



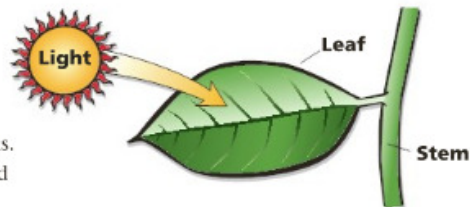
## Producers

**P**lants produce their own food. The food is sugar. The sugar is used by all plant cells. The cells use the energy in the sugar for growth.

Plants use a process called **photosynthesis** to make sugar for growth. The raw materials that plants use to make the sugar are water and carbon dioxide ( $\text{CO}_2$ ). Water from the soil and carbon dioxide from the air combine with light energy from the Sun. Sugar, oxygen, and water are the products.

Most plants are green. Or at least they have a lot of green leaves. Leaves look green because the leaf cells have **chlorophyll**. Chlorophyll can absorb blue and red light. It reflects green light. That's why chlorophyll looks green.

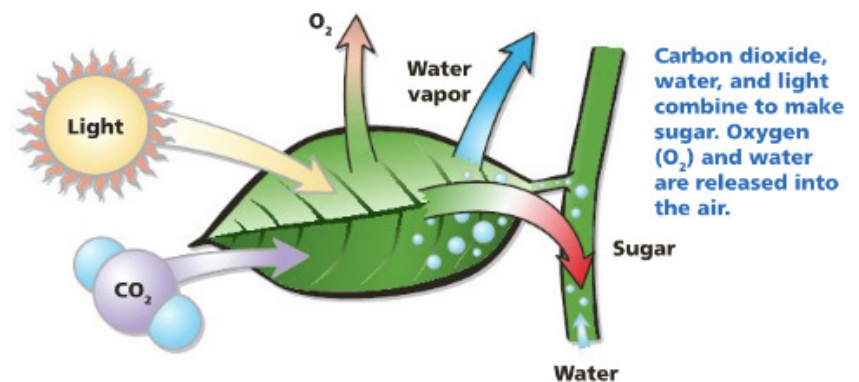
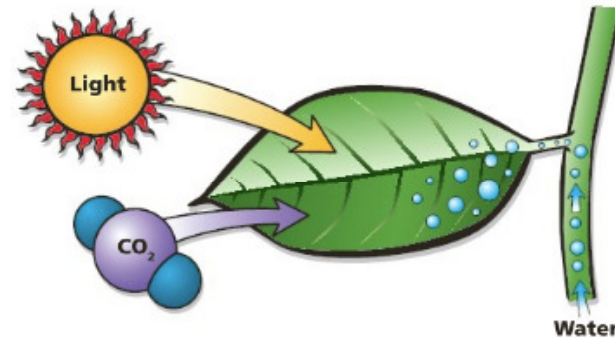
The important part is that chlorophyll absorbs blue and red light. The energy from the absorbed blue and red light is then used to make the sugar molecules during photosynthesis. Sugar is the energy nutrient used by the plant cells to perform their life functions.



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The green leaf cells make sugar out of carbon dioxide ( $\text{CO}_2$ ) and water ( $\text{H}_2\text{O}$ ). Carbon dioxide comes from the air. Water comes from the soil, up through the roots. The carbon dioxide and water meet in the green cells.

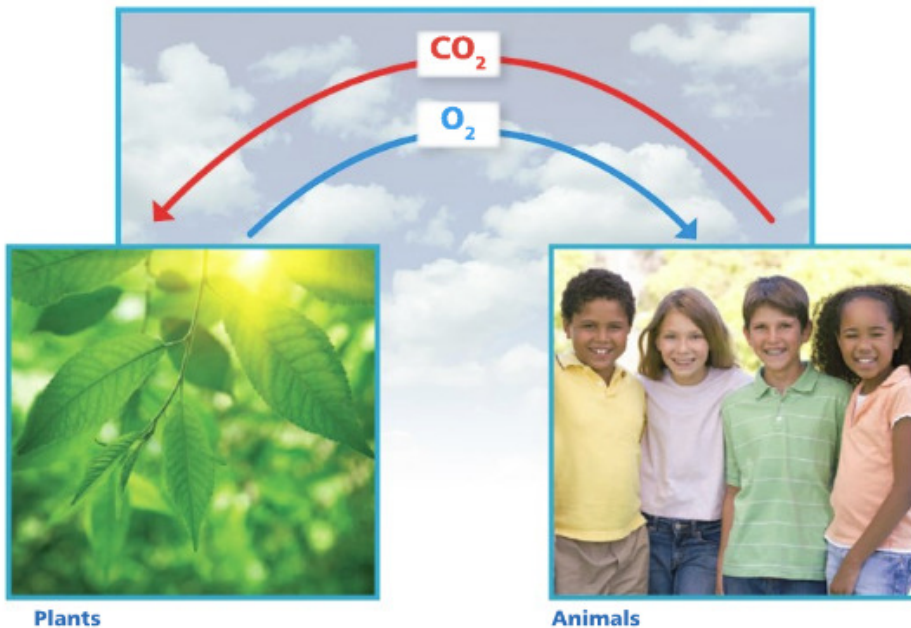
The carbon dioxide, water, and energy from the Sun combine to make sugar molecules in the plant's cells. The cells also produce oxygen and water molecules. The oxygen is released into the air. The plant reuses water or releases it into the air as water vapor (gas). So where is food produced? Food is produced in the green parts of the plant. Every cell that contains chlorophyll is making sugar.



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## The Carbon Dioxide–Oxygen Cycle

Through the process of photosynthesis, producers release oxygen to the air. This is very important to the biosphere. Animals and most other living things need oxygen to live. Even plants need oxygen for their life functions. Producers release more oxygen than they use. Carbon dioxide is released as a waste gas by animals and other living things. Producers use that gas to produce more oxygen. This carbon dioxide-oxygen cycle is very important to the health of the biosphere.



Food production doesn't stop there. Plants use the sugar to produce a lot of other molecules. They produce other kinds of sugars with names like sucrose, dextrose, and fructose. They produce starches, which store energy in potatoes and grains like wheat. They produce vegetable oils, such as corn oil, sunflower oil, and olive oil.

Plants store energy as sugars, starches, and oils. When the plant needs them, it pulls them out of storage, turns them back into **glucose**, and sends the glucose to the cells. That's how plants survive at night and during winter. They use stored energy to do whatever they need to do.

Other organisms use the energy stored by plants to live and survive. That includes humans. When you eat a slice of bread or a baked potato, you are eating energy stored by a plant. When you eat lettuce and carrots, you are eating sugars, starches, and all the cells made by plants. And when you eat food to nourish your cells, remember where the food came from. It started as carbon dioxide, water, and sunlight. It's really quite amazing when you stop to think about it. You are running on solar energy.



**The Sun's energy is used by producers to make their own food. Then, that energy is transferred to you when you eat a plant.**

## Thinking about Photosynthesis

1. What is sugar?
2. What raw materials do plants need for growth? Where do those materials come from?
3. What is the role played by chlorophyll?
4. What are the products of photosynthesis? Where do they go?
5. Where do plants produce food?
6. Explain how the Sun's energy is transferred through a simple food chain.