

Enrichment**LESSON 1**

Plant Respiration

Green plants perform photosynthesis, but all living things perform cellular respiration. You have learned that cellular respiration produces the energy molecule ATP from glucose and oxygen. It is ATP that fuels animal bodies for running, finding food, and all the other things for which we need energy. But if a plant makes its own food, why does it need to perform cellular respiration to get ATP?

Why Do Plants Perform Cellular Respiration?

Plants don't run or hunt for food, and they don't breathe in and out with lungs either. Plants give off oxygen as a product of photosynthesis. They get oxygen for cellular respiration from their own cells and from the environment through special structures on their leaves. Plant cellular respiration produces carbon dioxide just as it does in animals and other heterotrophs. Remember that a heterotroph is an organism that consumes plants or other organisms for food and an autotroph makes its own food through photosynthesis. So the question is still, "Plants don't breathe, and they don't move, and they don't do hardly any of the things that animals do, so why do they perform cellular respiration?"

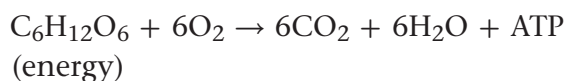
Applying Critical-Thinking Skills

Directions: Respond to each statement.

1. **Compare** photosynthesis with cellular respiration.
2. **Predict** what the side effects might be of a chemical hormone that interferes with the normal function of mitochondria when applied to a plant.
3. **Infer** three functions of a plant cell that require energy in the form of ATP.

The Answer Is in the Equation

Look at the chemical equation for cellular respiration. $C_6H_{12}O_6$ (one molecule of glucose) and $6O_2$ (six molecules of oxygen) react together to produce $6CO_2$ (six molecules of carbon dioxide), $6H_2O$ (six molecules of water), and ATP (energy).



What is the "food" made by plants in photosynthesis? Glucose. Which molecule do cells use for energy? Not glucose. It's ATP. So in cellular respiration, plants use the glucose they make in photosynthesis to produce ATP. No living thing, including plants, can use glucose directly as energy. Cellular respiration provides the ATP that all cells need to support the activities of life.

Where Does Cellular Respiration Occur?

Within the cytosol of a plant or animal cell are large organelles called mitochondria. Mitochondria are the sites of cellular respiration. These organelles occur in different numbers depending on the type of cell they are in. Mitochondria are usually more numerous in a cell that has a high energy requirement. Mitochondria can number in the thousands in the leg muscle cells of a marathon runner. Leaf cells that are carrying out the activities of photosynthesis also contain numerous mitochondria.