

Activity 2: How do plants breathe?

Materials

- 6-8 fresh green leaves
- Two clear glass or plastic jars or cups
- Water
- A sunny spot
- A dark or shady spot
- 2 small rocks or pebbles
- Optional: magnifying glass

Instructions

- (1) Fill both clear glass jars or cups with water
- (2) Put 3-4 leaves in each jar
- (3) Put the small rocks on top of the leaves to keep them underwater.
- (4) Look at the water: **do you see any bubbles?**
- (5) Put one cup in a sunny spot
- (6) Put the second cup in a dark or shady spot
- (7) Check on your jars every 20-30 minutes. **How does the water look? Are there bubbles in the water? Are there more bubbles in the jar that sat in the sun or in the dark?**

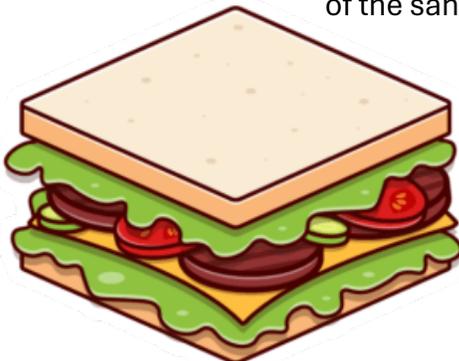
What you learned:

Explanation:

Leaves are made up of many layers, kind of like a sandwich.
(images courtesy of sciencewithme.com)

Sandwich

Bread (the "skin"
of the sandwich)

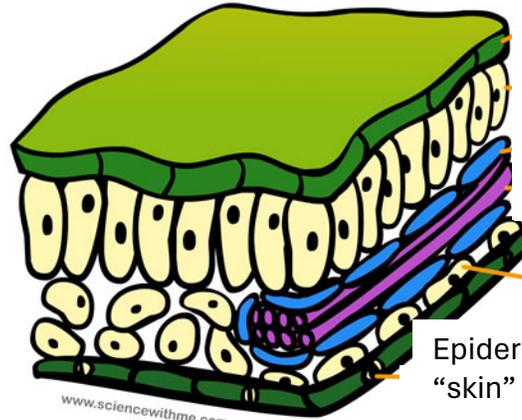


Delicious
fillings (full
of nutrients
and energy)

Bread (the "skin"
of the sandwich)

Leaf

Epidermis (the
"skin" of the leaf)

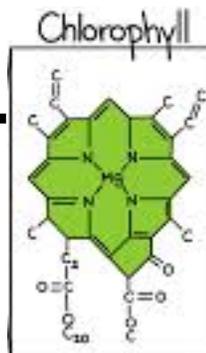
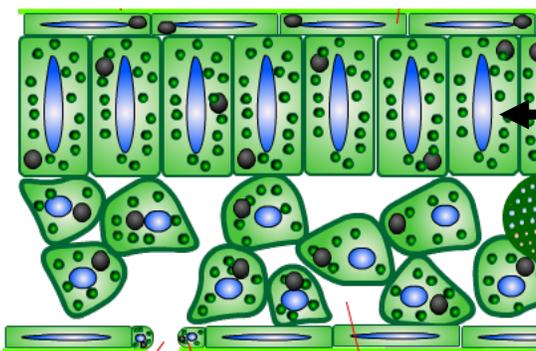


Mesophyll (the
"factory" of the
leaf, full of
nutrients and
energy)

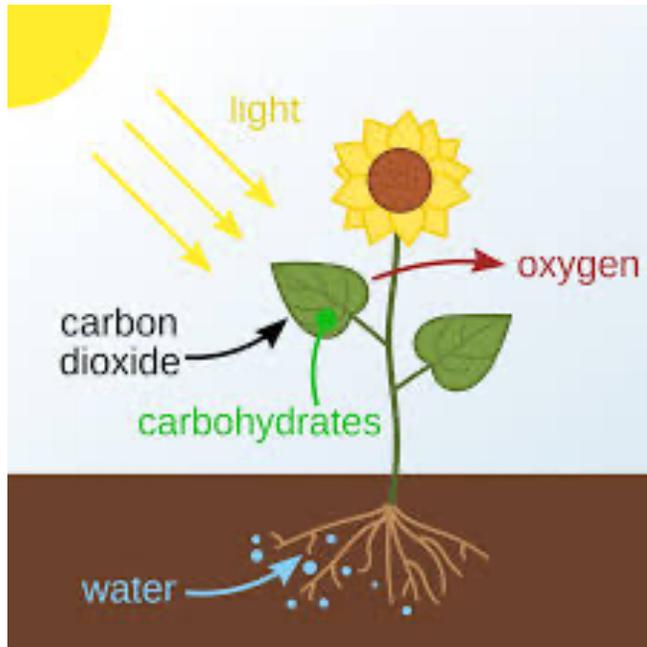
Epidermis (the
"skin" of the leaf)

