**PHOTOSYNTHESIS**

Photon = light energy

- **STAGE 1: LIGHT REACTIONS**
  - Occurs at the thylakoid
  - Light energy (photons) strike chlorophyll and reactions occur to make some ATP that will be used to fuel the dark reactions
  - Hydrogen (H) is broke off water molecules and oxygen (O₂) is released
**STAGE 2: DARK REACTIONS (CALVIN CYCLE)**

- Occurs in the stroma of the chloroplast
- Uses ATP from the light reactions AND Carbon dioxide \((CO_2)\) to create glucose \((C_6H_{12}O_6)\)

**SUMMARY:**

* USES: Light and water \((H_2O)\) in the LIGHT REACTIONS
* USES: Carbon dioxide \((CO_2)\) in the DARK REACTIONS

* MAKES: Oxygen \((O_2)\) in the LIGHT REACTIONS
* MAKES: Glucose \((C_6H_{12}O_6)\) in the DARK REACTIONS

\[
\text{Light energy} + 6H_2O + 6CO_2 \rightarrow 6O_2 + C_6H_{12}O_6
\]
1. Glycolysis: 1 molecule of glucose is broken into 2 pyruvate molecules. 2 ATP molecules are made when this bond is broken.

2. Kreb's cycle: uses the pyruvate to generate carbon dioxide CO$_2$ and 2 ATP.

3. Electron transport chain uses hydrogen ions and oxygen to make water H$_2$O and 32 ATP.

Each pyruvate then enters the mitochondria if oxygen is present.

1 glucose generates a total of 36 ATP!