An Overview of Photosynthesis

KEY QUESTION *What are the reactants and products of photosynthesis?*

Photosynthesis uses the energy of sunlight to convert water and carbon dioxide (low-energy reactants) into high-energy sugars and oxygen (products).

Light-Dependent Reactions The **Light-dependent Reactions** need sunlight. The sunlight energy is captured by pigments in the thylakoid membrane. The energy is used to convert ADP into ATP and $NADP^+$ into NADPH. These sources of energy are important for other steps in photosynthesis. Also, water is split apart, which makes more electrons available, and produced oxygen (O_2) and hydrogen ions (H^+).

Light-Independent Reactions The **Light-independent Reactions** (Calvin cycle) occur in the stroma and do not use sunlight. The energy in ATP and NADPH, produced in the light-dependent reactions, is used to "fix" carbon dioxide. That is, carbon dioxide (CO_2) is combined with H^+ to produce sugars, primarily glucose ($C_6H_{12}O_6$). The plant makes these sugars as food for itself.

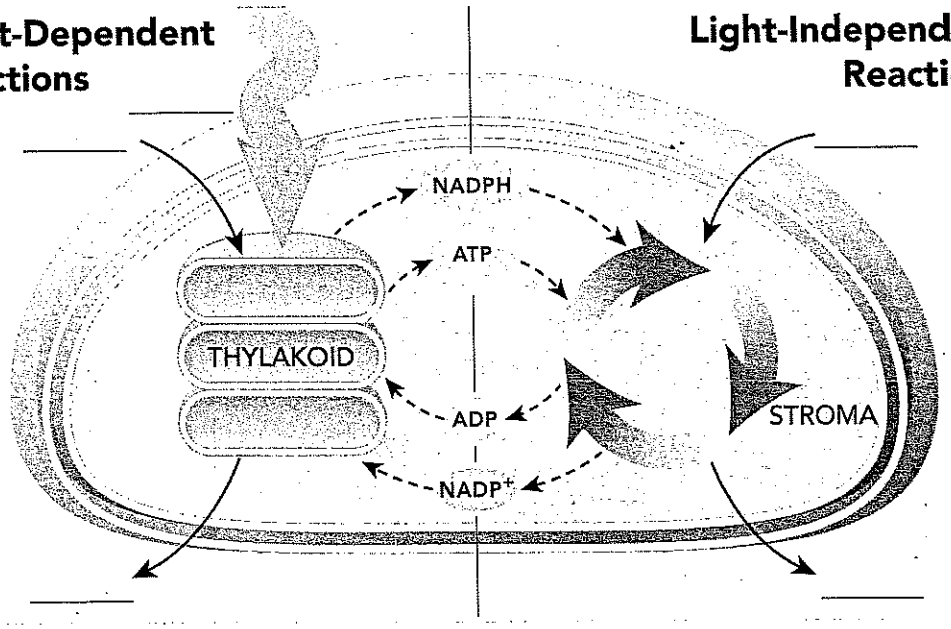
BUILD Vocabulary

light-dependent reactions set of reactions in photosynthesis that use energy from light to produce ATP and NADPH

light-independent reactions set of reactions in photosynthesis that do not require light; energy from ATP and NADPH is used to build high-energy compounds such as sugar

Visual Reading Tool: Inside a Chloroplast

1. Fill in the reactants and products of the light-dependent and light-independent reactions of photosynthesis.



2. What is the NADPH responsible for? _____

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3. Where do the "light" reactions (light-dependent) take place? _____