

# Plant Physiology (PLB416): Photosynthesis Module

Microteaching (Collaborative Learning)

Luke Gregory

November 17<sup>th</sup>, 2023

## Learning Question:

**How do plants manage changes in light to maintain photosynthetic performance in dynamic environmental conditions?**

## Learning Objective(s):

- You will gain a foundational knowledge on the current photosynthetic membrane model.
- Describe how dynamic environmental conditions can influence the light reactions of photosynthesis.

## Learning Question:

How do higher plants manage photon fluxes to maintain photosynthetic performance in dynamic environmental conditions?

## Learning Objective(s):

- You will gain a foundational knowledge on the current photosynthetic membrane model.
- Understand how dynamic environmental conditions can influence the photosynthesis.

### Collaborative Learning Activity:

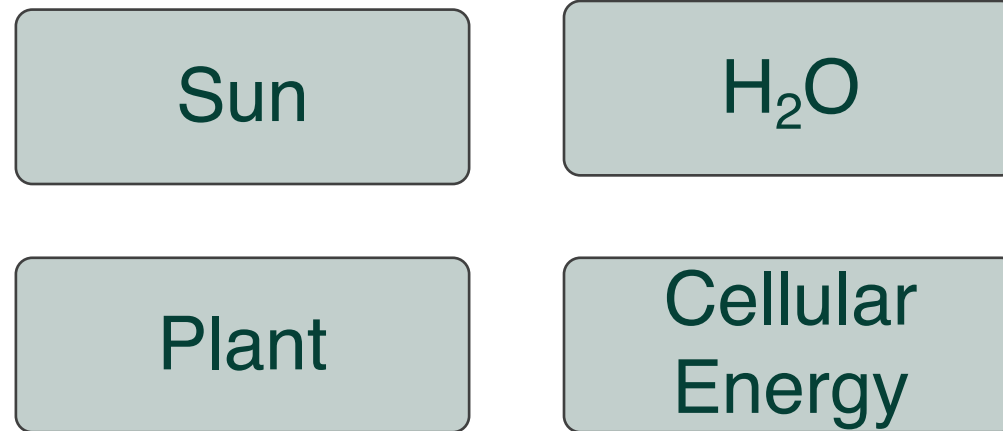
Get into your groups and construct a box and arrow model of what you think a hypothetical photosynthetic membrane should look like?

