WONDERFUL WEDNESDAY

Warm up question

Discs of tissue were cut from horse chestnut seeds and were placed in a solution of hydrogen peroxide. The enzyme catalase released from the cut cells resulted in the reaction:

$$2\ H_2O_2 \xrightarrow{\textbf{catalase}} 2H_2O \text{ and } O_2$$

The oxygen released by the reaction formed foam on the surface of the hydrogen peroxide. The volume of the foam was measured after five minutes using the various hydrogen peroxide concentrations, both with and without a fixed low concentration of copper ions. The results are shown right .

a. Calculate the rate of reaction for each of the 12 results.

b. Plot to show the effect of hydrogen peroxide concentration on the rate of reaction both with and without copper ions.

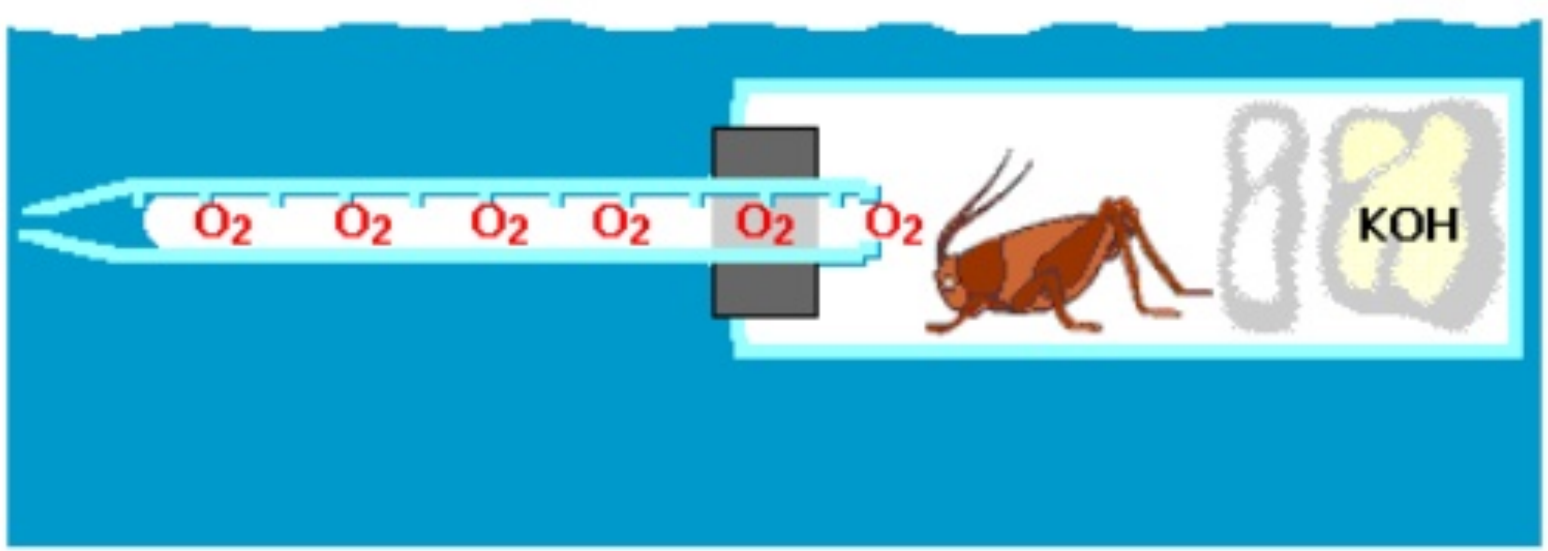
c. Deduce, with reasons, the effect of copper ions on catalase.

Table 1

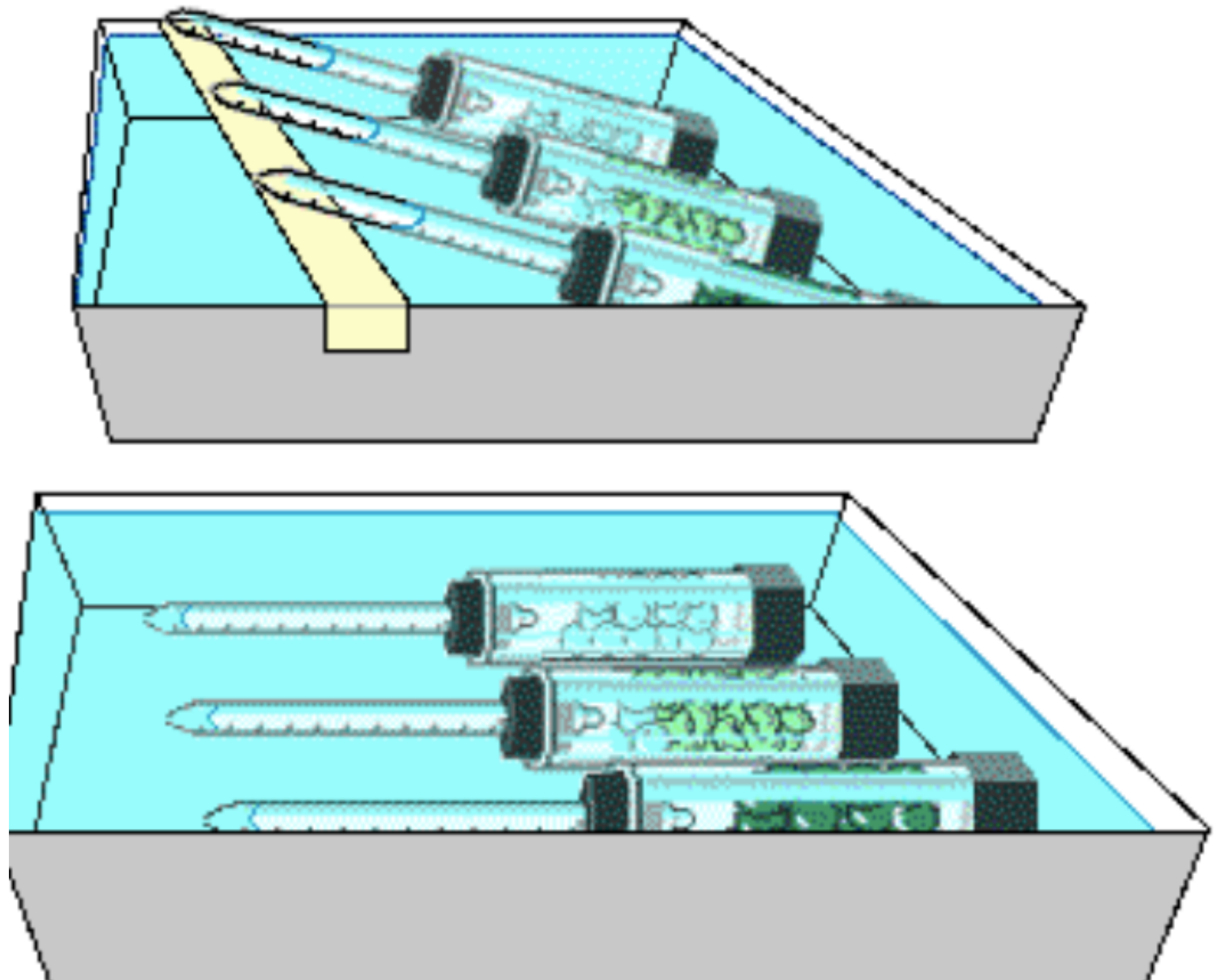
Concentration H2O2 (%)	**Volume of Oxygen (ml)** No Cu	With Cu
0	0.0	0.0
10	7.3	3.8
20	10.3	5.4
30	11.4	6.3
40	11.8	6.5
50	11.9	6.6

Respirometers

- **Respirometer:** A device used to measure respiration rate. *Most involve:*
  - A sealed container to contain living tissue
  - An alkali (i.e. KOH) to absorb carbon dioxide
  - A capillary tube or pipette connected to the container
    - *As oxygen is used up, the fluid moves toward the container*

