

Presenting Plant Photosynthesis to Elementary Students Using Chlorophyll Extraction

Vanessa Kariroux, Robert Hopewell, and
William D. Lubell

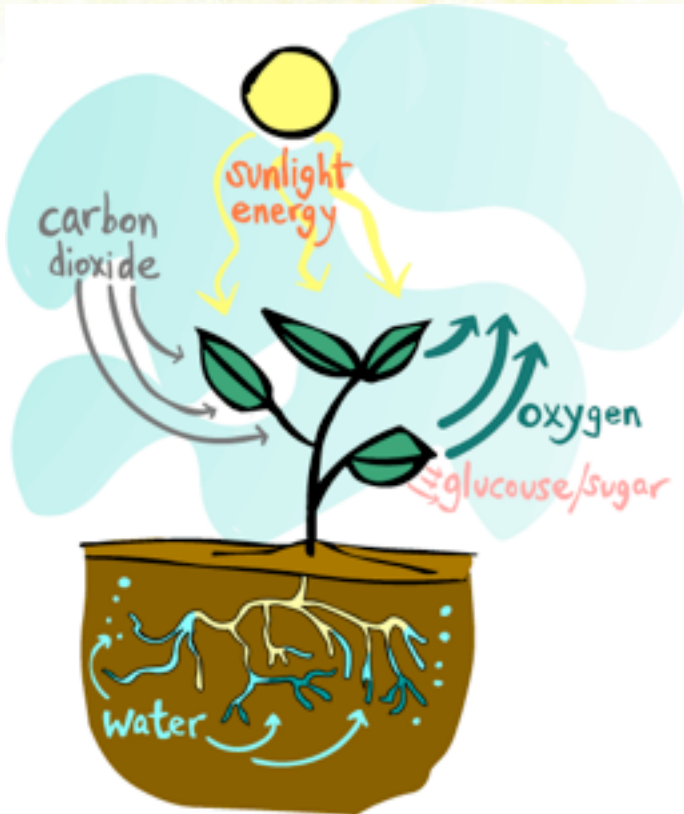
Molecules of Life

To stimulate a basic interest in chemical processes at an early age.

Features an interdisciplinary approach combining both art and science, in order to abate barriers between disciplines commonly reinforced in education



Introducing Photosynthesis



What makes plants grow?

Daylight is captured by leaves and is used as a source of energy
Water is sucked up from soil by the plant's roots. Now, the plant uses the energy to transform the carbon dioxide from the air and water to make sugar – not the kind in your sugar bowl or your soft drink, but rather, glucose.

Introducing Photosynthesis

Here's a delicious recipe for glucose: carbon dioxide gas + water + sun energy react to make...sugar (glucose)+ oxygen gas.



Breathe in! Oxygen is a gift from plants to you.

Breathe out! Carbon dioxide is your gift back to the plants so they can make sugar for you to eat.

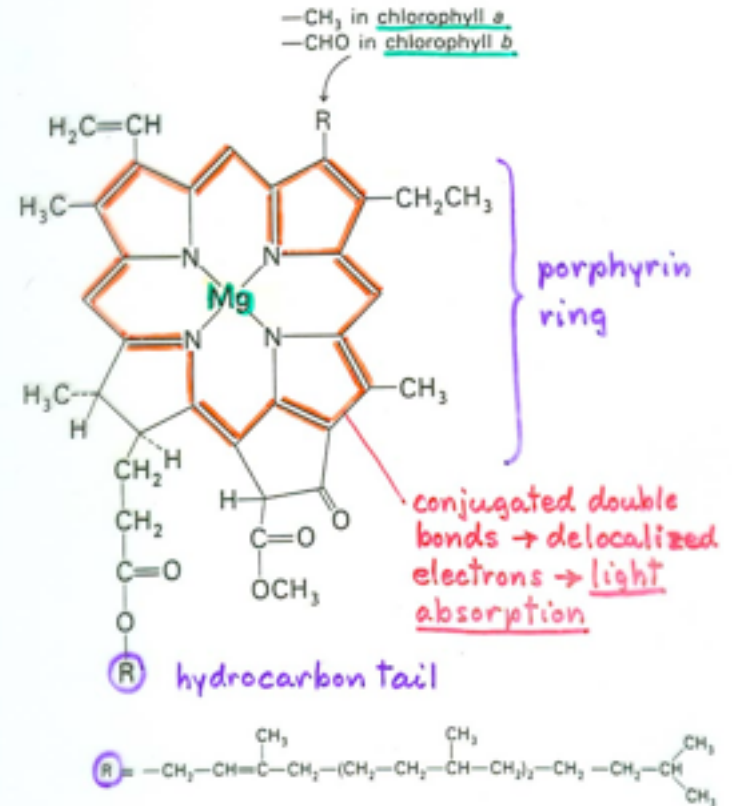
Introducing Chlorophyll

What makes plants green?



A plant molecule used for photosynthesis called **chlorophyll**!

Chlorophyll structure



Extracting Chlorophyll

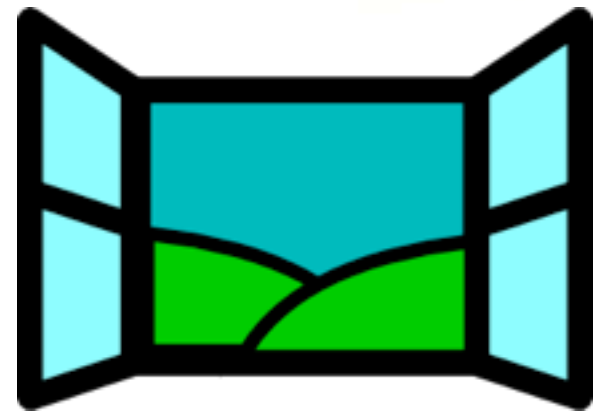
Step 1: Shred spinach into plastic bowls



Step 2: Rubbing alcohol is added to extract chlorophyll from the leaves

Extracting Chlorophyll

Step 3: The green solution is filtered



Step 4: The chlorophyll can be concentrated by evaporation at an open window

Painting with Chlorophyll

Now we can combine art and science!



The primarily aqueous chlorophyll solution can be used similarly to watercolor paints.

So, why are leaves green?

When students expose the paintings are to blacklight (UV), the paintings appear a dark red color.



The students discover that chlorophyll captures energy by absorbing the violet lighting, while emitting a lower energy light. Since chlorophyll does not absorb green light, plants usually appear this color in natural light.

Summary

Chlorophyll is extracted from spinach using rubbing alcohol, concentrated and used as a pigment artistically

This experiment is used to introduce concepts such as photosynthesis, the life-cycle, and the molecule chlorophyll

Molecules of Life features an interdisciplinary approach which teaches art and science together

Acknowledgements



RSP

BACHEM



Université  de Montréal

MEDILEX INC.



Molecules
of Life