### Learning Objective(s):

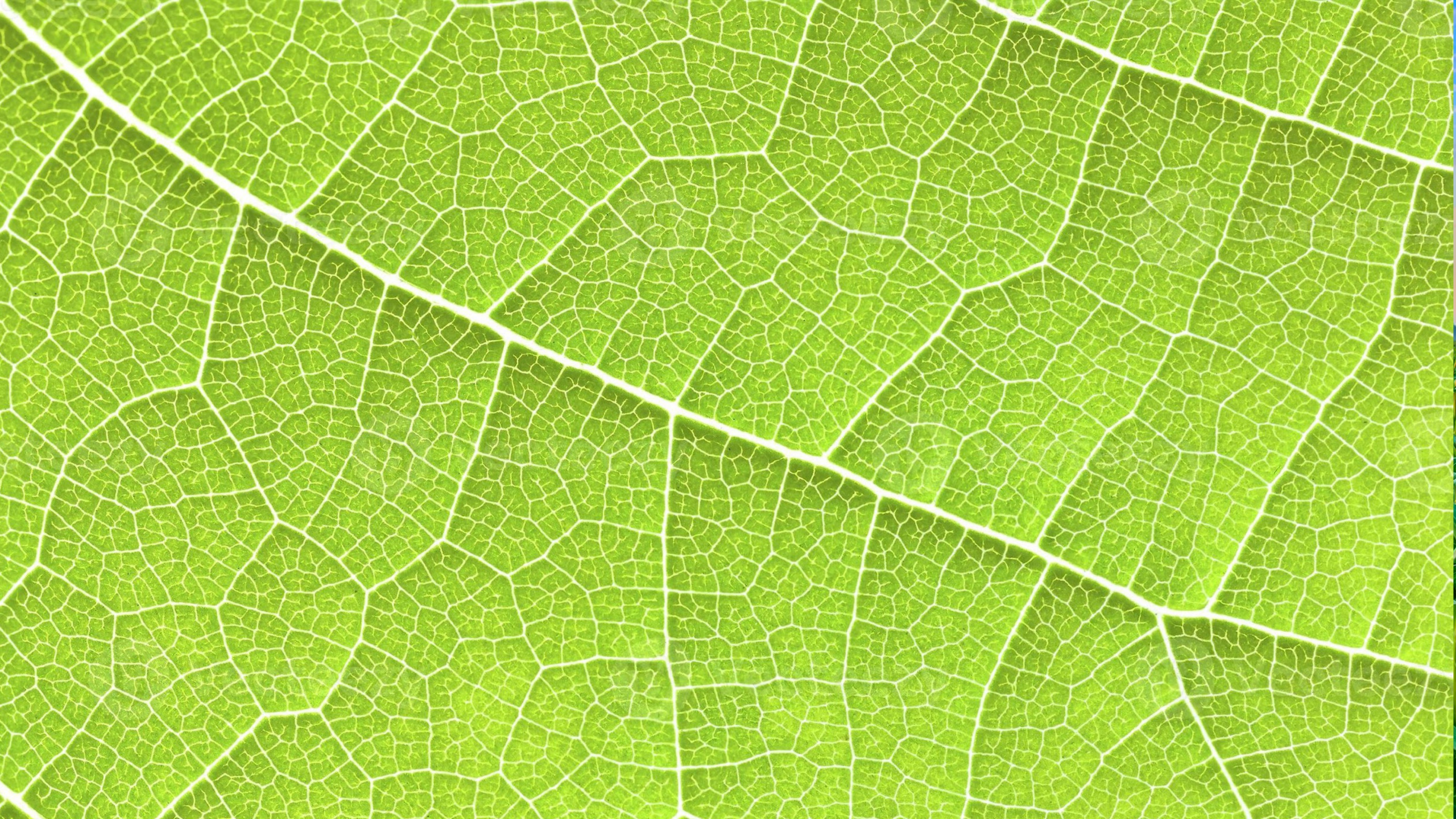
- You will gain a foundational knowledge on the current photosynthetic membrane model.



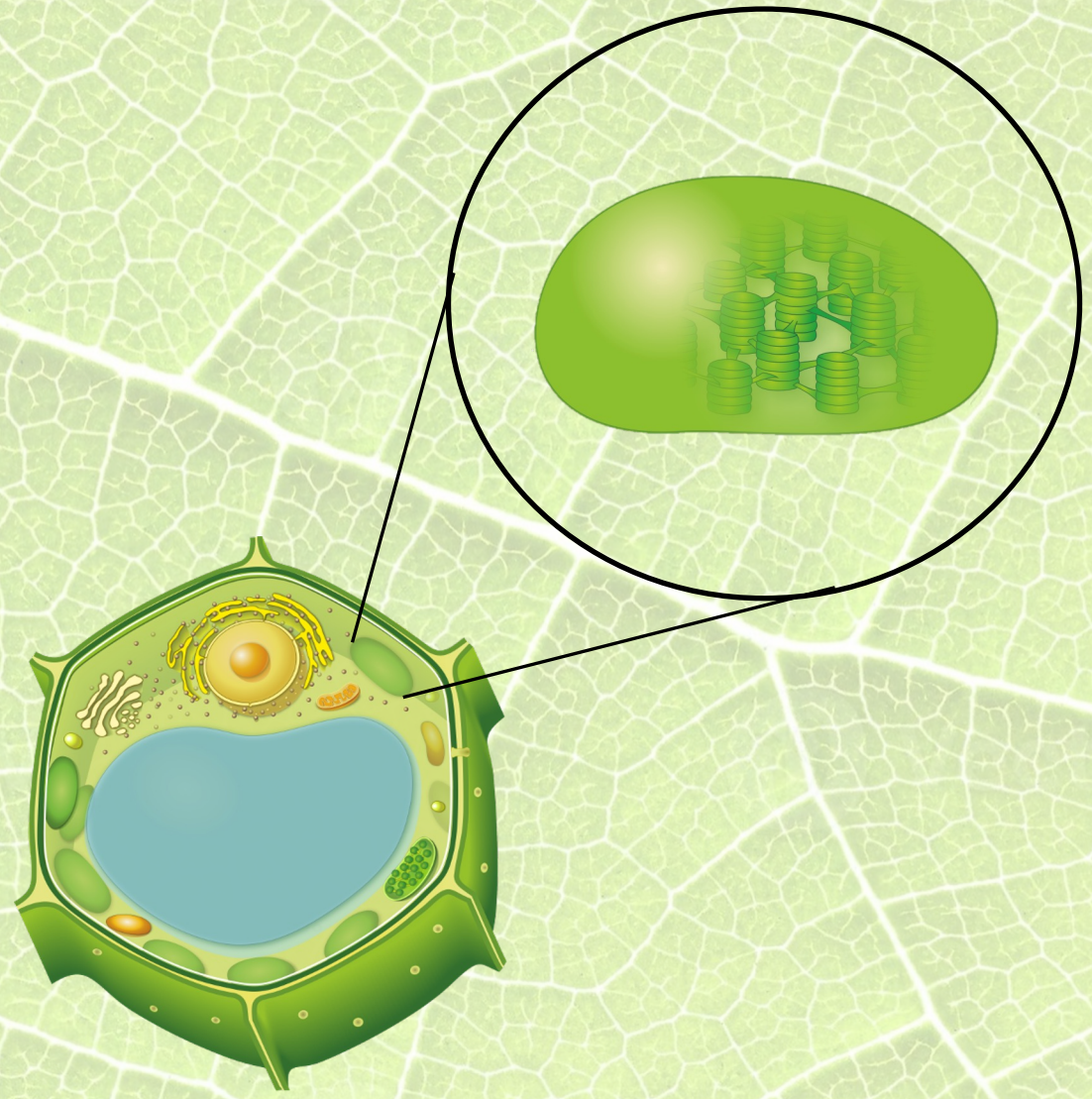
# Box and Arrow



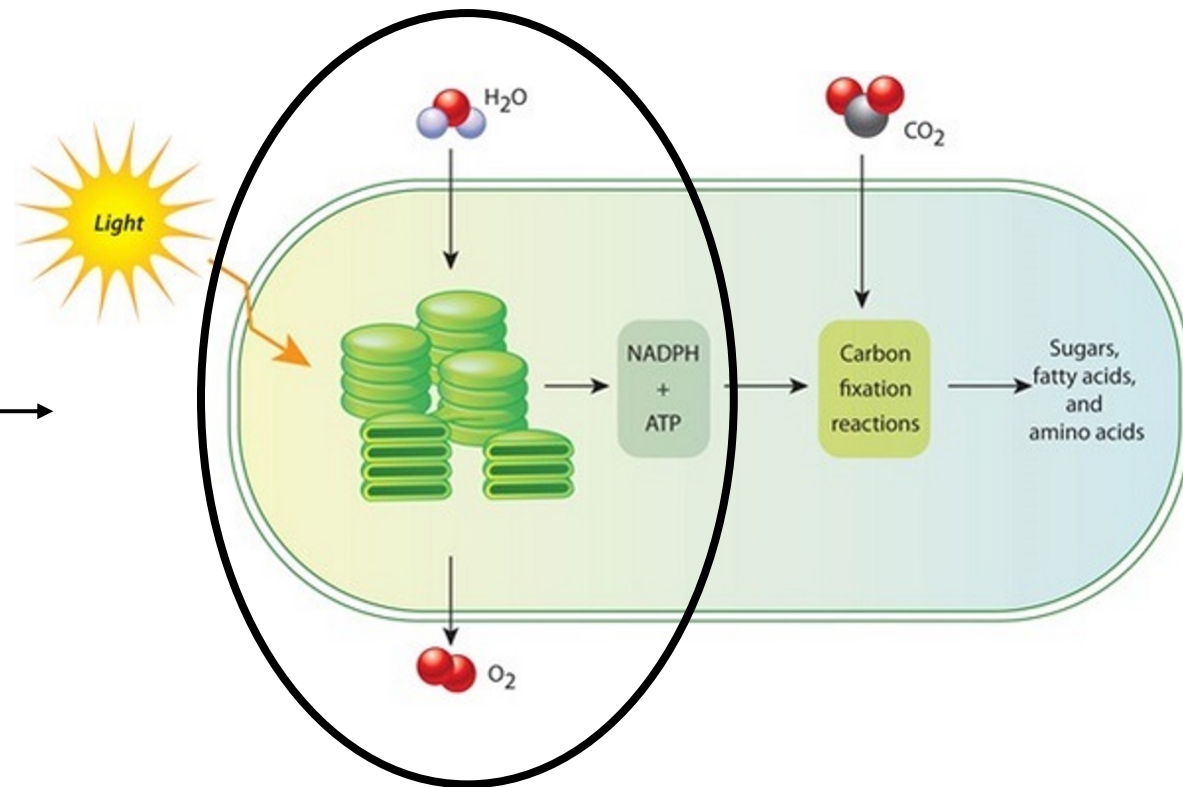
