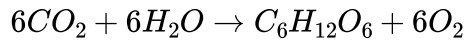


Photosynthesis



Carbon Dioxide + Water → Glucose + Oxygen

- Happens in the **Chloroplasts**
 - Inside the **Grana** (stacks of Thylakoids)
 - Inside the **Thylakoid** is **chlorophyll** (pigment)
 - Inside the **Stroma** (outside the grana)
- Produces **NADPH** and **ATP**
- **Chlorophyll** absorbs mainly red and blue light

Light Dependent Reaction (Electron Transport)

- Inside the **Thylakoid**
 - High gradient of Hydrogen is inside the **Thylakoid Space**
 - The low pressure is the **Stroma**
 - It produces **NADPH** and **ATP**
1. Light excites electrons inside Photosystem II
 1. Causes a water molecule to split
 2. Sends a proton (Hydrogen ion) into the thylakoid space from the stroma
 3. Oxygen is released (from water)
 2. Electrons through the electron acceptor molecule down the electron carriers to Photosystem I
 3. Electrons are transferred to ferredoxin in Photosystem I
 4. Ferredoxin transfers electrons to NADP⁺ and releases it into the Stroma
 1. Turns the NADP⁺ into NADPH
 5. Protons move down the gradient through the ATP synthase to the Stroma
 1. Turns ADP into ATP

Light Independent Reaction (Calvin Cycle)

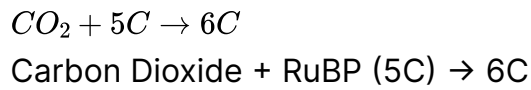
- Converts the NADPH and ATP into glucose for long term storage
- Uses **18 ATP** and **12 NADPH** to make one glucose
- Happens inside the **Stroma**, outside the Thylakoid

Steps in the Calvin Cycle

1) Carbon Fixation

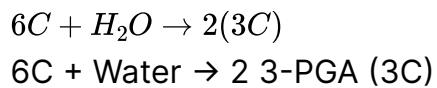
1. $CO_2 + C_5H_{12}O_{11}P_2 \rightarrow C_6H_{14}O_{11}P_2$
Carbon Dioxide + RuBP (5C) \rightarrow 6-Carbon intermediary

Simplified:

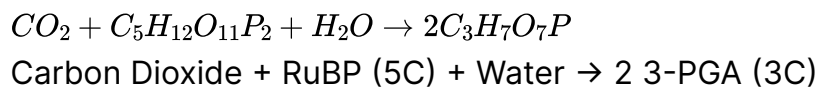


2. $C_6H_{14}O_{11}P_2 + H_2O \rightarrow 2C_3H_7O_7P$
6-Carbon intermediary + Water \rightarrow 2 3-PGA (3C)

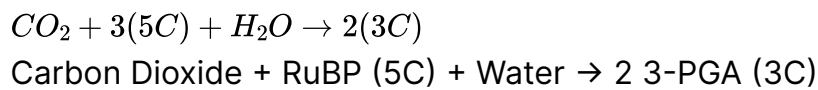
Simplified:



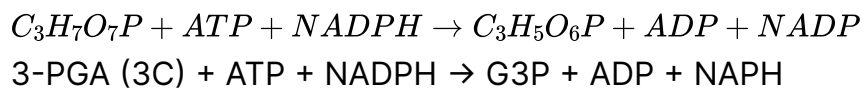
Overall



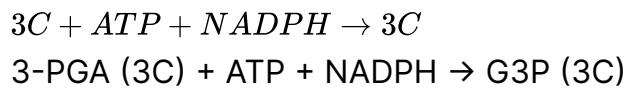
Simplified:



2) Reduction

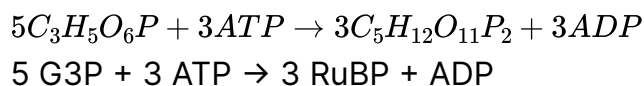


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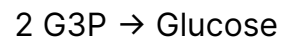
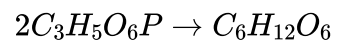


3) Regeneration

- One G3P leaves the cycle to produce Glucose
- The other 5 stay to regenerate the RuBP



4) Glucose Formation



I couldn't find anything about this so idk what to put