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Between the two layers of epidermis (like the leaf's "skin") there's an energy factory full of little green molecules called **chlorophyll** that make energy. (images from expii.com and wikimedia)

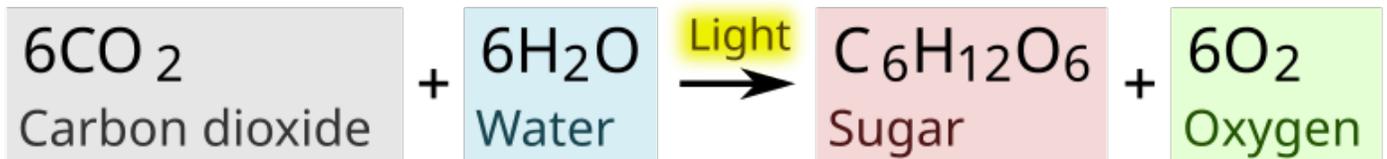
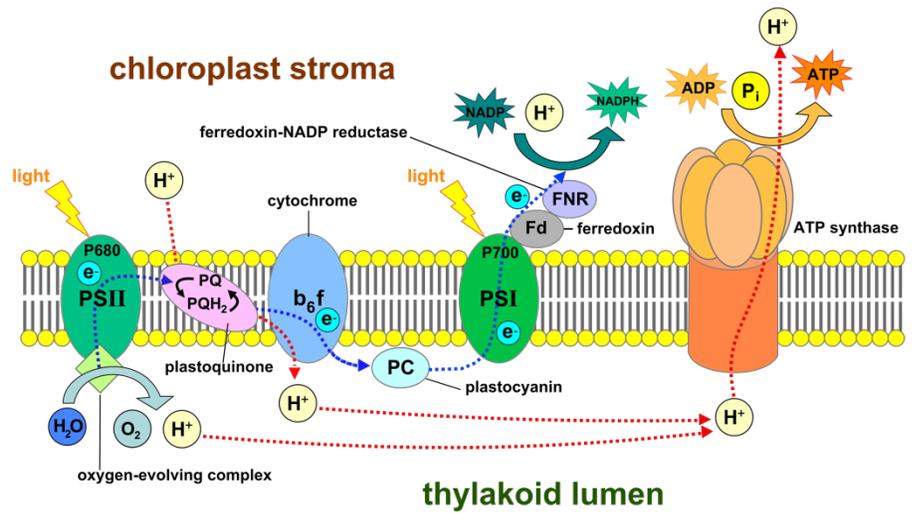
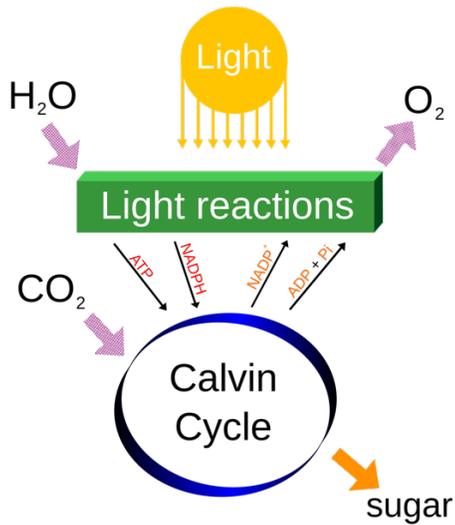


When plants make energy, their chlorophyll uses **sun** and **carbon dioxide** to make energy and produces **oxygen** as a “waste” product. This process is called **photosynthesis** and is how plants “breathe”. If the term “oxygen” sounds familiar, remember that people breathe oxygen and produce carbon dioxide as a waste product.



So what about our experiment? We used water to measure the oxygen produced by the leaves as they “breathed”: making energy using sun and carbon dioxide. Over time, the leaves produced **oxygen**, like they were “breathing out” underwater. So you should be able to see the air bubbles full of oxygen in the water. The leaves that were resting in a sunny spot made more oxygen bubbles than the leaves resting in a shady/dark spot, because **chlorophyll** uses light to make energy.

If you are interested in more information, see below: (courtesy of wikipedia)



You can also obtain much more detailed scientific information at:
<https://sciencenotes.org/what-are-the-products-of-photosynthesis/>