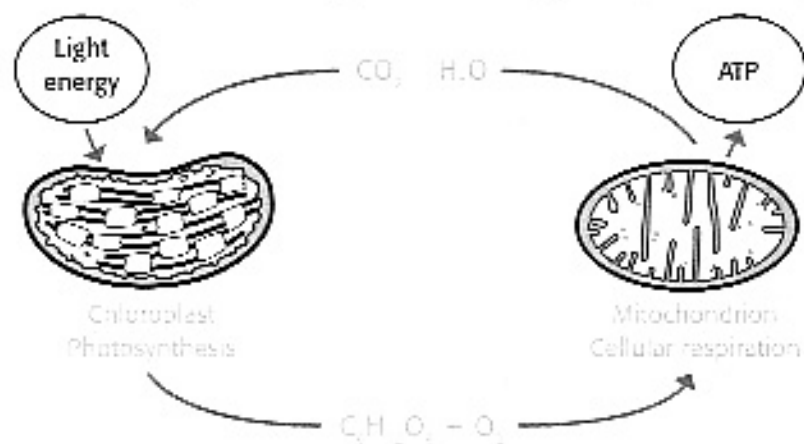


# Photosynthesis and Respiration

How do organisms get the energy they need to power life's processes?



The end products of photosynthesis are the raw materials of cellular respiration

During **photosynthesis**, green plants and algae trap the energy in sunlight and use it to make food. In their cells, organelles called chloroplasts contain the green pigment **chlorophyll**, which absorbs solar energy. This energy is used to combine carbon dioxide ( $\text{CO}_2$ ) from the air and water ( $\text{H}_2\text{O}$ ) from the soil to form sugar ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) and oxygen ( $\text{O}_2$ ). Some of the trapped energy from the sun is stored in the bonds of the sugar molecules as chemical energy. The plant uses sugar, a **carbohydrate**, for food.

From the chloroplasts, the sugar moves to the mitochondria. There, **cellular**

**respiration** occurs. In this process, sugar is broken down and combined with oxygen from the air. Carbon dioxide and water form, and energy is released. The energy is transferred to **ATP**, a molecule that supplies energy to cells.

Unlike plants, animals cannot trap light energy and produce their own food. That's because their cells have no chloroplasts and no chlorophyll. Instead, animals take in food.

When the carbohydrates in food are digested, sugar forms. The sugar is then broken down to release energy. Cellular respiration occurs in the mitochondria of animal cells just as it occurs in the mitochondria of plant cells.

The energy source for all life processes is the sun. **Producers** trap solar energy during photosynthesis. **Consumers** eat either producers or other consumers that eat producers. Thus, animals also depend on the sun for energy.

## Show What You Know

**How are the cellular activities of plants and animals alike? How are they different?**

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