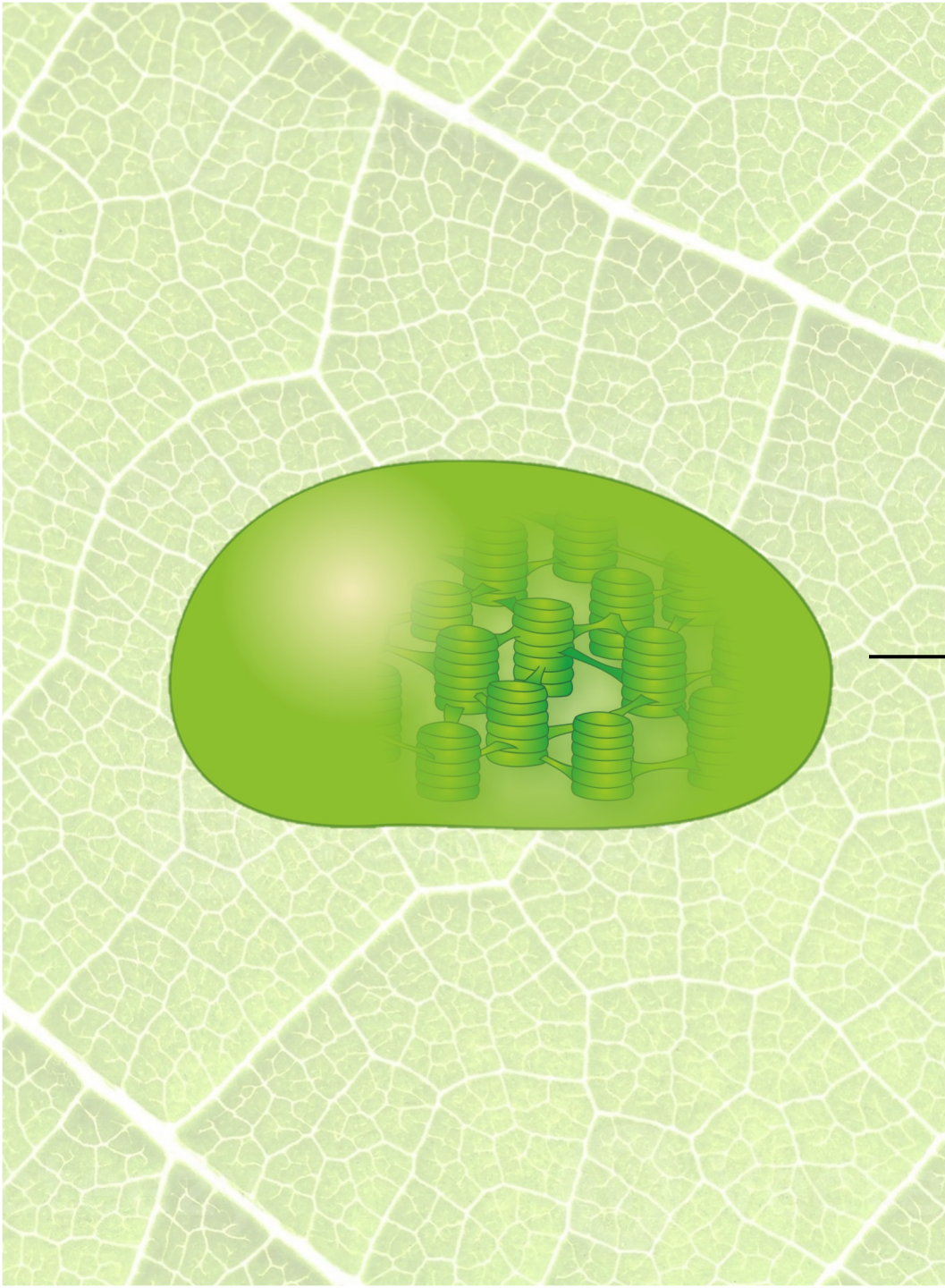




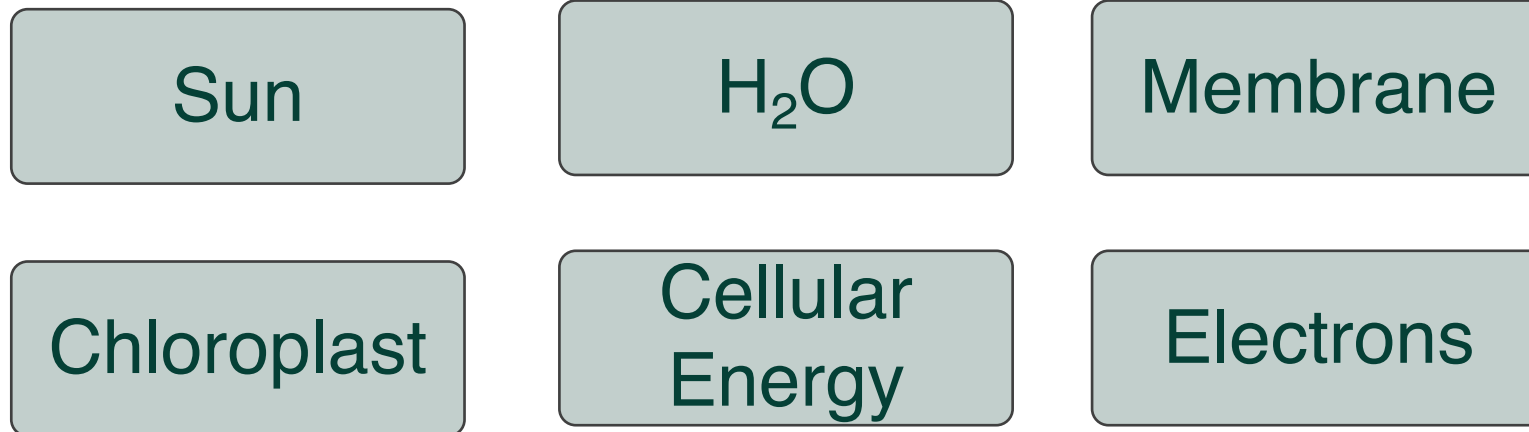






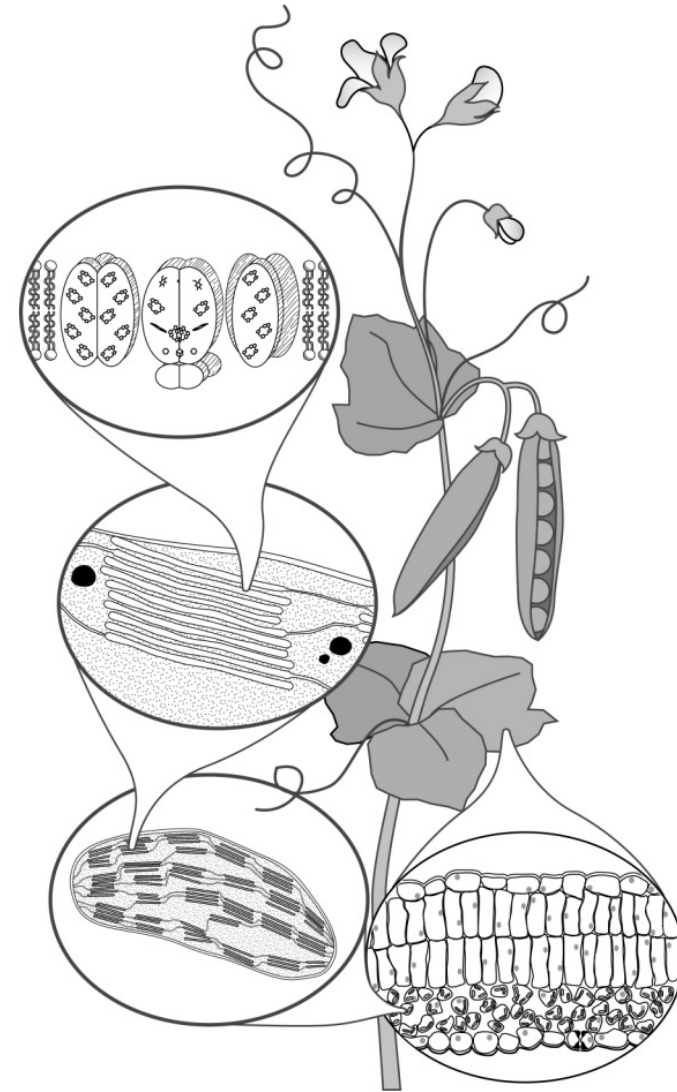


## Box and Arrow; more complex

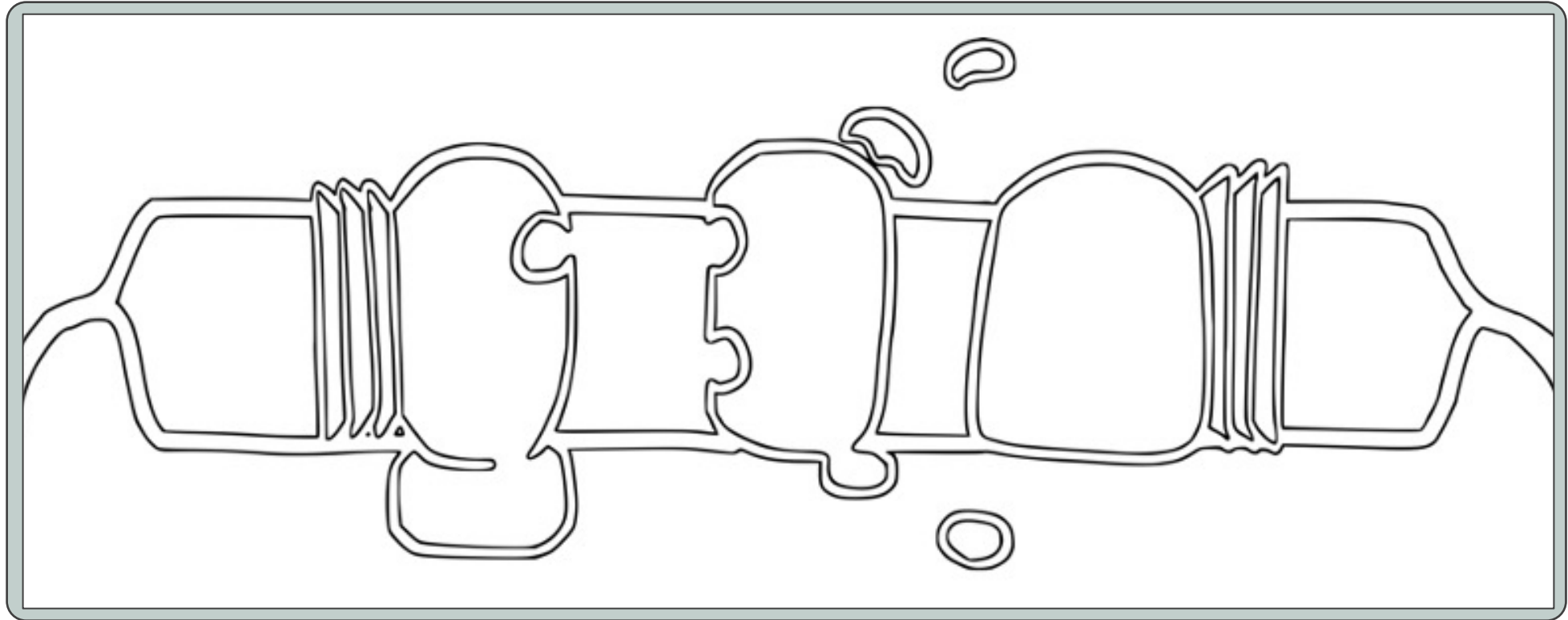


# From the Leaf to the Thylakoid

**Figure 1.2** Exploding diagram of the photosynthetic apparatus of a typical higher plant. The first expansion bubble shows a cross-section of a leaf, with the different types of cells; the dark spots are the chloroplasts. The second bubble is a chloroplast; the thylakoid membranes are the dark lines, the stroma is the stippled area. The third bubble shows a grana stack of thylakoids. The fourth bubble shows a schematic picture of the molecular structure of the thylakoid membrane, with a reaction center flanked by antenna complexes. Figure courtesy of Aileen Taguchi.

