Erasmus+
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ALIVE

# Photosynthesis

World of plants

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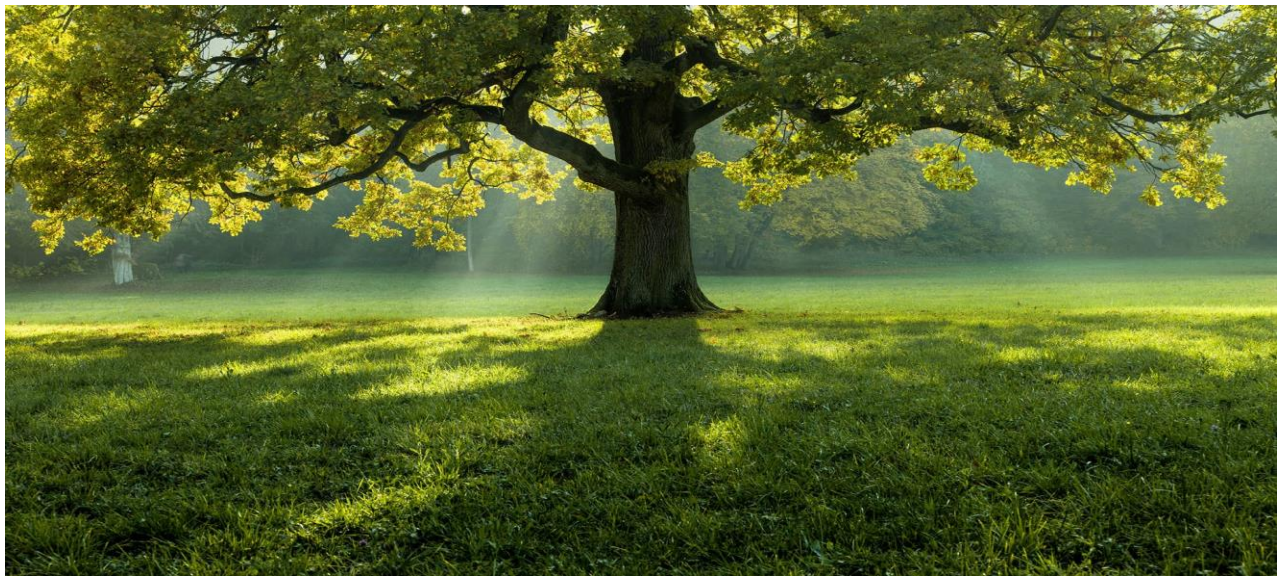
# WHAT MAKES PLANTS SPECIAL?

- most green plants undergo a process that does not occur in any other organisms (microorganisms, fungi, animals, humans)
- we call this process photosynthesis



# PHOTOSYNTHESIS

- It comes from Greek, where the prefix fotos = light and synthesis = binding
- Photosynthesis consists in binding solar energy and converting it into the energy of chemical bonds (an organic compound is formed)

# PHOTOSYNTHESIS

- This process consists in the fact that green plants take in carbon dioxide from the air and release oxygen into the atmosphere in the presence of light.
- This process produces sugar, which we call GLUCOSE = $C_6H_{12}O_6$.
- Energy is used to create

