

Chapter 11 Lesson 1- Energy Processing in Plants

Energy Processing in Plants

Materials for Plant Processes

Any process, whether a manufacturing operation or the functioning of a plant, requires basic materials and energy. The materials used by plants include water and carbon dioxide. Plants get their energy from light—usually sunlight.

Photosynthesis

Plants make their own food, using light energy to convert carbon dioxide and water into sugars. This process, called photosynthesis, is carried out in leaf structures called chloroplasts. Photosynthesis consists of two series of reactions, called the light reactions and the dark reactions. In the light reactions, captured light energy is converted into chemical energy, which is stored in a compound called ATP. In the dark reactions, the stored energy is used to produce sugars.

Photosynthesis occurs in eukaryotic cell structures called **chloroplasts**. A **chloroplast** is a type of **plant cell organelle**. A chloroplast contains a **green pigment** called **chlorophyll**, which **absorbs light energy for photosynthesis**. Hence, the name chloroplast indicates that these structures are chlorophyll containing structures. Plant chloroplasts develop mainly in cells **located in plant leaves**.

In **photosynthesis**, the sun's **solar energy is converted to chemical energy**. The chemical energy is stored in the form of glucose (sugar). Carbon dioxide, water, and sunlight are used to produce glucose, oxygen, and water. Photosynthesis occurs in two stages. These stages are known as the light reaction stage and the dark reaction stage.

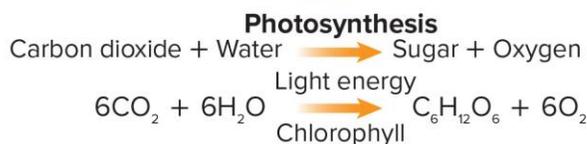
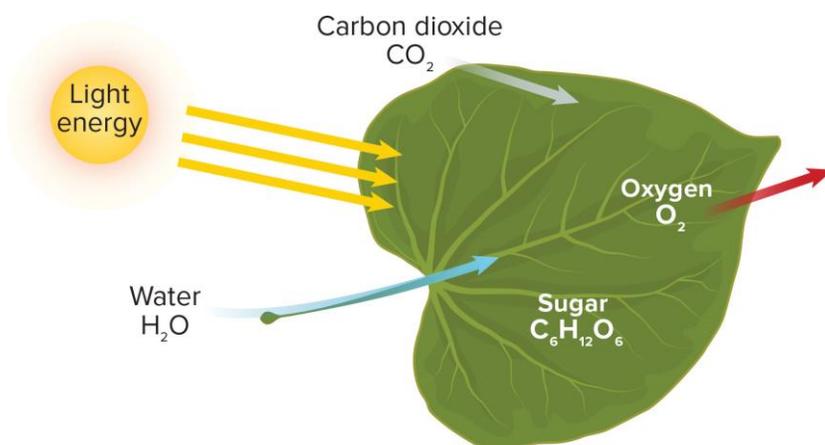
Photosynthesis is a series of chemical reactions that convert light energy, water, and carbon dioxide into

the food-energy molecule glucose and give off oxygen. The structure of a leaf is well-suited to its role in photosynthesis.

Chlorophyll, a pigment in chloroplasts, absorbs and stores the energy in light.

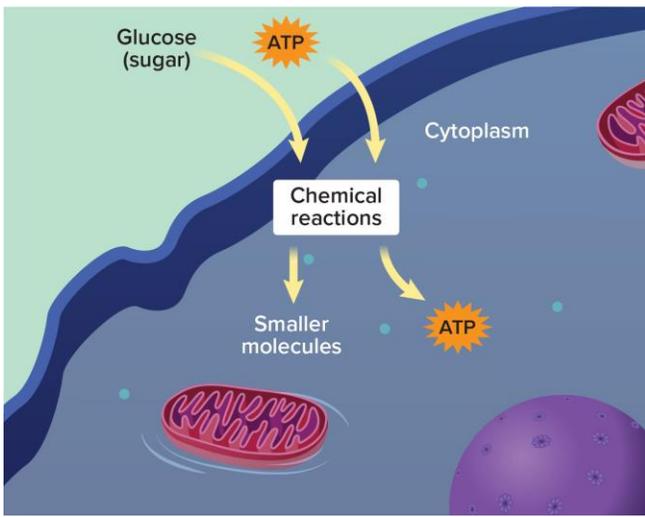
Steps of Photosynthesis

In the first step of photosynthesis, light is captured and stored, and oxygen is released. In the second step, sugars are made.



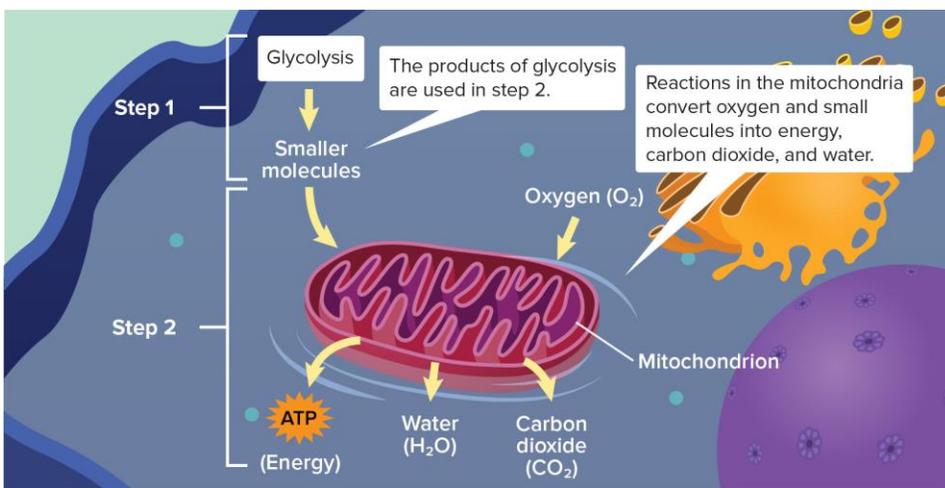
Cellular Respiration When humans or other animals eat plants, they obtain the energy stored in the sugars produced by the plants. That energy is converted back into ATP for use by the animals' cells. This process is called cellular respiration.

