Plants & Photosynthesis

**Producers**
- able to make their own food
  - Ex: plants

** Consumers**
- not able to make their own food
  - Ex: Animals

All life depends on producers and producers depend on the sun!

Stomata are opening on the underside of the leaf that allow for gases to enter & exit the leaf. They are regulated by guard cells.
Chlorophyll: a light absorbing pigment that makes plants green

- reflects GREEN light and absorbs all other Colors

*The color we see is the color that is reflected!*
Light Dependent Reactions

- Water splits into oxygen and electrons
- Electrons are excited by sunlight
- Oxygen is released into the atmosphere as a by-product
- Electrons move down the electron transport chain
- [ATP] and [NADPH] are produced by the energy carried in the electrons

Calvin Cycle

- Carbon dioxide enters the plant through stomata
- The carbon in carbon dioxide gets "fixed" into sugar C₆H₁₂O₆
- The energy for this comes from ATP and NADPH
Photosynthesis

The process of converting sunlight into a usable form of energy (glucose).

\[
H_2O + CO_2 \rightarrow C_6H_{12}O_6 + O_2
\]

2 reactions

1. Light Dependent Reactions
   - take place in thylakoids/grana

2. Light Independent Reactions (Calvin Cycle)
   - takes place in the stroma
Calvin Cycle

- Carbon dioxide enters the plant through stomata.
- The carbon in carbon dioxide gets "fixed" into Sugar C₆H₁₂O₆.
- The energy for this comes from ATP and NADPH.

Sunlight → Water → Light Reactions → O₂

Light Reactions → ATP, NADPH

ATP, NADPH → Calvin Cycle → C₆H₁₂O₆
Chloroplast

- Found in the cells of plants
- Contain the pigment Chlorophyll
- Absorb sunlight
- Photosynthesis takes place in this organelle

![Diagram of Chloroplast with labeled parts: Stroma, thylakoid, and grana]
2 Important Molecules

Adenosine triphosphate **ATP**
- Stores energy in a form that can be used by the cell

![Chemical structure of ATP with three phosphate groups](image)
- Energy is released when a phosphate group is removed
  $$\text{ATP} \rightarrow \text{ADP} + \text{P}$$
  $$\text{ADP} = \text{adenosine diphosphate}$$

**NADPH**
- An electron carrier
- After it gives up its electron it is converted into **NADP** and is ready to pick up another electron

**ATP + NADPH** carry the sun's energy from the light dependent reactions to the Calvin cycle, and then go back for more...