

explainity explains: Photosynthesis

Meet Joseph Priestley, a scientist and preacher who lived in the 18th century. His experiment on the purification of foul air by plants is particularly well known.

Prior to Priestley's research, people thought that plants pulled their nutrients solely from the ground, which allowed them to grow. However, Priestley wondered what role air played for a plant. To find out, he put a mouse in an airtight container. Priestley was aware when he did this that the mouse, like every other living thing, inhales oxygen from its environment, and exhales carbon dioxide. As the oxygen in the container was soon used up, the mouse died.

Priestley conducted the experiment again. This time, the mouse shared the container with a potted plant. And the mouse survived.

To Priestley, it was clear that the potted plant must be able to regenerate the air used up by the mouse. He came to the conclusion that plants transform carbon dioxide into oxygen, which they then release into the environment. Although he did not know it, Priestley's observations had led him to formulate the first description of photosynthesis. We now know that there is more to this phenomenon.

In the process, under the influence of sunlight and with the aid of carbon dioxide and water, plants not only produce the oxygen that Priestley had discovered, but also the sugar molecule glucose, which plants use as a nutrient and energy source. Let's take a closer look.

The processes involved in photosynthesis can be divided into two phases: the **light reaction** and the **dark reaction**. During the light reaction, the plant absorbs energy in the form of sunlight using the green leaf pigment, "chlorophyll", in its leaves. The light energy absorbed is then converted into chemical energy by means of the energy storage substance adenosine triphosphate – ATP for short. The stomata in the leaf provide openings through which the resulting oxygen is released.

In the subsequent dark reaction, the chemical energy stored as ATP is used to turn carbon dioxide and water into glucose. The whole process takes place in the chloroplasts of the leaves; these are components of plant cells.

The oxygen produced during the light reaction is basically only a waste product as far as the plant is concerned. But for us human beings, and for animals, this oxygen is essential for survival. And without it, the mouse in the airtight container could not have survived, either.

www.explainity.com		www.youtube.com/explainitychannel
www.facebook.com/explainity	www.twitter.com/explainity	www.instagram.com/explainity
<small>Note: Almost every explainity education clip was produced and published for private, non-commercial use and can therefore be shared without further consent for private purposes free of charge. For commercial use or educational purposes like screenings for academic institutions (showing the video at school or in an academic setting) the video must be licensed. The transcripts (texts) are free to use for classes. For further information please visit our website: www.explainity.com/education-project/. Please note that the content of all video clips and transcripts must not be altered in any way, neither the illustrations nor the content itself. All contents were created to the best of our knowledge and belief at the time of production. explainity assumes no responsibility for content being up-to-date, complete and valid and is not liable for any errors. © explainity - all rights reserved.</small>		