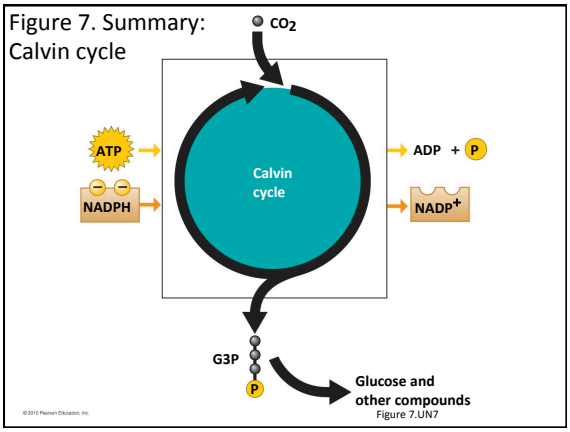
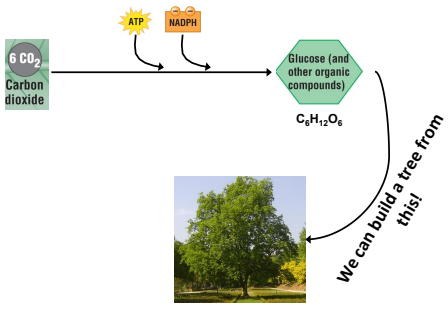


Figure 7. Summary: Calvin cycle



2. Light-Independent Reactions: Calvin Cycle



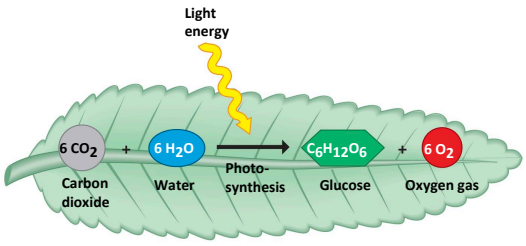


Figure 7.UN1

Evolution Connection:
Solar-Driven Evolution

3 types of plants

1. C_3 plants:
   - Use CO_2 directly from the air
   - Are very common and widely distributed
2. C_4 plants:
   - Close their stomata to save water during hot and dry weather
   - Can still carry out photosynthesis
3. CAM plants:
   - Are adapted to very dry climates
   - Open their stomata only at night to conserve water