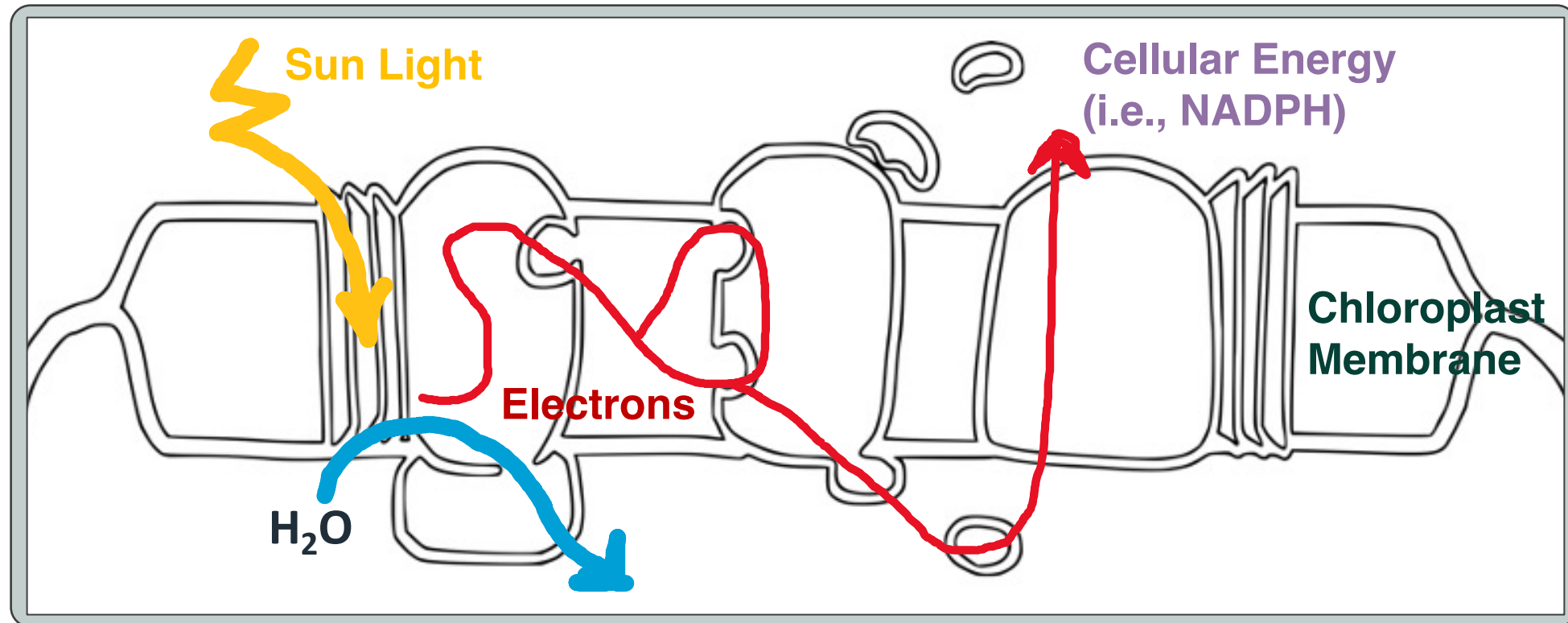


Using this diagram, can you fill in your groups box and arrow model?





Using this diagram, can you fill in your groups box and arrow model?

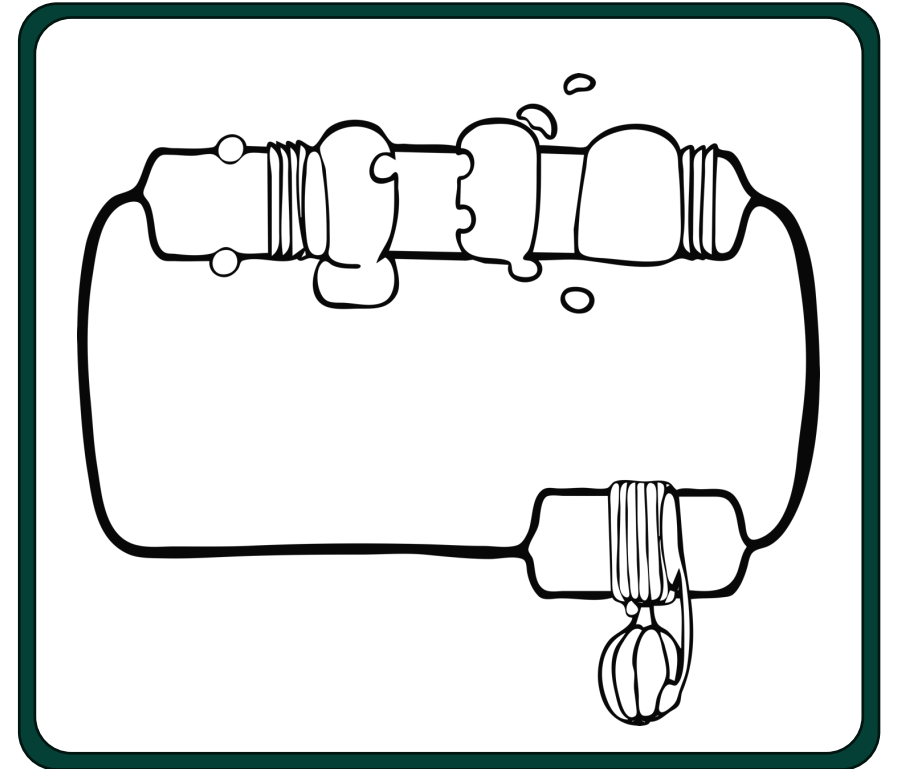




# We just created an accurate model for Linear Electron Flow

...the light energy that is captured drives the extraction of electrons from water and transfers them to NADPH (i.e., cellular energy), which is called linear electron flow.

... linear electron flow is related to the rate of electron transported through photosynthetic membranes.



Next class: Create a model that describes the relationship between Linear Electron Flow and light intensity in a leaf tissue?

