Photosynthesis

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CHAPTER 1 Photosynthesis

- Define photosynthesis.
- Distinguish between autotrophs and heterotrophs.
- Explain the importance of photosynthesis.

Vocabulary

TABLE 1.1:

Word	Definition	Used in a sentence (context)	Example(s)
Photosynthesis	The process in which Plants take in Carbon Dioxide and water to produce glucose.	Lots of sunlight helps plants photosynthesize more efficiently	Trees growing
Glucose ($C_6H_{12}O_6$)	A carbohydrate that is created through photosynthesis	Glucose is the most important and most simple sugar.	Glucose levels in blood
ATP	Usable chemical energy	Living things convert glucose to ATP for the energy to live.	ATP created during photosynthesis ATP converted to ADP during cellular respiration
Chloroplast	The part of the cell where photosynthesis occurs.	Plants are green because of the pigments in chloroplasts.	Green coloring in leaves
Cellular respiration	The process by which plants and animals break down glucose to release energy	Holding your breath is more difficult while exercising because of the increased rate of cellular respiration.	Breathing

An overview of photosynthesis

http://www.youtube.com/watch?v=hj_WKgnL6MI (5:04)

A simple explanation of Photosynthesis and its connection to Cellular respiration

https://www.youtube.com/watch?v=0IJMRsTcwcg

What can a tiny plant do that you can't do?

This tiny plant can use the energy of the sun to make its own food. You can't make food by just sitting in the sun. Plants are not the only organisms that can get energy from the sun, however. Some protists, such as algae, and some bacteria can also use the energy of the sun to make their own food.

What is Photosynthesis?

If a plant gets hungry, it cannot walk to a local restaurant and buy a slice of pizza. So, how does a plant get the food it needs to survive? Plants are **producers**, which means they are able to make, or produce, their own food. They also produce the "food" for other organisms.

Through photosynthesis. **Photosynthesis** is the process plants use to make their own “food” from the sun’s energy (carbon dioxide, and water.) During photosynthesis, carbon dioxide and water combine with solar energy to create the simple sugar **glucose**, ($C_6H_{12}O_6$), and oxygen.

The process can be summarized as: in the presence of sunlight, carbon dioxide + water $\rightarrow$ glucose + oxygen.

Glucose is a sugar that acts as the "food" source for plants. The glucose is then converted into usable chemical energy, **ATP**, during **cellular respiration**. The oxygen formed during photosynthesis, which is necessary for animal life, is essentially a waste product of the photosynthesis process.

Almost all organisms obtain their energy from photosynthetic organisms. For example, if a bird eats a caterpillar, then the bird gets the energy that the caterpillar gets from the plants it eats. So the bird indirectly gets energy that began with the glucose formed through photosynthesis. In plants, photosynthesis occurs in **chloroplasts**. Only cells with chloroplasts can perform photosynthesis. Animal cells and fungal cells do not have chloroplasts and, therefore, cannot photosynthesize. That is why these organisms, as well as the non-photosynthetic protists, rely on other organisms to obtain their energy.

Summary

- All the energy used by living things on Earth came from the process of photosynthesis.
- During photosynthesis, carbon dioxide and water combine with solar energy to create glucose and oxygen.
- Photosynthesis equation:
  $H_2O + CO_2 +$ energy–>$C_6H_{12}0_6 + O_2$
  Photosynthesis equation (using words):
  Water + Carbon Dioxide + light—
  textgreater Glucose + Oxygen

Review

1. How is the process of photosynthesis central to sustaining life on Earth?
2. What are the two products produced by photosynthesis?
3. What two raw materials are needed by plants in order to perform photosynthesis?