Bioenergetics

Content

Photosynthesis

What is Photosynthesis?

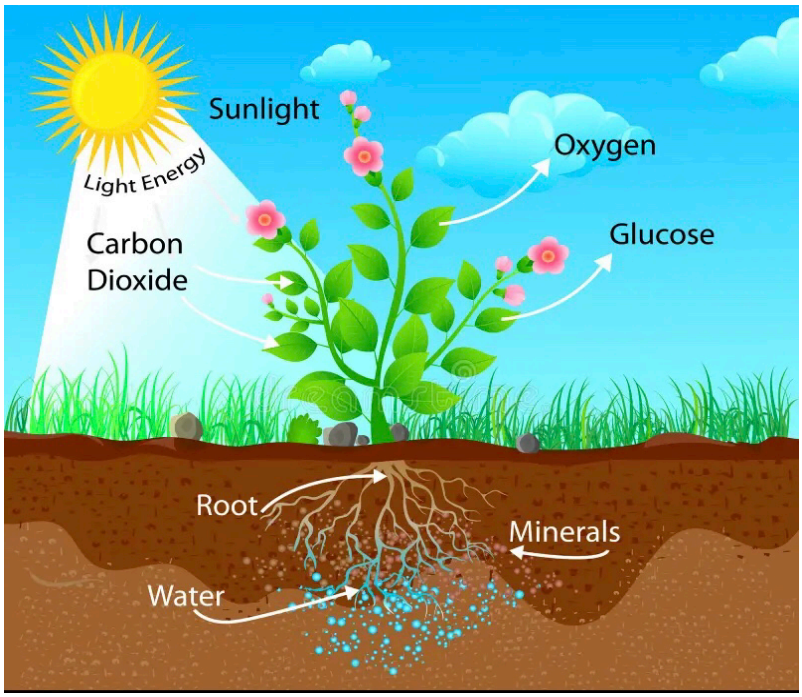
- Photosynthesis is the process by which plants (and some algae) use light energy to create their own food, in the form of glucose, from carbon dioxide and water. Oxygen is also made which can be released into the atmosphere or used for aerobic respiration.

- **Word equation:**

Carbon dioxide + Water ——Light——> Glucose + Oxygen

- **Chemical equation:**

$6CO_2$ + $6H_2O$ ——Light——> $C_6H_{12}O_6$ + $6O_2$



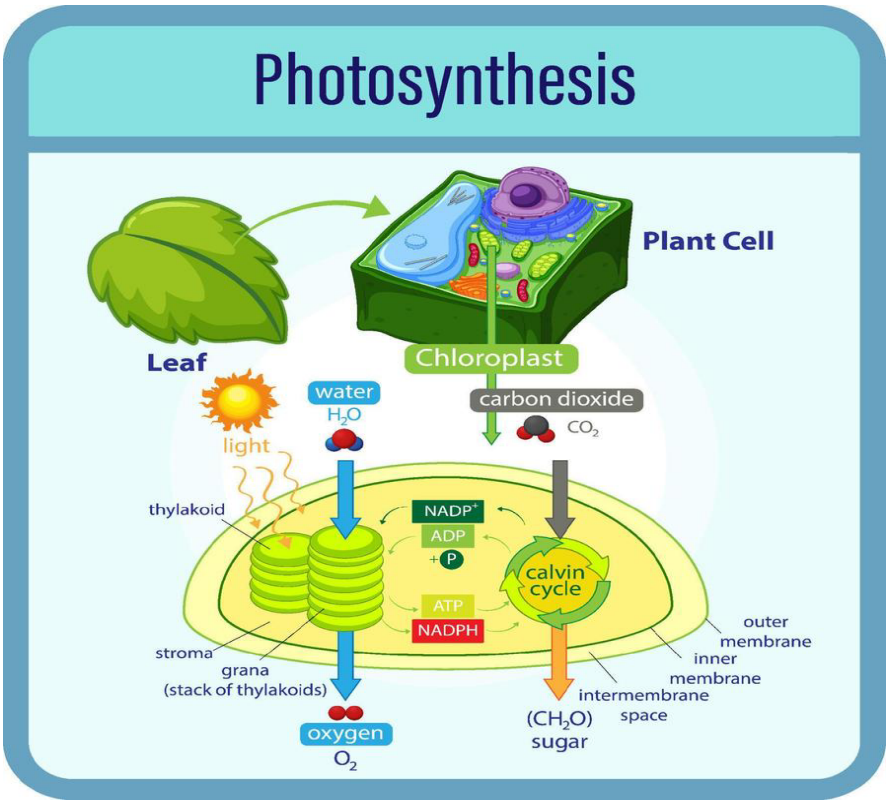
- **Organelles responsible for photosynthesis:**

Plant cells have **chloroplasts** which contain a green pigment called chlorophyll which absorbs the light needed for photosynthesis.

