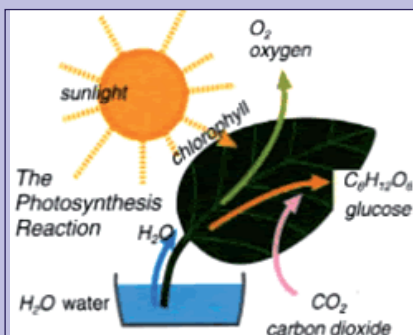




What is Photosynthesis?

Plants and trees are living organisms. Like all organisms they need food and nutrients in order to grow and survive. Animals can obtain their nutrients by eating, however plants cannot do this. To compensate plants have a special way of making their own food. This process is called photosynthesis.



There are four main factors involved in photosynthesis:

- water;
- carbon dioxide gas;
- the energy of sunlight;
- the green leaf pigment, Chlorophyll.

During photosynthesis, plants make sugars such as glucose which can be quickly changed into starch.

Energy from light, in the presence of chlorophyll, promotes a reaction between carbon dioxide and water vapour that leads to the production of glucose.

Oxygen gas is released as a by-product and diffuses out of the plant into the atmosphere.

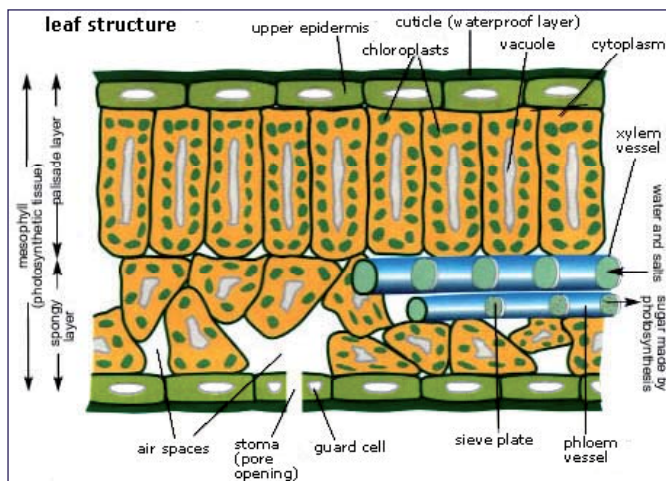
This is a very simplified account of what happens.

It actually consists of at least 50 different reactions in sequence. Essentially the light energy enables the water molecules to split into hydrogen and oxygen atoms. The hydrogen atoms then combine with the carbon dioxide to form glucose and more water molecules. Light is only needed in the initial stages of photosynthesis.

The Role of Leaves in Photosynthesis

Green leaves are the principal part of a plant which carry out photosynthesis in daylight hours. In daylight, the mesophyll absorbs carbon dioxide through small pores (stomas) found in

the base of the leaves. Oxygen is then released as the photosynthesis process occurs. The sugar made in the leaves is



transported away by the phloem sieve tubes to growth and food storage areas of the plant.

In bright light, plants often produce more sugar than can be removed by the phloem. The excess sugar is stored in leaves as starch grains. These remain in the leaf until night when they are re-converted into sugar and transported from the leaf. The presence of starch in a leaf is evidence that photosynthesis has taken place.

The Importance of Photosynthesis

Photosynthesis is of vital importance to the continuation of life on earth.

Food Production

Plants manufacture all their body building and energy producing substances from simple raw materials using sunlight energy. Animals however, are not independent in this way – they live by eating plants and/or each other! Thus plants are the means of feeding the whole living world.

UPDATED: MAY 2009

Production of Oxygen

Atmospheric oxygen is used up by the process of respiration of living things and by the burning of materials known as combustion.

However, the supply of atmospheric oxygen is continually replaced through the photosynthetic process of plants. Because trees and green plants are so essential to life on earth, the paper industry takes great care to ensure more trees are planted than are harvested.

Photosynthesis and the Paper Industry

Scientists in the paper industry have to understand the process whereby plants generate oxygen, and convert this into useful materials within the plant structure. This allows them to investigate new plant species that may be of special use in making paper: perhaps because the fibres are of a particular shape, or the plant is very fast growing or even because it grows in very poor soils. Paper scientists are always looking for new sources of their raw materials - cellulose fibre.

The Product of Photosynthesis

Simple sugars such as glucose which are produced by photosynthesis are the raw materials out of which plants manufacture many other substances such as complex carbohydrates like starch and cellulose. The manufacture of cellulose involves linking together glucose molecules into long chains. Millions of these

chains make up a micro fibril and millions of these go to make the cellulose wall of one cell.

The forest derives its energy from the sun. The process of photosynthesis converts the solar energy with carbon dioxide and water into 'fuel' for the growth of trees. This process makes the forest into a renewable source of raw materials, the main products of which are wood fibres and energy.

Wood fibres are used for the manufacture of paper products. If the used products are recycled as recovered paper, the fibres can be used several times.

Do you know?
Photosynthesis makes life for everyone. Animals could not live without plants. They need them for FOOD and for the OXYGEN they breathe.
368,000,000,000 tonnes of OXYGEN are produced in the world each year by photosynthesis.
The faster the rate of photosynthesis, the fast the plant will grow because it is manufacturing more food.
Plants make sugar during photosynthesis but they cannot live on sugar alone. They need proteins which they make from the minerals and
Motor cars, aeroplanes, home heating systems and industrial complexes all make use of the sun's energy which reached the earth millions of

