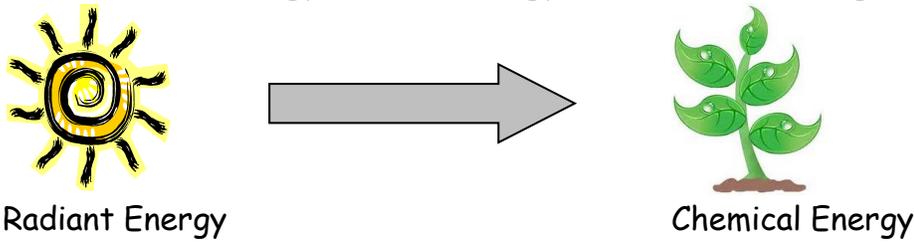


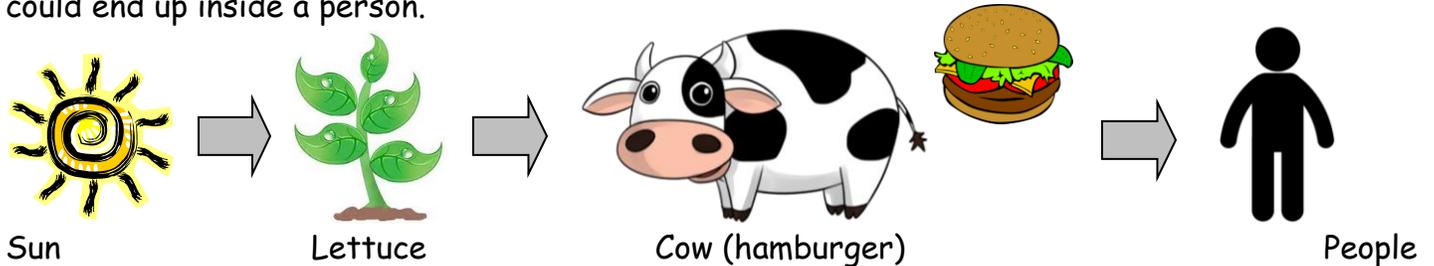
Photosynthesis

Big Idea

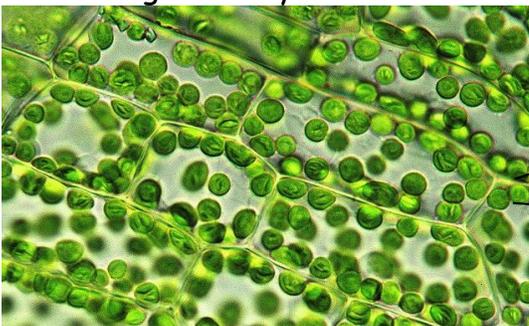
Photosynthesis is a process in which radiant energy from the sun is transformed (changed) inside a plant into chemical energy. Radiant energy can also be called light or solar energy.



All energy on Earth originally came from the Sun. When people eat food they get chemical energy they need to live and grow. The food chain below shows how the energy from the Sun could end up inside a person.



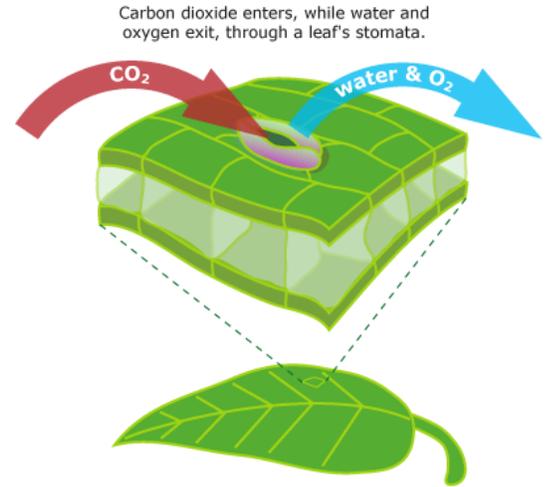
Plants need radiant energy, carbon dioxide (CO_2) and water (H_2O) to go through photosynthesis. These ingredients meet in the leaves of plants to produce glucose ($C_6H_{12}O_6$) and oxygen (O_2). If you use a microscope to look closely at a leaf, you will see that it is made up of thousands of tiny plant cells. Inside of plant cells are organelles. Each organelle has a specific job or function. The function of a chloroplast is to perform photosynthesis. Chloroplasts contain the pigment, chlorophyll. Chlorophyll reflects only green and yellow wavelengths of light. This is why we see leaves as green or yellow - because these colors are reflected into our eyes.



1. What energy transformation occurs during photosynthesis? _____ → _____
2. Give 2 other names for sunlight energy. _____
3. All energy of Earth comes from the _____.
4. What plant organelle performs photosynthesis? _____
5. Why are plants green? _____

Reactants

Reactants are ingredients needed to perform a task. Plants (or producers, or autotrophs) not only need radiant energy from sunlight for photosynthesis, but they also need carbon dioxide (CO_2) and water (H_2O). Producers use their leaves as solar panels to absorb the radiant energy. Plants get carbon dioxide (CO_2) from the air through pores called stomata (pictured to the right). Much of the carbon dioxide comes from living organisms that exhale it, but some also comes from factories and car fumes. Roots absorb water from the ground. Water travels up the stem through a tube called a xylem, to reach the leaf.



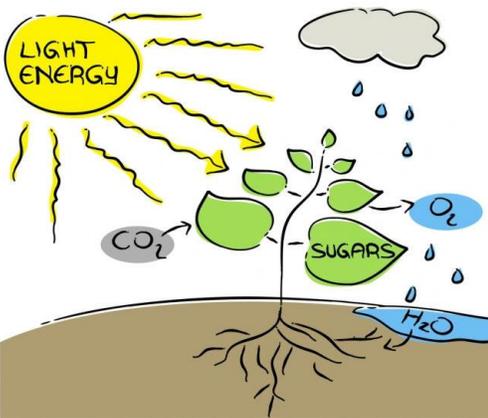
1. What are the 3 reactants needed for photosynthesis?

2. Plants can also be called _____ or _____ .

3. How does CO_2 enter a plant? _____

4. Give 2 ways carbon dioxide gets into the air? _____

5. What is the name of the tube that transports water? _____



Products

Photosynthesis produces (or yields) two products, glucose and oxygen. Glucose (sugar) is chemical energy needed by the plant to grow and operate. The chemical formula for glucose is $\text{C}_6\text{H}_{12}\text{O}_6$. We also use this glucose by eating plants. During this process, oxygen (O_2) is created as a waste product and is released into the air for us to breath. Photosynthesis is essential for all life on earth, because it provides food and oxygen. The chemical equation for photosynthesis is:



This is not a balanced equation, because there are more atoms on the product side than the reactant side. According to the Law of Conservation of Mass, mass cannot be created or destroyed but can be rearranged. So since there are only 2 carbon atoms on the left, it is impossible to have 6 on the right. So in nature the photosynthesis equation is actually:



1. What is the formula for photosynthesis? _____

2. What is glucose used for? _____

3. What is the oxygen plants make important to you? _____

4. Explain the Law of Conservation of Mass. _____