Most photosynthesis happens in the **leavesas** they are specifically adapted for this function.

➤ **Principal of photosynthesis:**

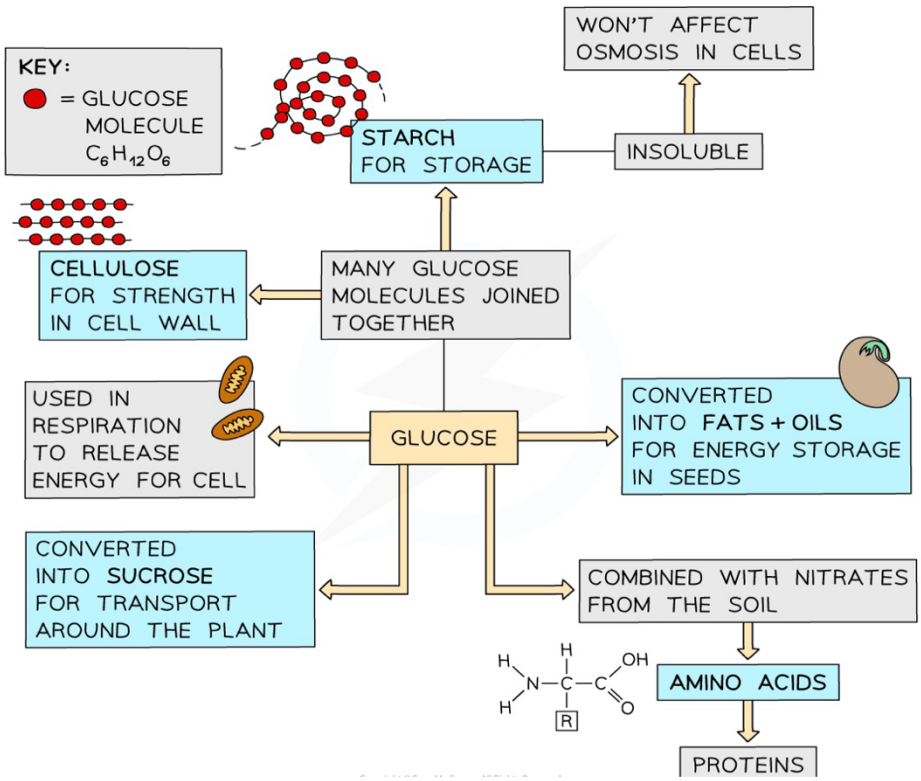
Photosynthesis is an **endothermic reaction** which because energy is transferred to the chloroplasts from the environment, in the form of **light.**



Uses of Glucose in Plants

The glucose made in photosynthesis is used by the plant in many ways.

- **Respiration**: Glucose is used to produce energy in respiration.
- **Cellulose making :** Lots of glucose molecules are joined together to form cellulose which provides strength to cell walls.
- **Protein synthesis:** Glucose can be combined with nitrate ions that are absorbed from the soil to produce amino acids. Amino acids join together to make proteins in a process called protein synthesis.
- **Stored Glucose:** Glucose can be stored as insoluble starch in the plants leaves, stems and roots. This means the plant will have glucose available in times where it cannot photosynthesis such as during winter.
- **Glucose** can also be stored in seeds as fats and oils.


KEY:
= GLUCOSE MOLECULE
$C_6H_{12}O_6$
WON'T AFFECT OSMOSIS IN CELLS
STARCH FOR STORAGE
INSOLUBLE
CELLULOSE FOR STRENGTH IN CELL WALL
MANY GLUCOSE MOLECULES JOINED TOGETHER
USED IN RESPIRATION TO RELEASE ENERGY FOR CELL
GLUCOSE
CONVERTED INTO FATS + OILS FOR ENERGY STORAGE IN SEEDS
CONVERTED INTO SUCROSE FOR TRANSPORT AROUND THE PLANT
COMBINED WITH NITRATES FROM THE SOIL
AMINO ACIDS
PROTEINS