Cellular respiration is a series of chemical reactions that convert the energy in food molecules into a usable form of energy called ATP.



Reactions in the Mitochondria

The second step of cellular respiration is called an aerobic process because it requires oxygen.

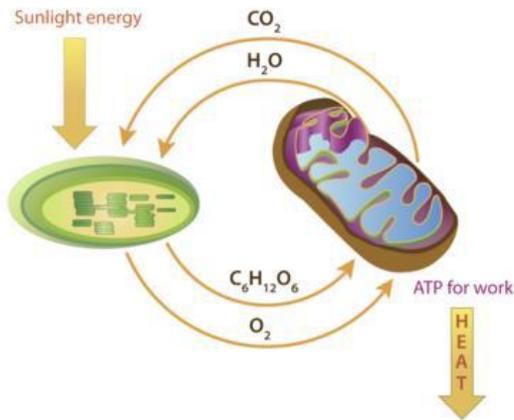
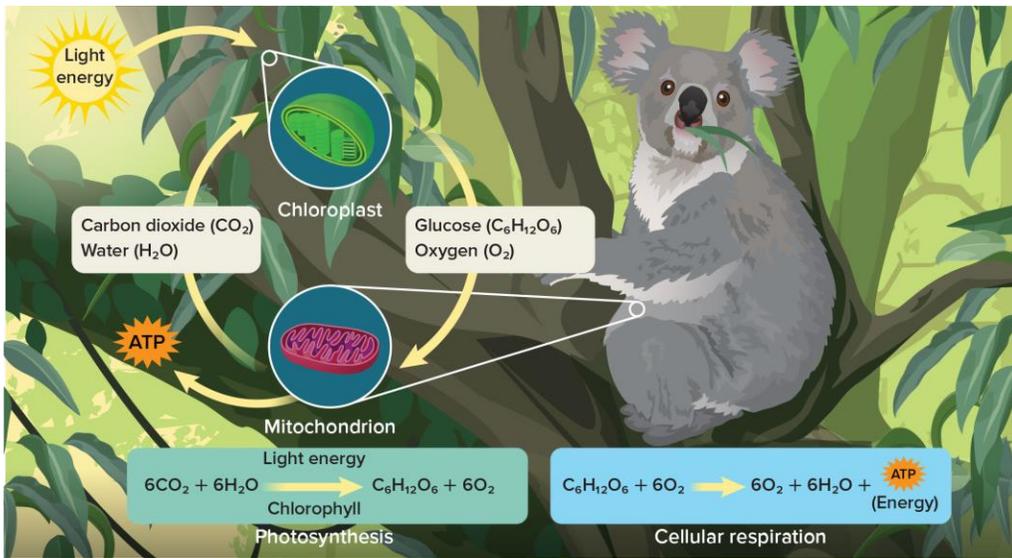


Why is cellular respiration important?

If your body did not break down the food you eat through cellular respiration, you would not have energy to do anything. Plants produce sugar, but without cellular respiration, plants could not grow, reproduce, or repair tissues.

The law of conservation of mass- states that **mass** in an isolated system is neither created nor destroyed by chemical reactions or physical transformations. According to the **law of conservation of mass**, the **mass** of the products in a chemical reaction must equal the **mass** of the reactants.

The law of conservation of matter- **matter** cannot be created or destroyed in an isolated system.



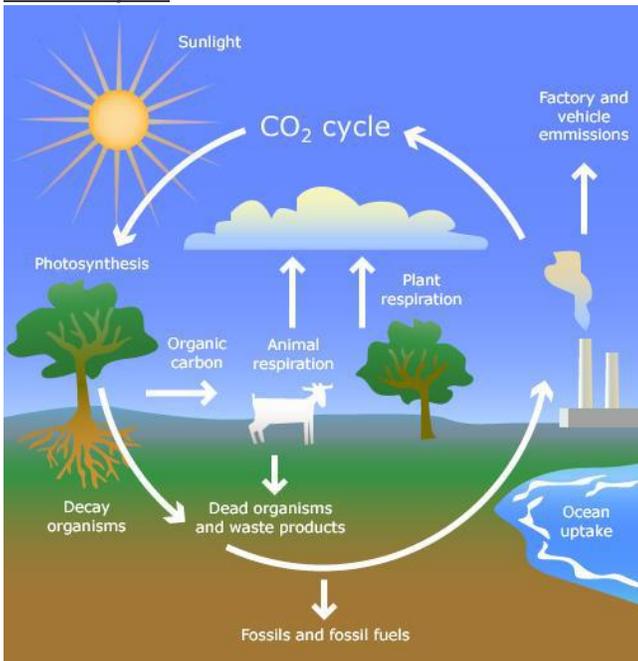
Photosynthesis

- It takes place in a chloroplast.
- Carbon dioxide and water react, using light energy, to produce glucose and oxygen.
- Light energy from the sun changes to chemical energy in glucose.

Cellular respiration

- It takes place in a mitochondrion.
- Glucose and oxygen react to produce carbon dioxide, water, and energy (ATP).
- Chemical energy in glucose changes to chemical energy in ATP.

Carbon Cycle:



Images to print for students:

