

Chapter 8-2

Photosynthesis



Research into **PHOTOSYNTHESIS**
began centuries ago with this
simple question:



When a tiny seed grows into a tree, where does all the “new plant” come from?

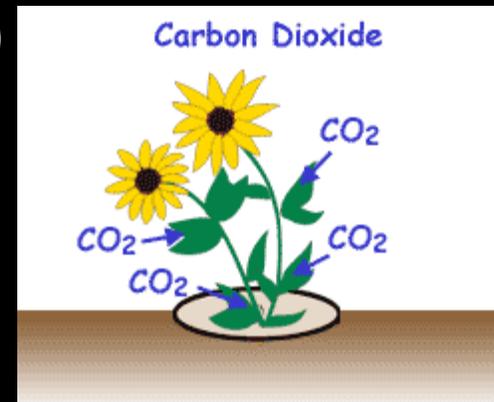
I. Experiments 1643-1948

A. VanHelmont-1643

1. Wondered what made up the mass of a tree- because the only thing he added was water.

2. He did not take in account for carbs(glucose) produced during photosynthesis.

3. Van Helmont didn't realize the major contribution to the mass of his tree was something he couldn't see...

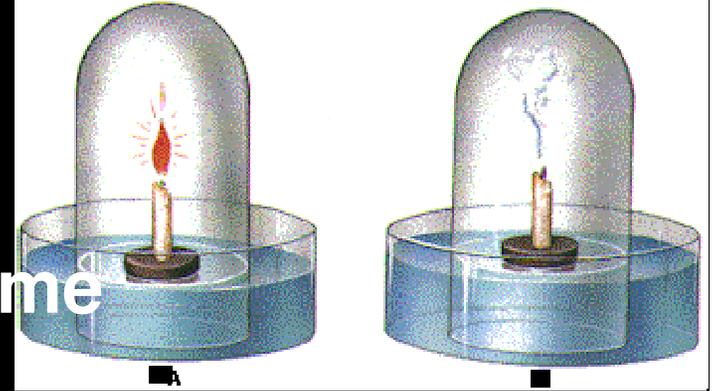


carbon dioxide from the air.

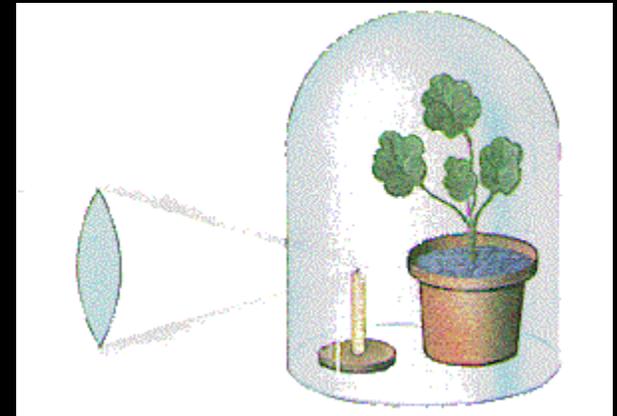
4. Plants use water and carbon dioxide to make Carbohydrates

B. Priestly-1771

1. Lit a candle- put jar over it – flame goes out



2. If he placed a live plant in the jar and allowed a few days to pass, the candle would stay lit.



3. The plant produced something “required for burning” that the candle used up

4. We now know it was ... OXYGEN

C. Ingenhaus-1779

1. Showed that the effect that Priestly observed occurred only when plant is exposed to light.

2. Determined that plants need light to produce oxygen



D.THE BIG PICTURE

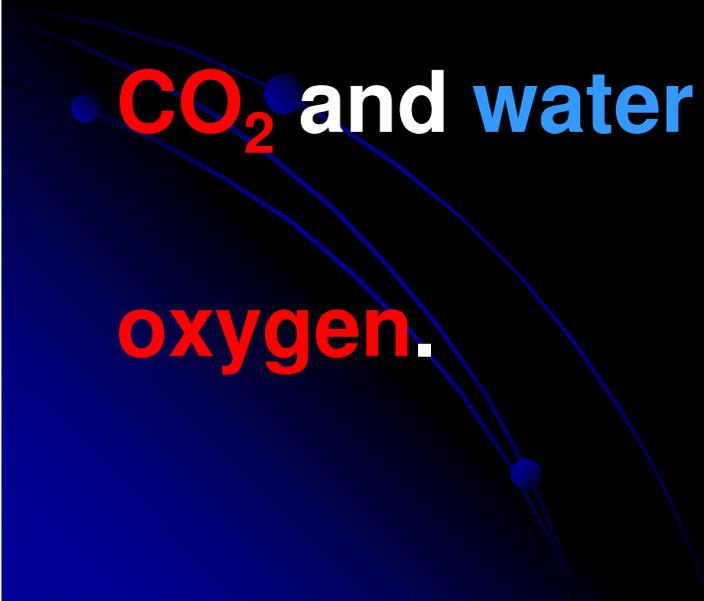
1. These experiments led to work by later

scientists who finally discovered that in

the presence of **light**, **plants** transform

CO₂ and **water** into **glucose** and release

oxygen.



E. Mayer – 1845

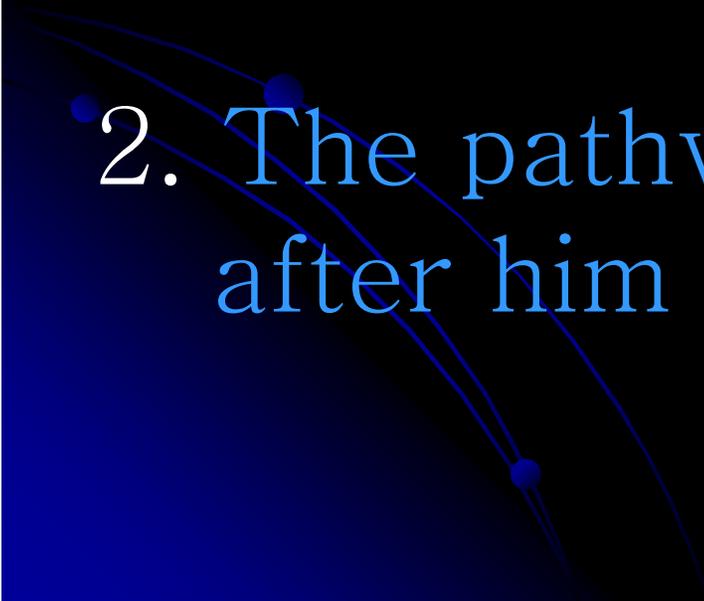
1. Determined that plants convert light energy (usually from sun) to chemical energy (glucose)



F. Calvin – 1948

1. Determined the biochemical pathway that Carbon follows to form glucose.

2. The pathway (cycle) is named after him (Calvin Cycle).



II. Photosynthesis Equation

A. PS uses (reactants): BEFORE THE ARROW

1. **Water**
2. **Carbon Dioxide (thanks to us) ☺**

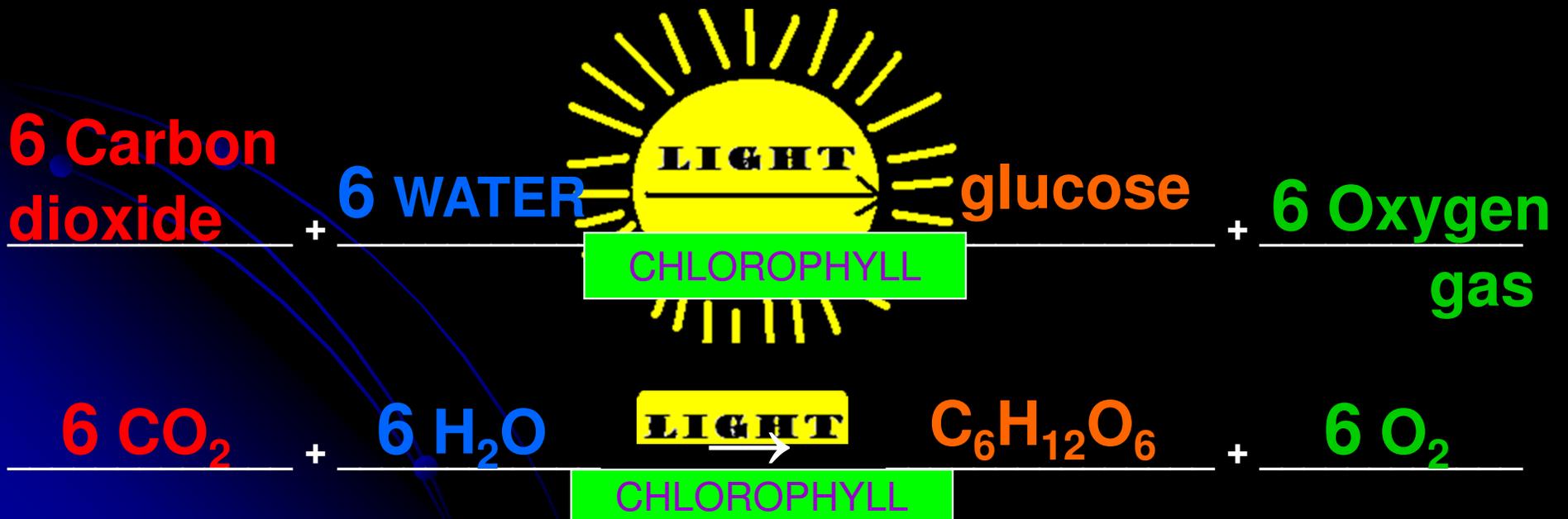
B. In the presence of: WITH THE ARROW

1. **Sunlight**
2. **Chlorophyll**

C. PS makes (products): AFTER THE ARROW

1. **Glucose (for cell)**
2. **Oxygen (given off as waste) lucky us ☺**

C. THE EQUATION THAT YOU NEED TO KNOW!!!!!!!!!!!!!!



D. In addition to **water** and **carbon dioxide**,

<http://fig.cox.miami.edu/~cmallery/255/255phts/255phts.htm>

chlorophyll



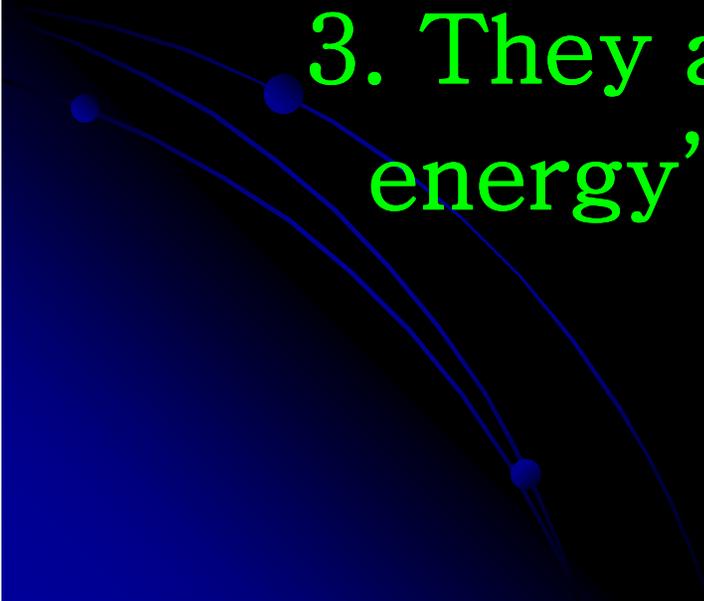
and

light energy



are needed for **photosynthesis** to happen.

III. Pigments and Reactions

- A. Chlorophyll- is a green pigment
1. Traps the E from sunlight
 2. Transfers the E to the e⁻
(electrons) in chlorophyll
 3. They are now called “ high energy” e⁻'s
- 

Photosynthesis involves a complex series of chemical reactions, in which the product of one reaction is the reactant for the next reaction.

Reaction 1 → Product X → Reaction 2 → Product Y

A series of reactions linked in this way is referred to as a biochemical pathway