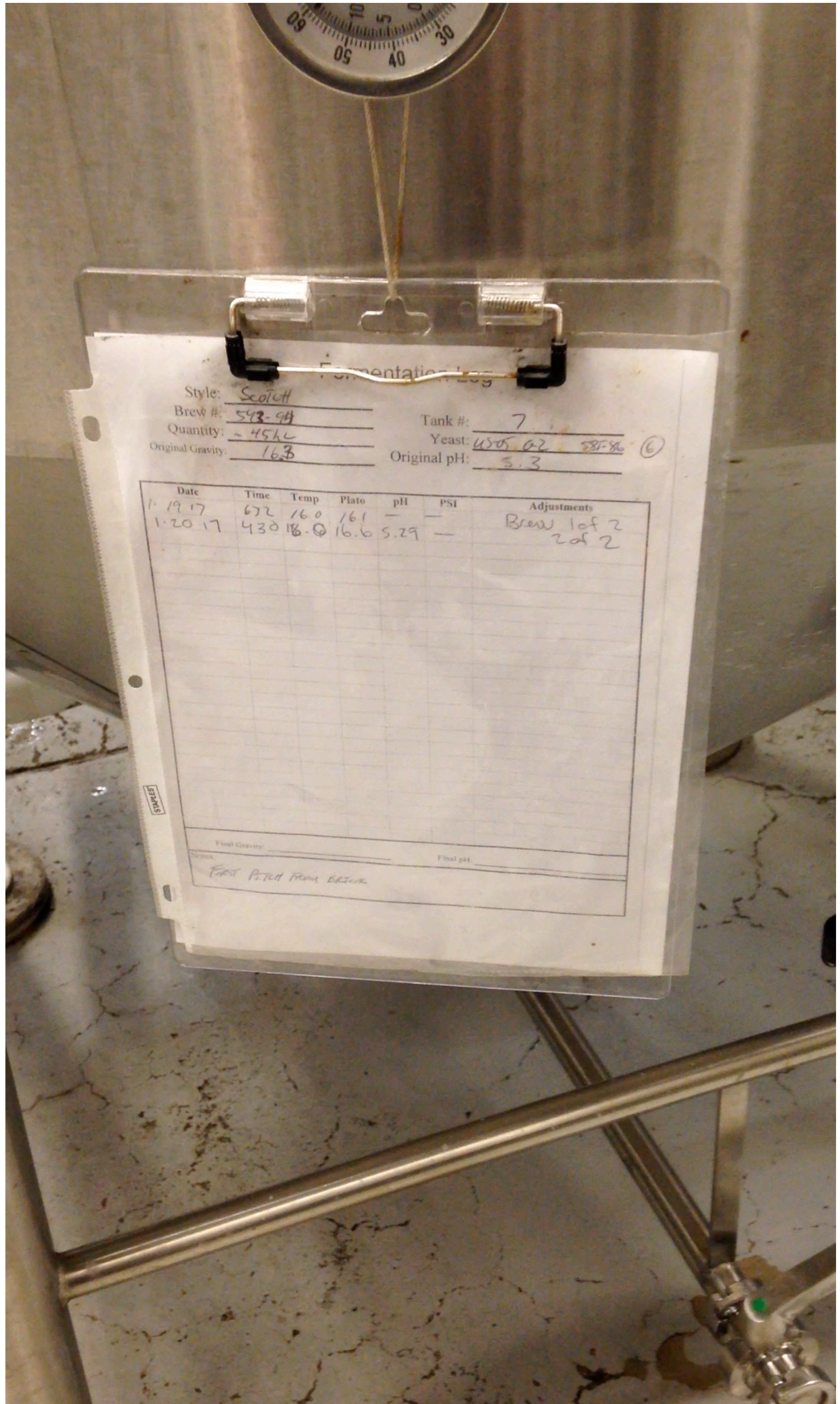


Try and measure respiration in 10 germinated seed 15



	0 hr	14 hr	38 hr
CO2 produced	-0.020 ppm/s -0.021 ppm/s	0.5OO ppm/s 0.669 ppm/s	1.223 ppm/s .735 ppm/s
Average	-0.0205 ppm/s	0.0584 ppm/s	0.979 ppm/s

	Glass bead 21.5°C	Dry Pea seed 21.5°C	Germinated Pea seed 21.5°C	Germinated Pea seed ICE WATER TREATMENT
CO2 produced	-0.012 ppm/s 0.008 ppm/s 0.100 ppm/s	-0.020 ppm/s -0.021 ppm/s	1.380 ppm/s 1.725 ppm/s 1.554 ppm/s	0.803 ppm/s 1.308 ppm/s 1.128 ppm/3
Average	0.032 ppm/s	-0.0205 ppm/s	1.553 ppm/s	1.104 ppm/s



Fermentation Log

Style: Scotch
Brew #: 543-94
Quantity: ~45hL
Original Gravity: 16.3
Tank #: 7
Yeast: US05 G2 58F-86 (6)
Original pH: 5.3

Date	Time	Temp	Plato	pH	PSI	Adjustments
1.19.17	632	16.0	16.1	—	—	Brew 1 of 2
1.20.17	430	18.0	16.6	5.29	—	2 of 2

Final Gravity:
Notes:
Final pH:

FIRST PITCH FROM BRICK

CONCLUSION

Think ABOUT around 5-6 sentences long;

- State your hypothesis and whether the data supports your hypothesis.
- The conclusion has to be justified and supported by the data you've provided.
- Brag on, expound the possible effects, but make sure it's not too short.
- Relate this to your introduction
- talk a bit about the significance of the conclusion
- relate the real life application (from the intro…)

Discussion

Title a separate section

Here you can talk about the following:

- Limitations of your experiment (eg. *this method is not so accurate but the standard lab method is too expensive/cannot be done in the laboratory*)

    - *How accurate*?
    - *Was there lots of variation between groups to make you question the results?*
    - *Did other variables affect your result?*
    - *Did your make mistakes along the way?*
    - *Is there an alternative supplementary test to check for errors?*
    - *Was there factors that weren't considered in the planning*

Discussion

Title a separate section

Here you can talk about the following:

- A possible and relevant extension to your investigation - *eg. next experiment will be…*

Discussion

Title a separate section

Here you can talk about the following:

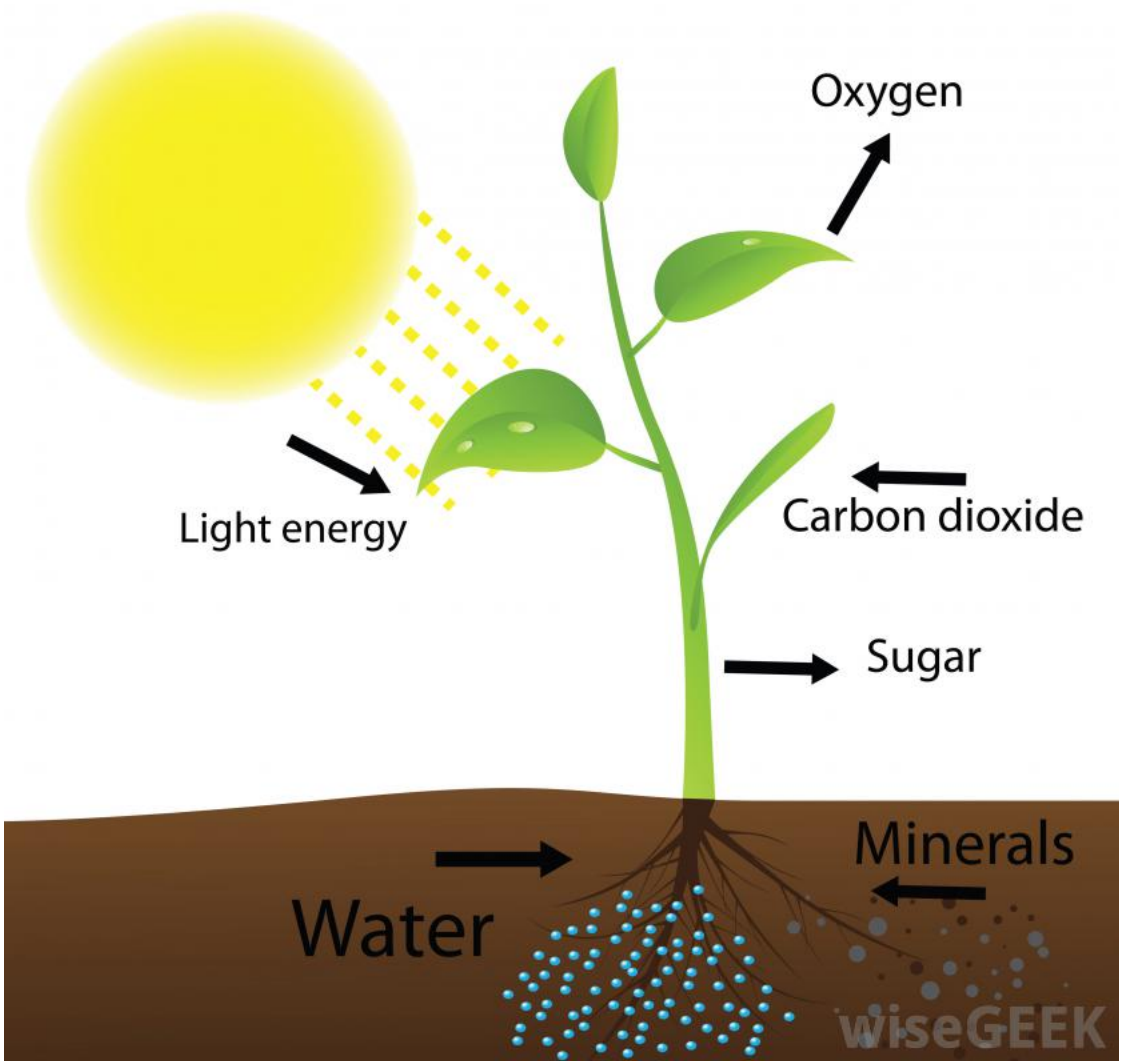
- How can you relate this to your experiment to real life application?
- How can the investigation be improved or what else can be done in consideration with the application of your methods.

WRITE a rough draft and prepare to Share

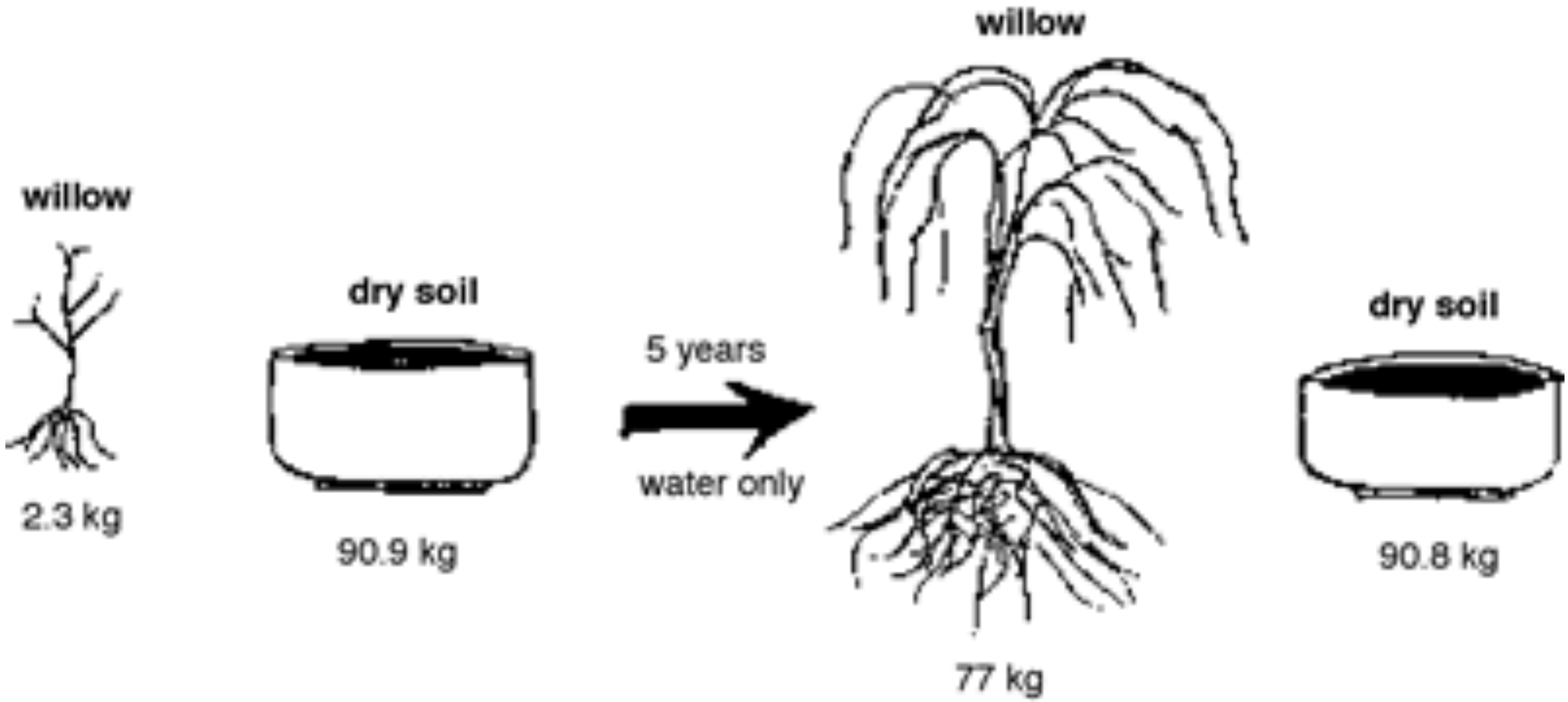
Share

Photosynthesis

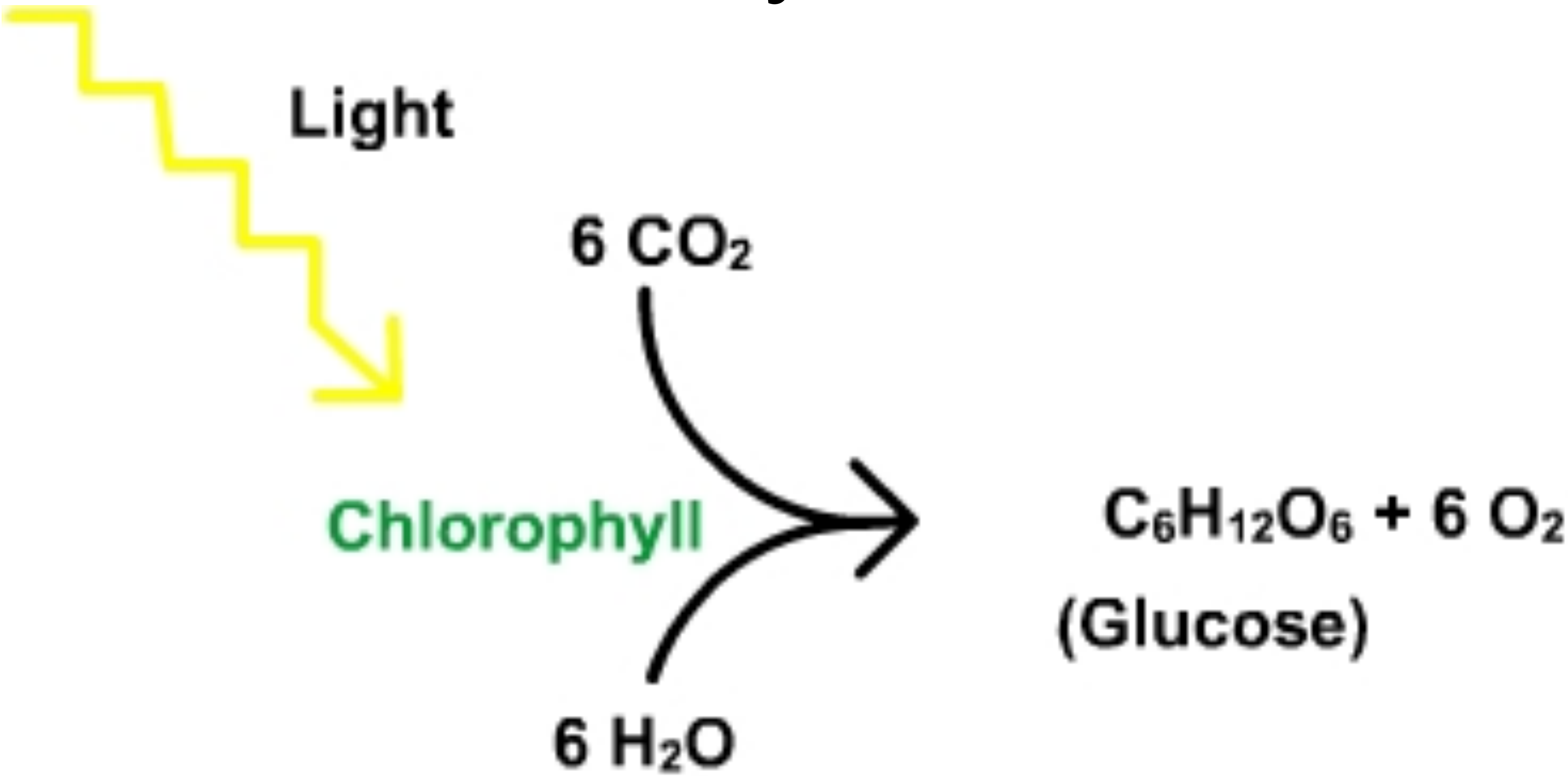
An Introduction



Van Helmont's experiment (1648)



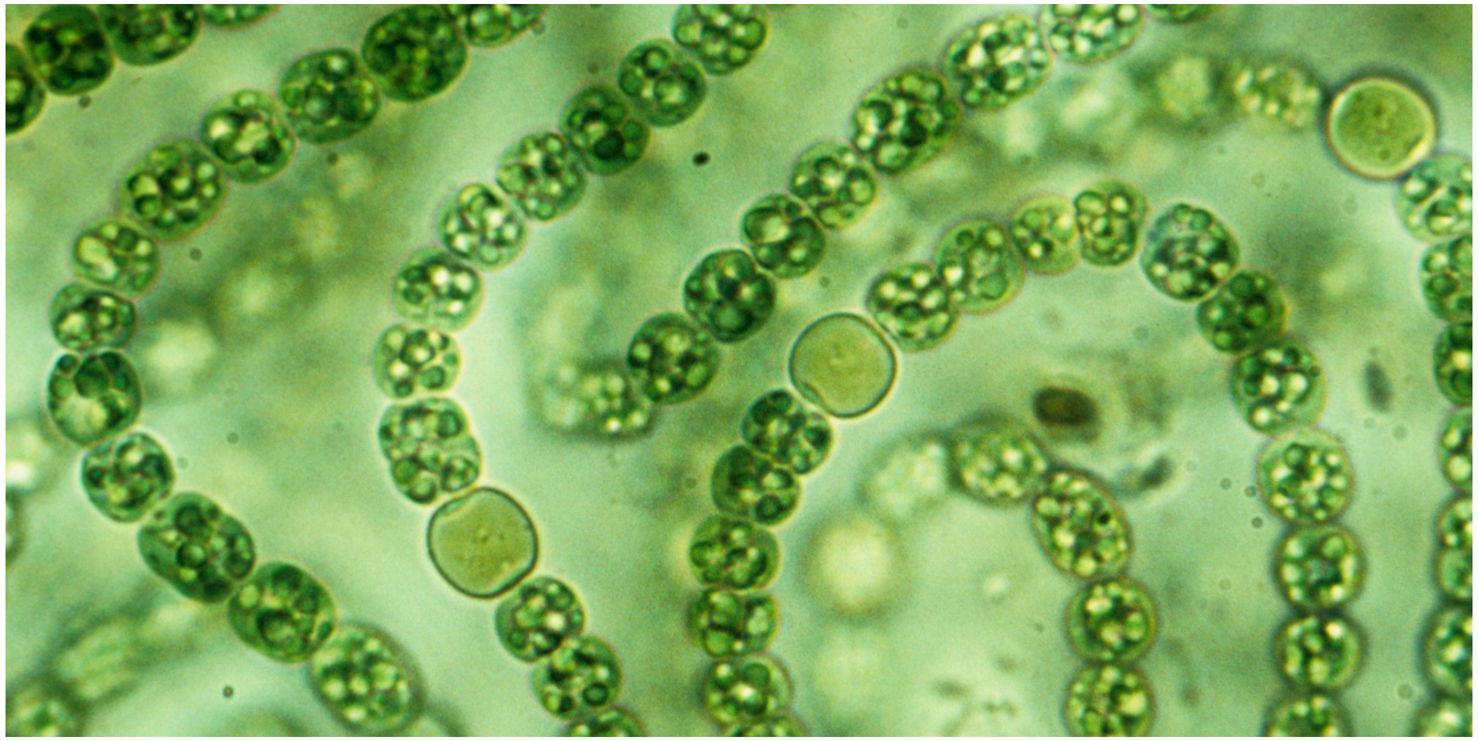
Photosynthesis



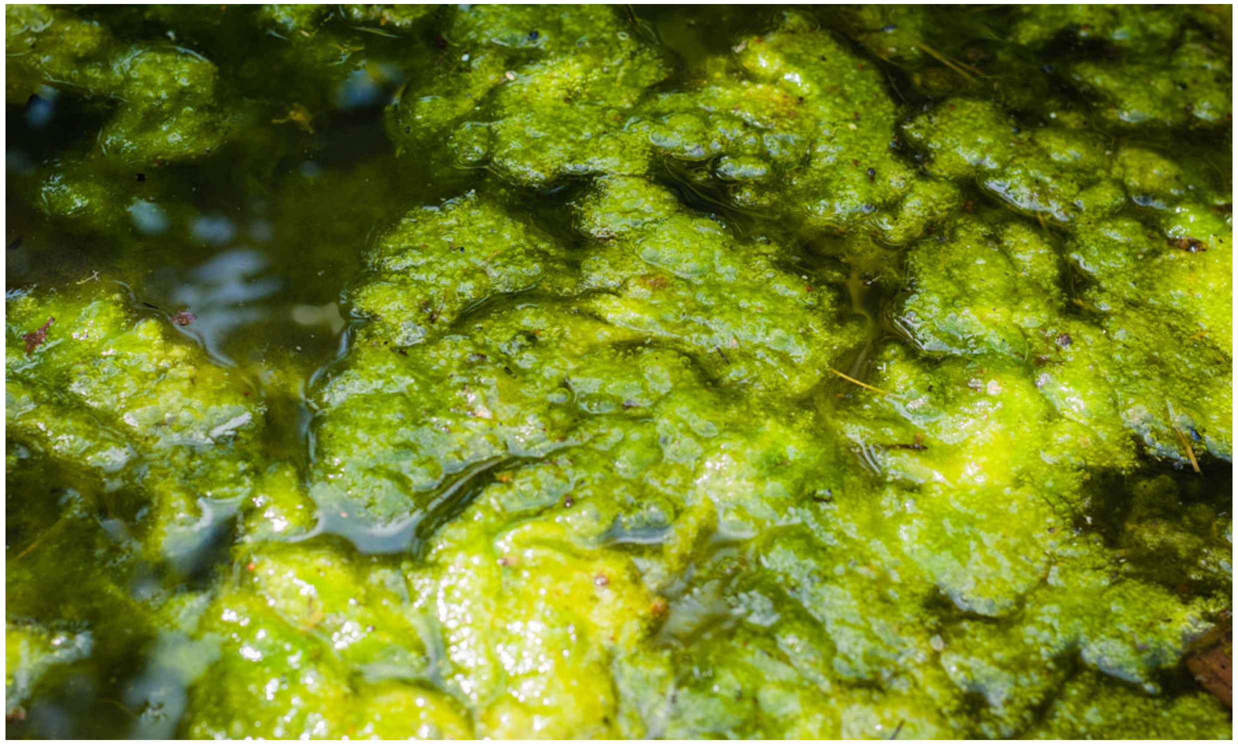
Photoautotrophs

- synthesize complex organic molecules using energy from the Sun
- some examples are…

Cyanobacteria



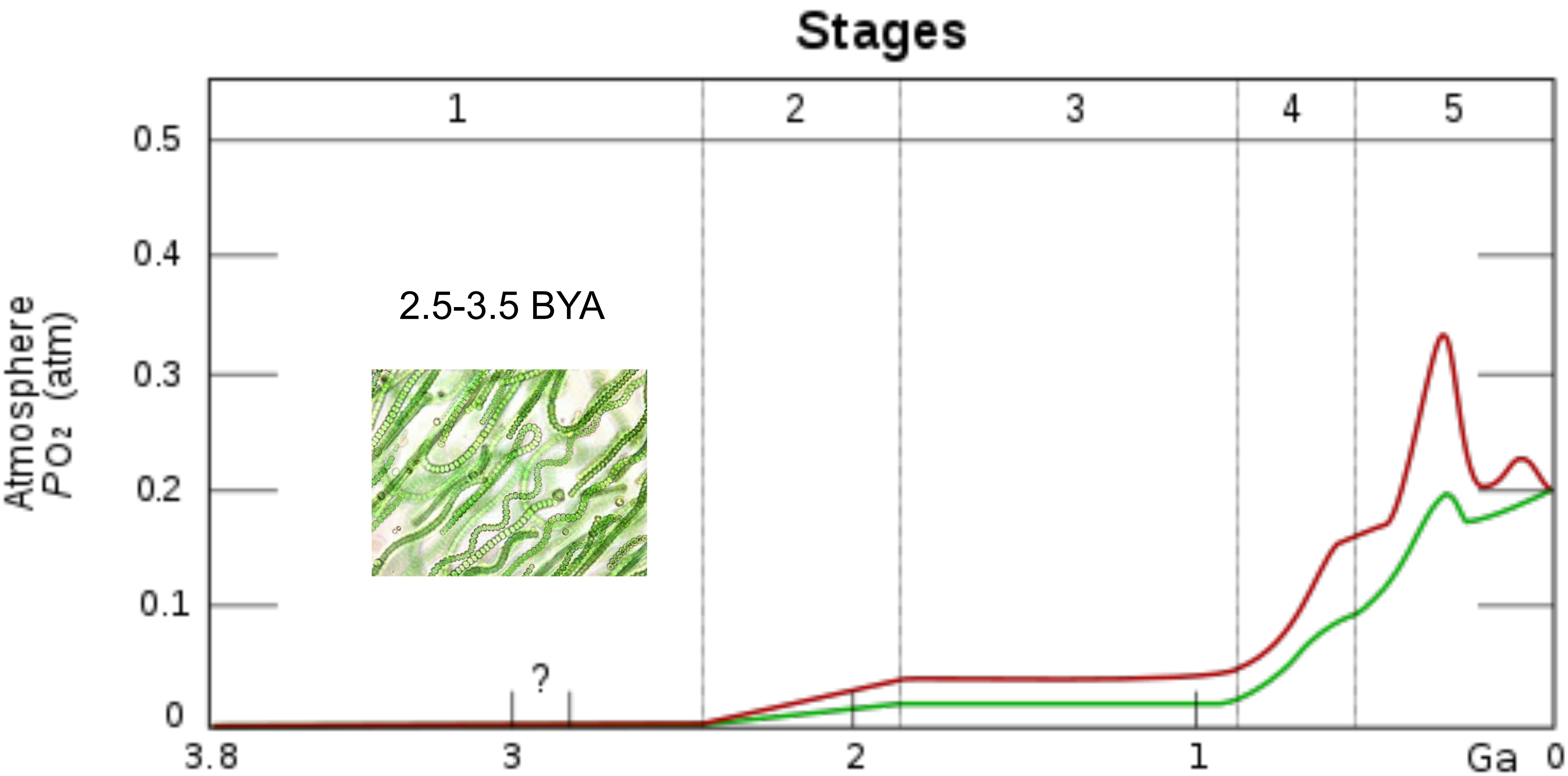
Algae- Protista



Plants

The Effects of Cyanobacterium

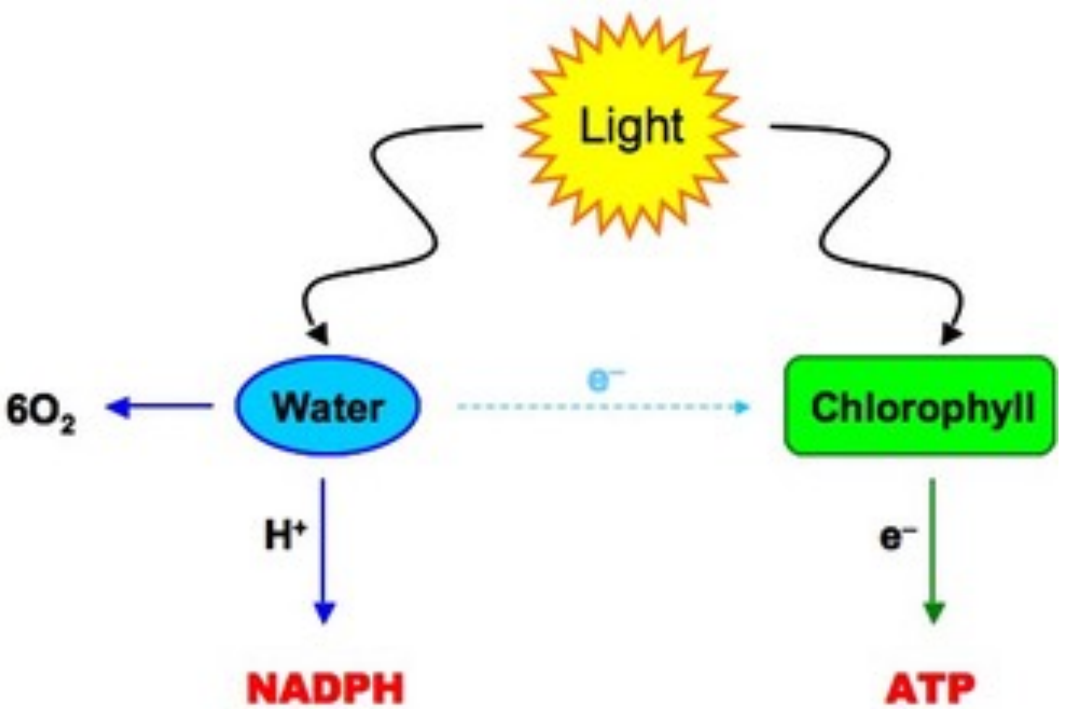
Oxygen production



Photolysis

- Photosynthesis involves oxidizing chlorophyll pigments (loss of electrons)
- Chlorophyll that is oxidized by sunlight becomes an agent that splits water to gain back electrons lost

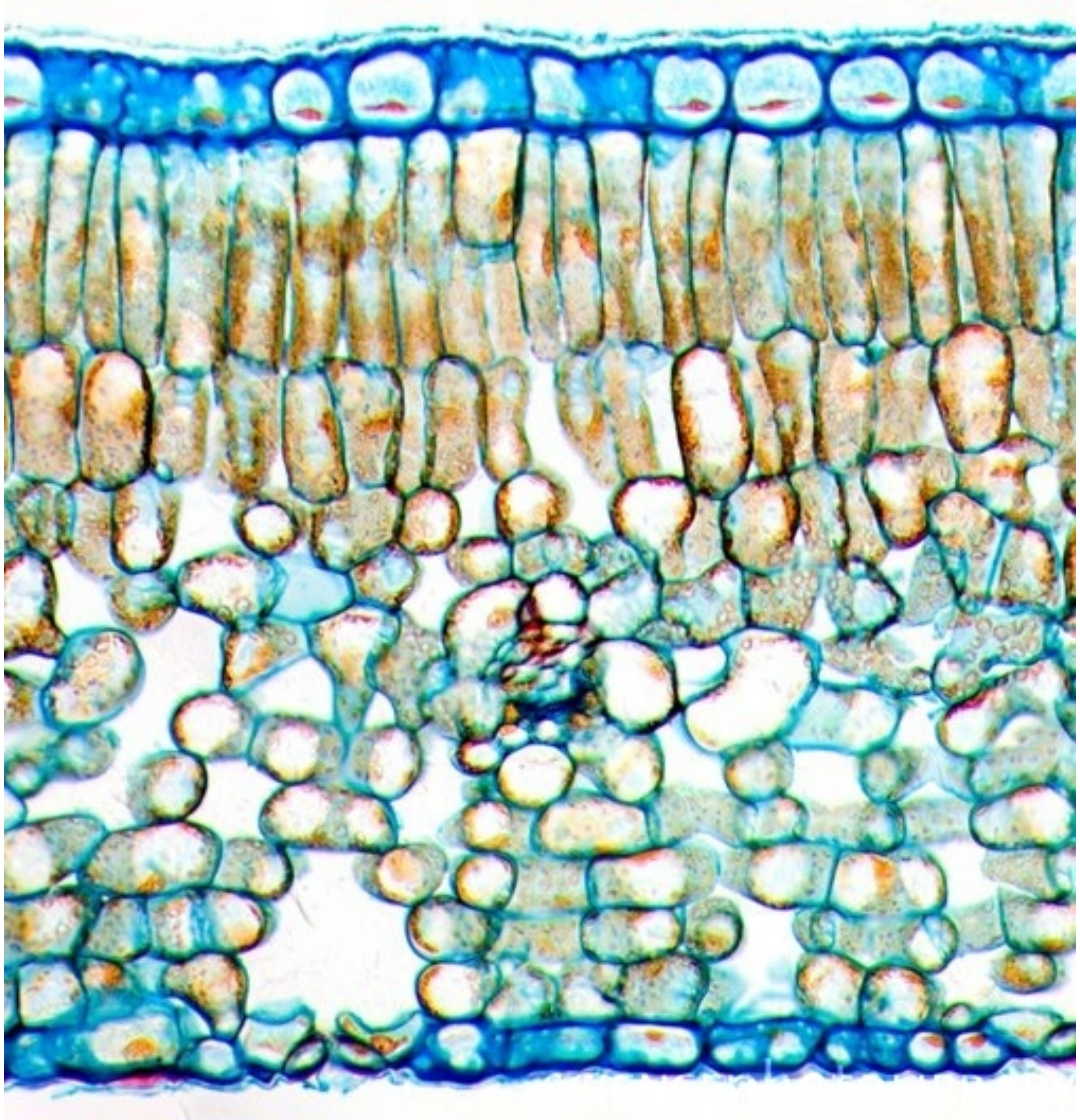
$$2\ H_2O \longrightarrow O_2 + 4H^+ + 4e^-$$



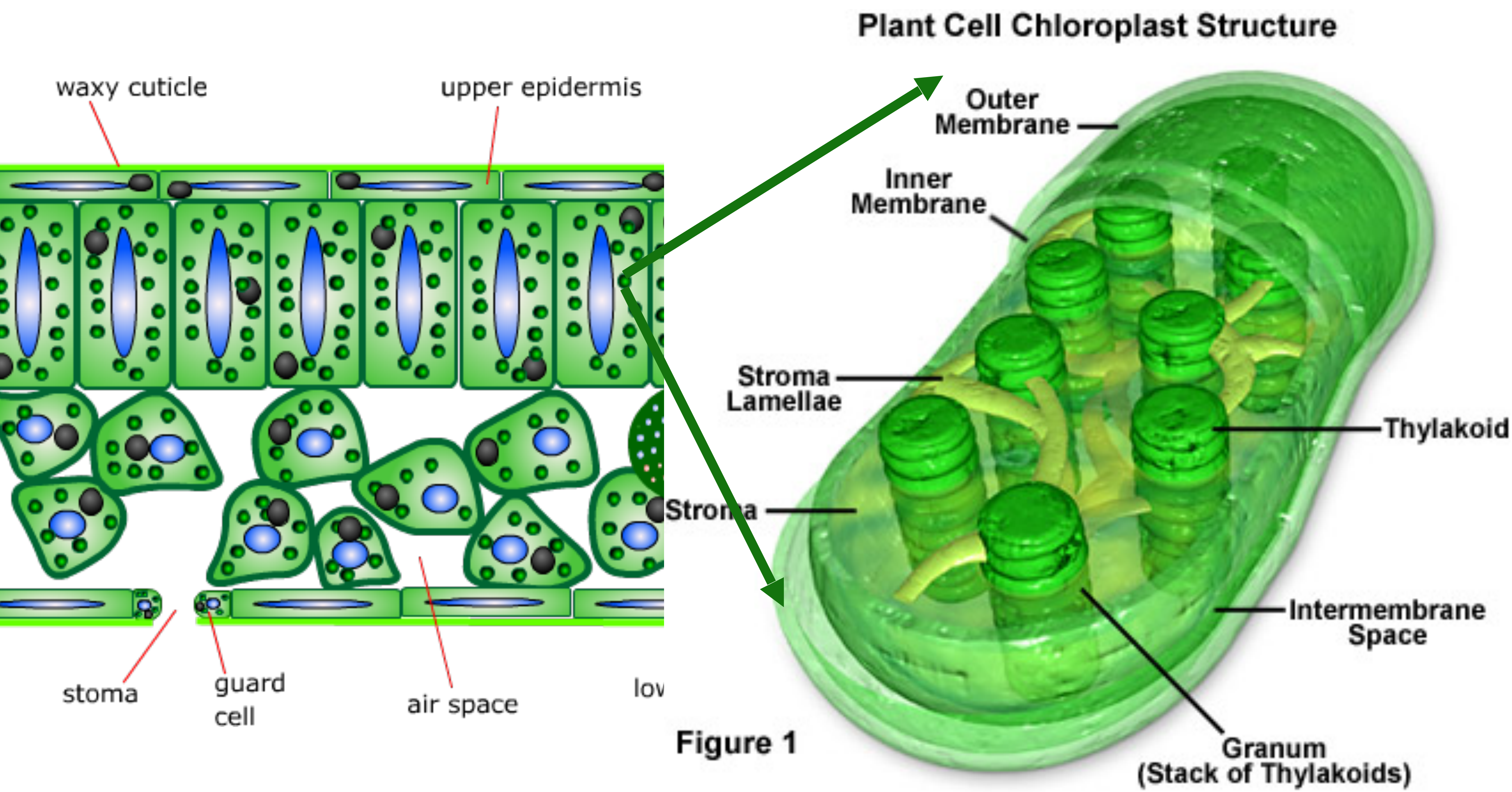
First Photosynthesis

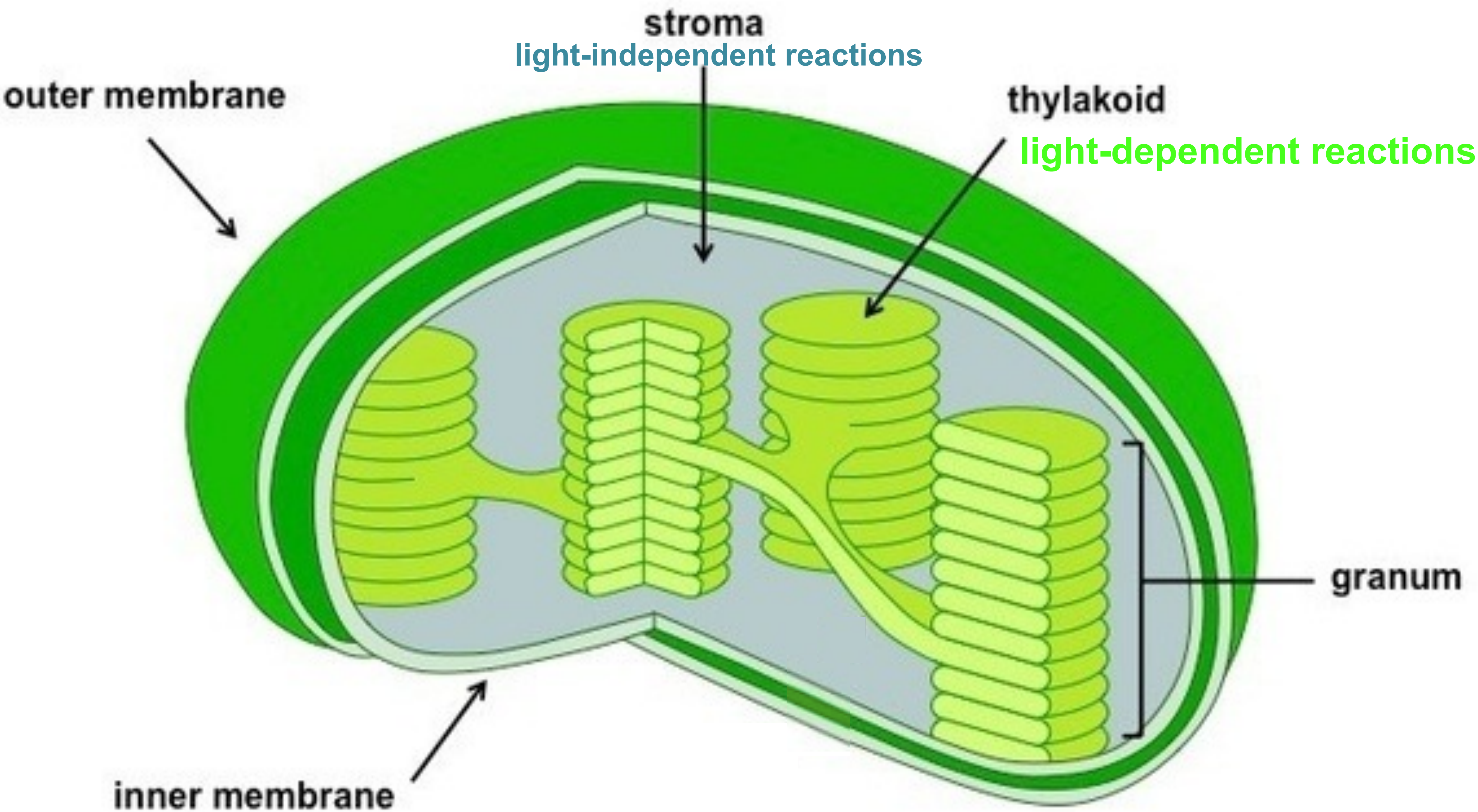
- occurring the earliest around 3.5 billion year ago
- progressed to the Great Oxygen Event ≈ 2.4 b.y.a. when the atmosphere became 2% O_2
- caused iron to oxide around the planet
- O2 rose to as high as 30% 750 m.y.a. (probably from the evolving algae and plants)

Cross-section of leaf

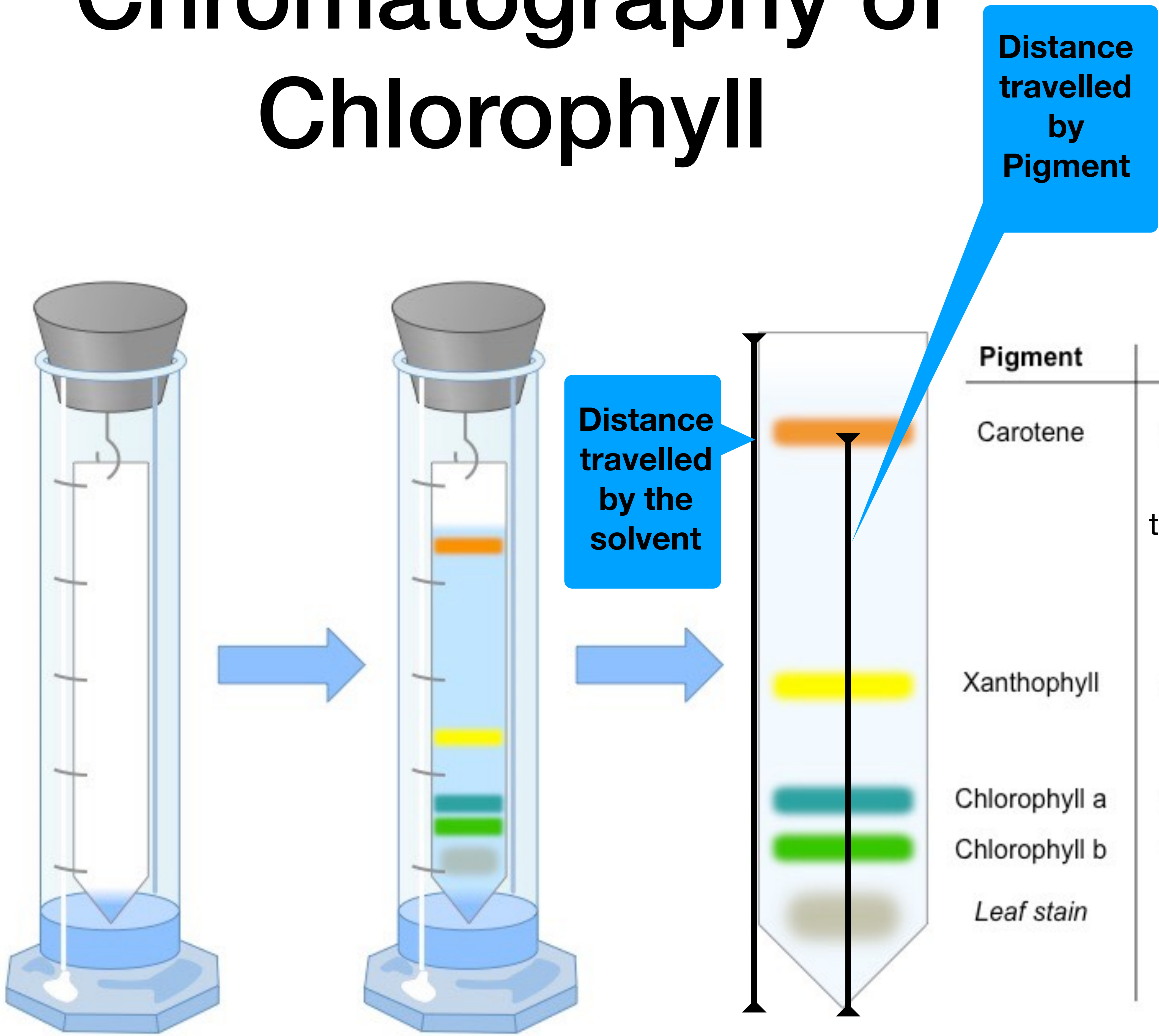


Chloroplasts




stroma
light-independent reactions
outer membrane
thylakoid
light-dependent reactions
granum
inner membrane

Chromatography of Chlorophyll



Pigment	Rf value
Carotene	0.95
Xanthophyll	0.71
Chlorophyll a	0.65
Chlorophyll b	0.45
Leaf stain	

$$= \frac{\text{distance of pigment}}{\text{total distance by solvent}}$$

Why do leaves change color in the Autumn?

Most of the spectacular colors of autumn have actually been in the leaves all summer, however they were “covered up” by the dominant green of the chlorophyl. As weather cools, and shorter days settle in, the chlorophyll begins to break down, revealing new and varied color pigments.The brightest colors are seen when late summer is dry, and autumn has bright sunny days and cool nights.

White Birch

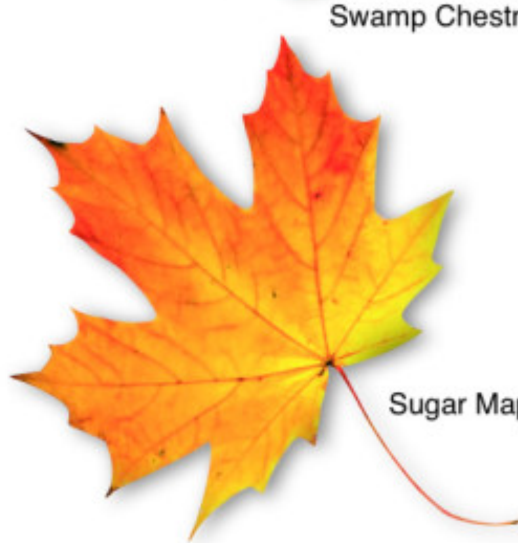
GREEN - Chlorophyl

Chlorophyll is responsible for helping trees and plants turn sunlight into food. For most months, it is the dominant color seen in most leaves until it fades away. As many trees shut down their food production, they turn to stored sugars to survive the winter.

Swamp Chestnut Oak

RED - Anthocyanin

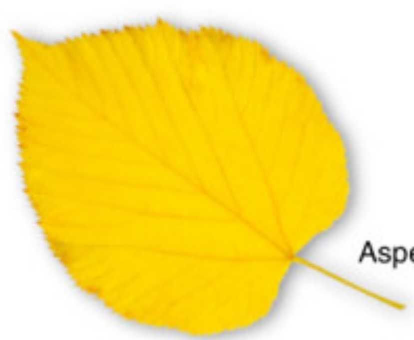
Unlike other leaf colors that always exist in the leaf, anthocyanins are produced as the chlorophyl is broken down. The anthocyanins are often seen in leaves named for their autumn splash of red including Red Maples, Scarlet Oaks, and Red Sumacs.



Sugar Maple

ORANGE - Carotene

Sugar Maples may be one of the best examples of carotene in action. Their bright signature orange fills many hills and country roads throughout the northern US. Sassafras leaves also turn a slightly more muted orange. As its name implies, Carotenes are also the chemical responsible for giving carrots their unique coloring.



Aspen

YELLOW - Xanthophyll

Xanthophyll can be seen throughout the fall in trees including beeches, ashes, birches, aspens, and some oaks. It also contributes its bright yellow color to autumn squash and corn.

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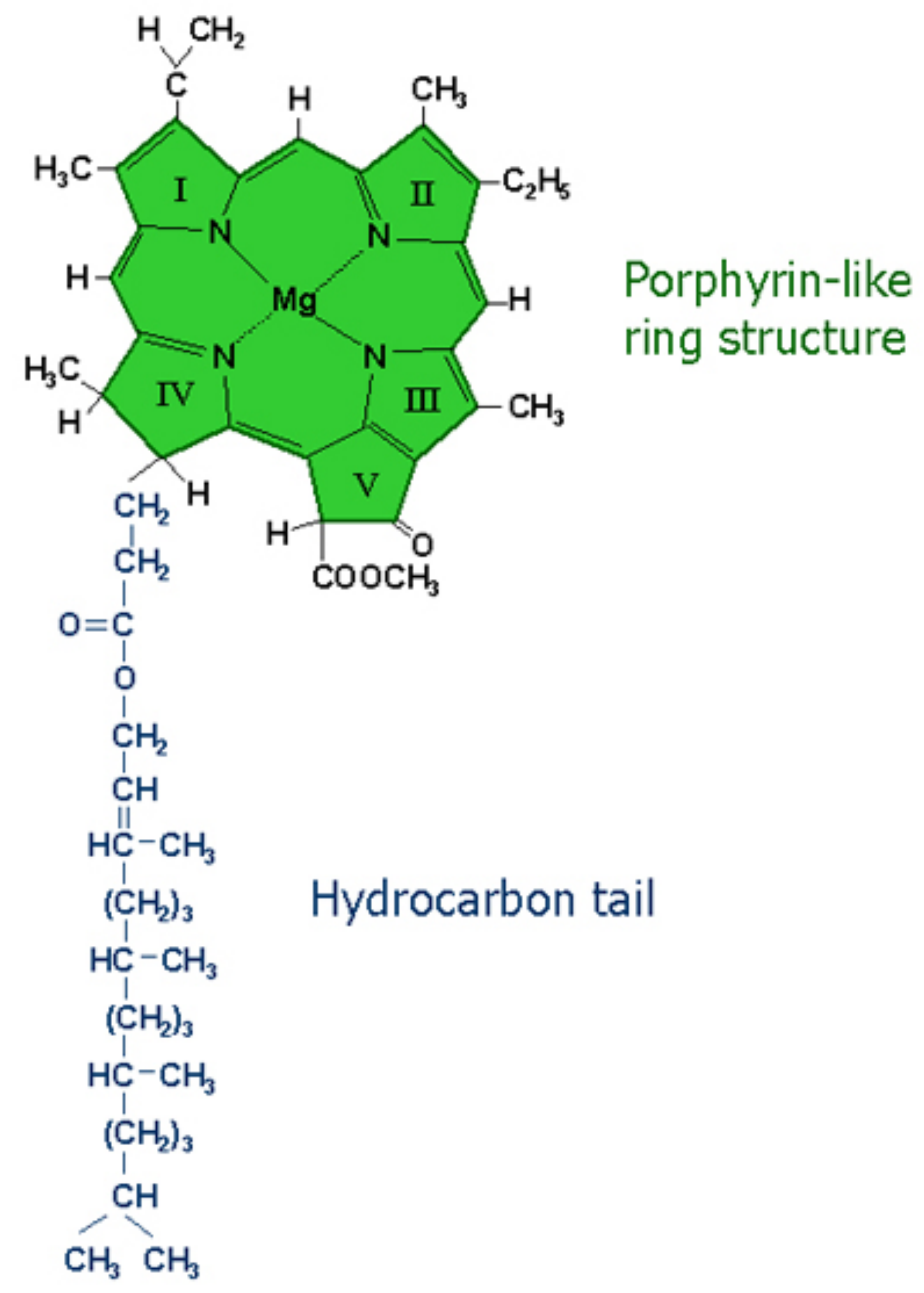
Chlorophyll

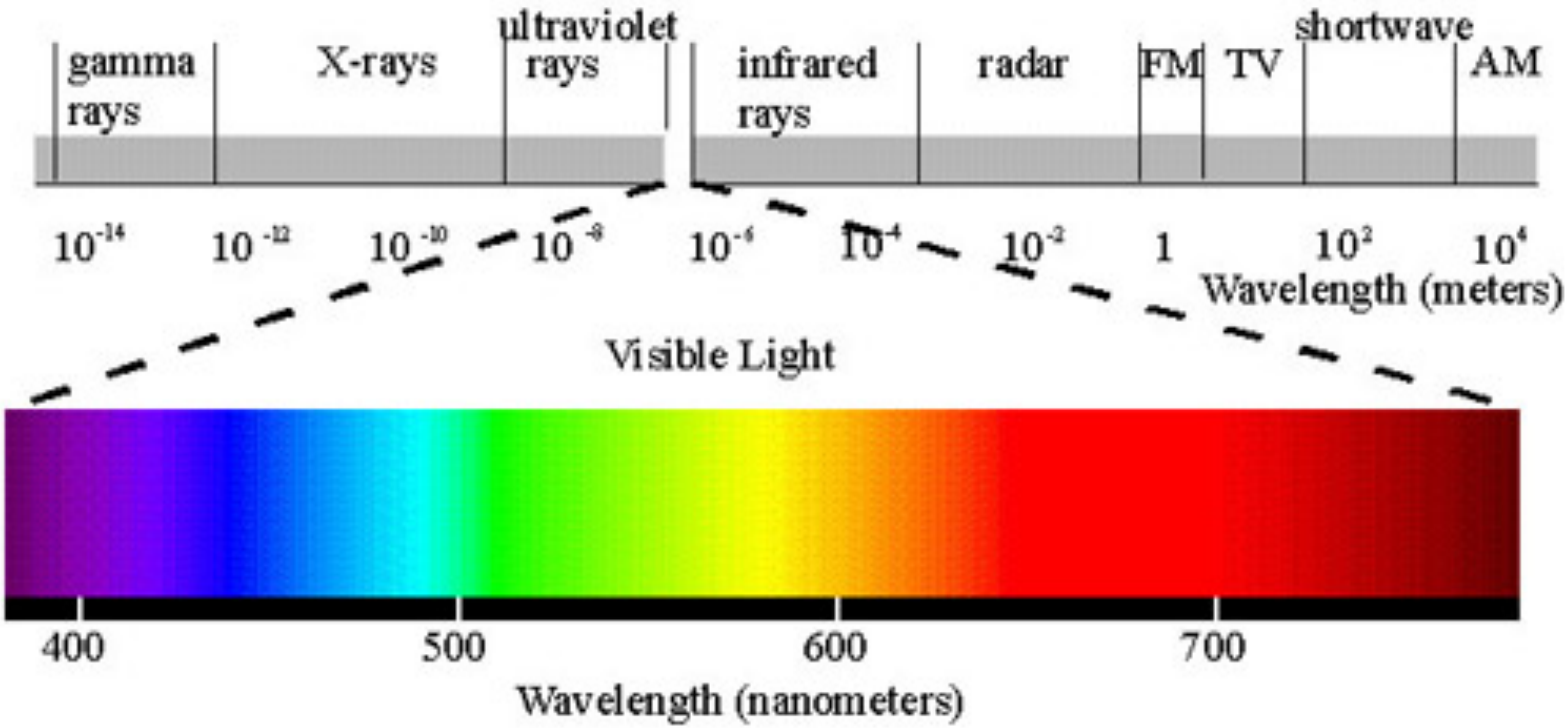
- all photosynthetic organisms contain **chlorophyll**
- chlorophyll *a* is the primary photosynthetic pigment
- it gives plants a green colour



Other Plant Pigments

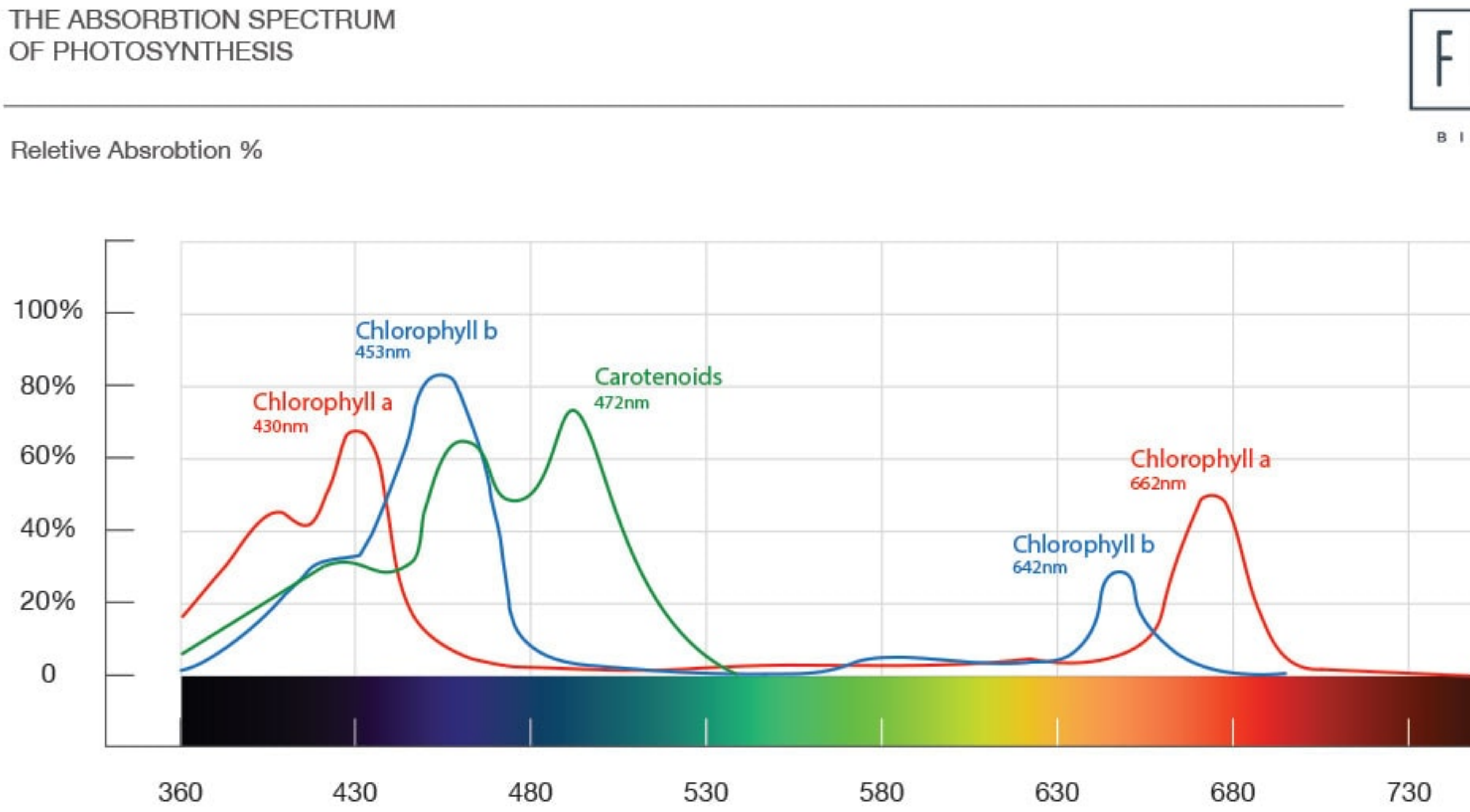
- absorb different wavelengths of light than chlorophyll *a* (light green)
- carotenoid (orange & yellow)
- chlorophyll *b* (green)

Electromagnetic Spectrum



Absorption Spectra

- A plot of Wavelength vs the Absorption of light (usually by % of light)

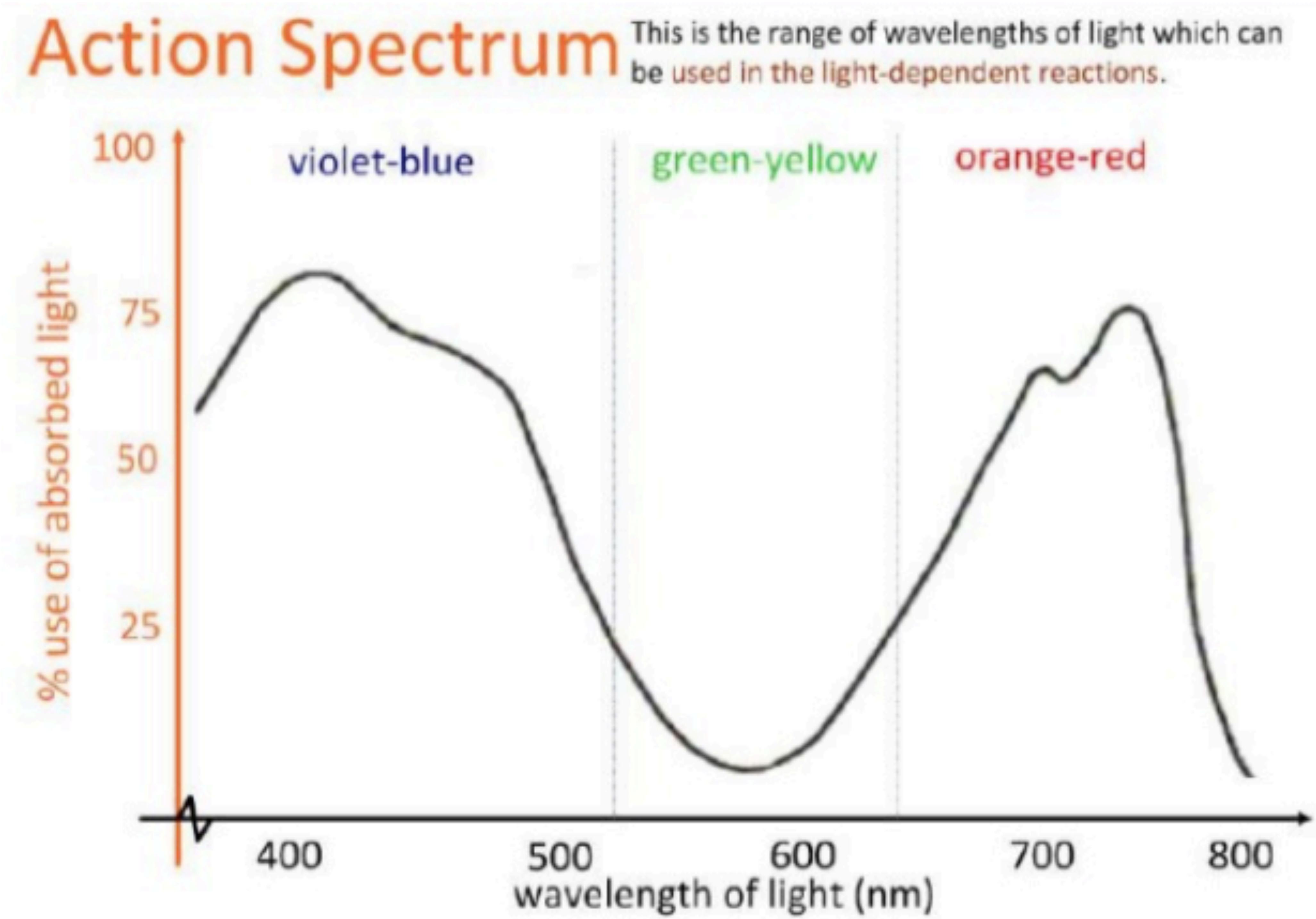


Absorption Spectra

- A plot of Wavelength vs the Absorption of light (usually by % of light)
- chlorophylls absorb mostly red and blue visible light (a and b chlorophyll)
- Green is not absorbed but instead reflects off to give chlorophyll is typical green colour

Action Spectra

» A plot of Wavelength vs the light used in photosynthesis



Action Spectra

» A plot of Wavelength vs the light used in photosynthesis

» Photosynthesis involves utilizing mostly blue light (largest peak) and red light a second peak (a and b chlorophyll)

» Green is less effective (some used) even though little is absorbed

Fall Plant Pigments

Assignment

Complete Your Test Review.