

PHOTOSYNTHESIS

Every living creature needs food to survive. While most of the beings depend on others for food and energy, there are some living things like plants that can produce their own food. The process by which they can produce their own food and energy, using only the natural source of light and water, is called Photosynthesis.

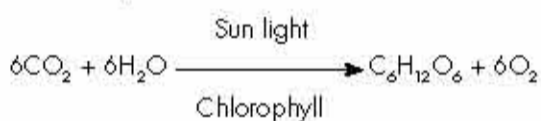
So how will plants prepare their food?

It uses,

- ▶ Light energy that comes from the sun.
- ▶ Water that comes from the soil, gathered by the tree's roots.
- ▶ Carbon dioxide that comes from the air.
- ▶ Chlorophyll which is present in the cells of green plants.

Directions

The Photosynthesis Reaction:

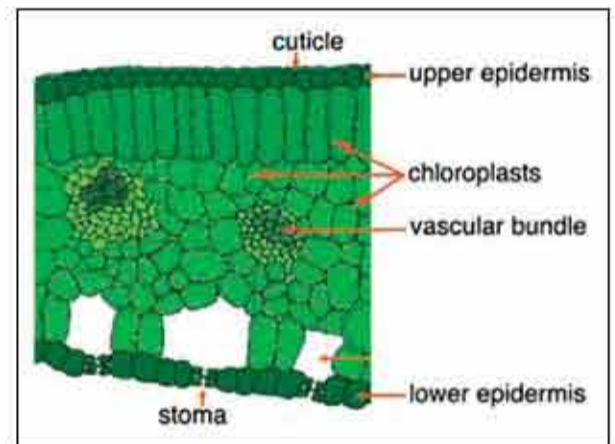


Basically, photosynthesis occurs when a tree uses the sunlight and chlorophyll to convert carbon dioxide and water into glucose.

HOW DOES THE PROCESS OF PHOTOSYNTHESIS TAKE PLACE IN THE LEAF?

Transverse section of a leaf shows the various parts that help in the process of photosynthesis:

- ▶ The CUTICLE which is non-cellular, water proof and transparent allows light to pass through.
- ▶ The UPPER EPIDERMIS is a single layer of cells on the upper surface of a leaf. It allows light to pass to the cells below.
- ▶ CHLOROPLASTS contain chlorophyll for absorbing sunlight.
- ▶ VEINS OR VASCULAR BUNDLES act as drain pipes distributing raw materials to the leaves and conducting away manufactured food to other parts of a plant.
- ▶ STOMA is a pore that allows gaseous exchange to take place. Carbon dioxide



enters and oxygen leaves the leaf through stomata.

- ▶ A THIN LAMINA provides a short distance over which diffusion of gases take place.
- ▶ A BROAD LAMINA provides a large surface area for absorbing sunlight energy.

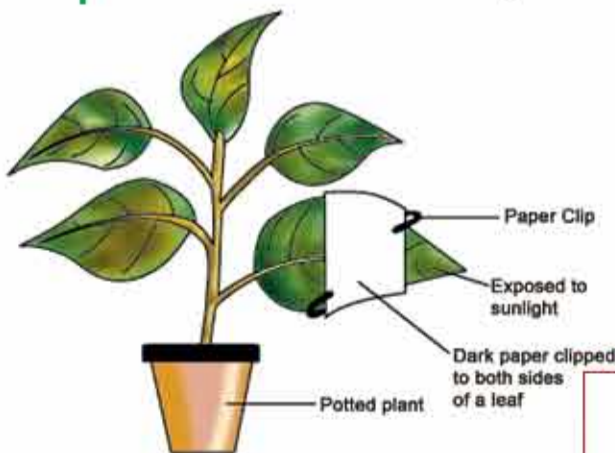
TRY THIS

EXPERIMENT TO SHOW THAT LIGHT IS NECESSARY FOR PHOTOSYNTHESIS

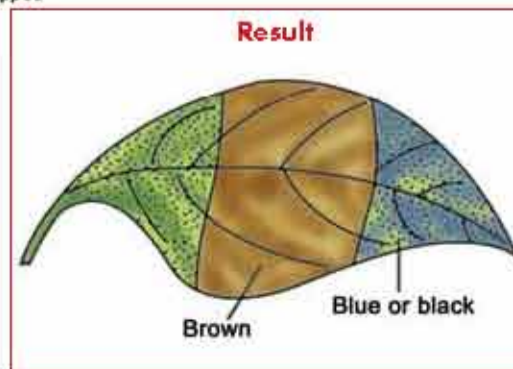
Materials: Well watered destarched potted plant, dark paper, scissors / knife / scalpel, pins/clips.

Pre-experiment: During photosynthesis many plants form starch grains in the chloroplasts. Destarching a plant involves keeping the plant in the dark for 24 to 48 hours until the starch is used by the plant for energy or building blocks.

Now we continue with our experiment:



- Fix the paper on one of the leaves as shown in the diagram below.
- The experimental set up is exposed to sunlight for 2-6 hours.
- The paper is removed and the leaf is tested for starch.
- Make a labelled diagram to show the results.



Conclusion.

Starch is produced only in areas that received light. This shows that (i) Sunlight is necessary for the process of photosynthesis, and (ii) Leaves make starch as food by photosynthesis.

Did you know?

Trees grow the most in the spring and summer, where there is a lot of sunshine every day. When winter approaches, the days grow shorter and there is less sun. This alerts the tree to begin getting ready for winter. The leaves begin to turn red, orange, gold, and brown, because with less sunlight and water for photosynthesis, the green chlorophyll begins to disappear.

The leaf colours we see in the autumn have been in the leaves all along, but with so much green chlorophyll, we can't see them until the chlorophyll is gone. As winter begins to approach, the tree uses the food it has stored during the spring and summer, and goes into a rest period. They lose all their leaves and stand up to sleep.