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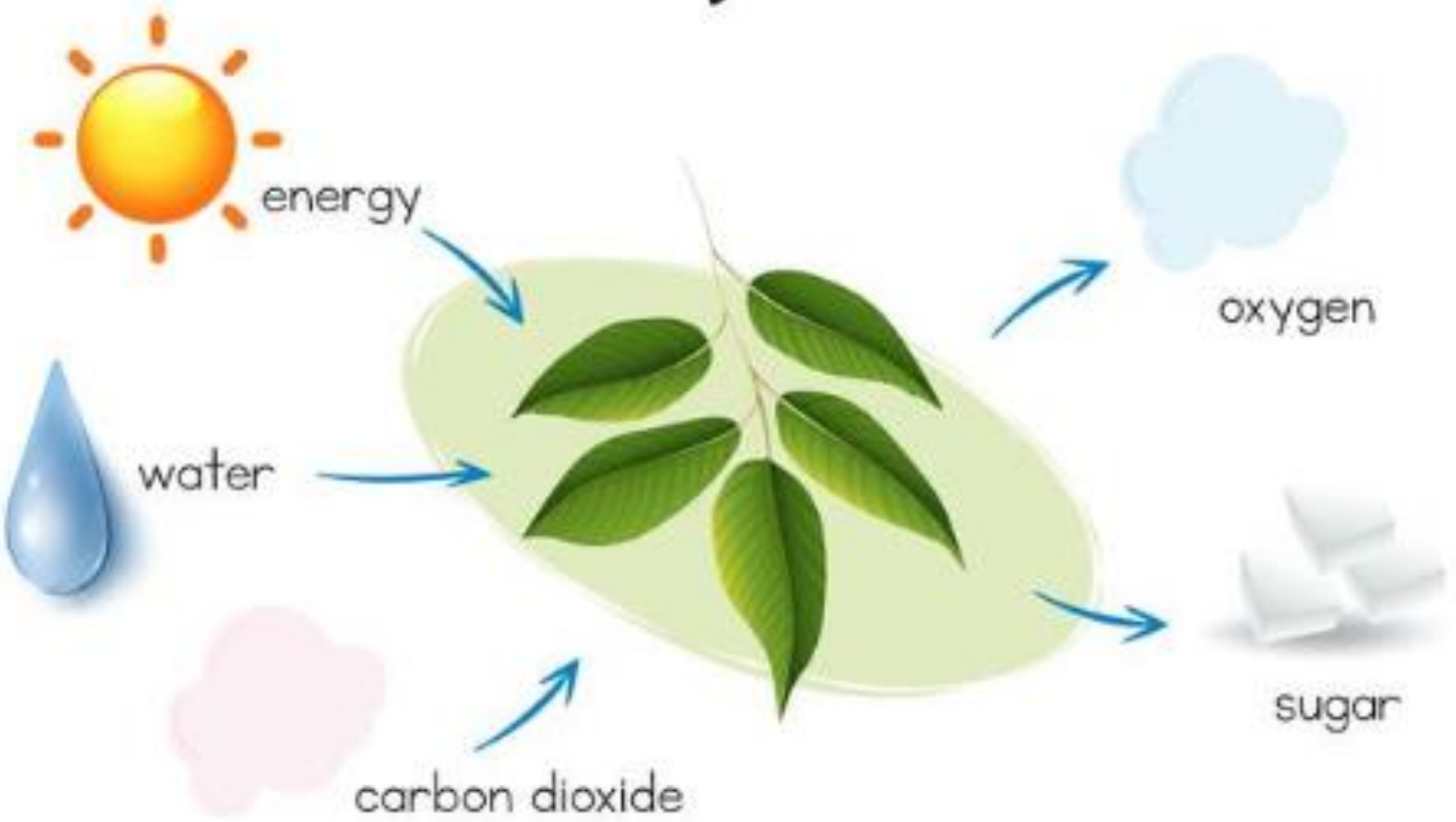
# Photosynthesis

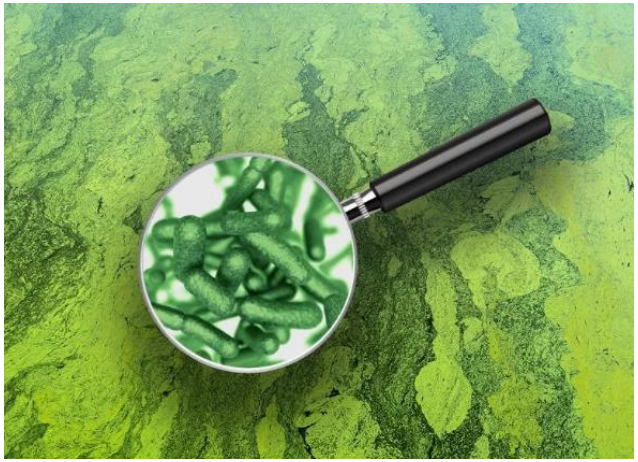


# PHOTOSYNTHESIS

= conversion of simple inorganic substances (water and carbon dioxide) into more complex organic compounds (sugar = glucose) with simultaneous release of oxygen.

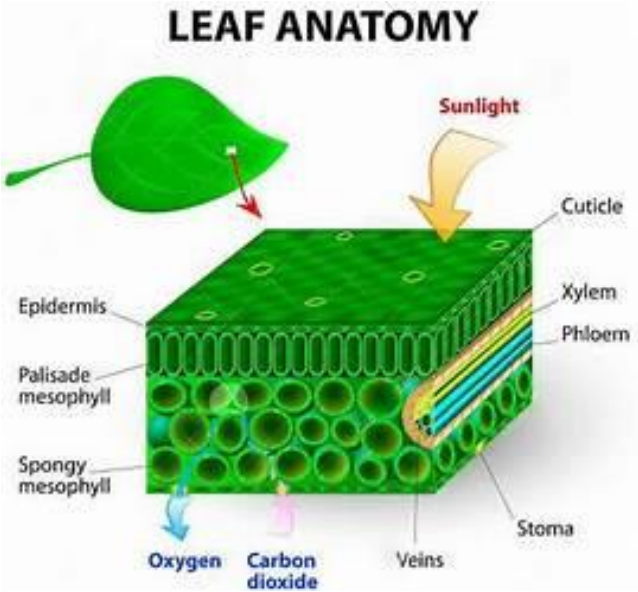
# PHOTOSYNTHESIS TAKES PLACE IN

- All autotrophic (photoautotrophic) organisms
- Green plants, algae, cyanobacteria



# WHERE DOES PHOTHOSYNTHESIS TAKES PLACE

- The main plant organ of photosynthesis is the GREEN LEAF




# WHAT DOES PHOTOSYNTHESIS TAKES PLACE

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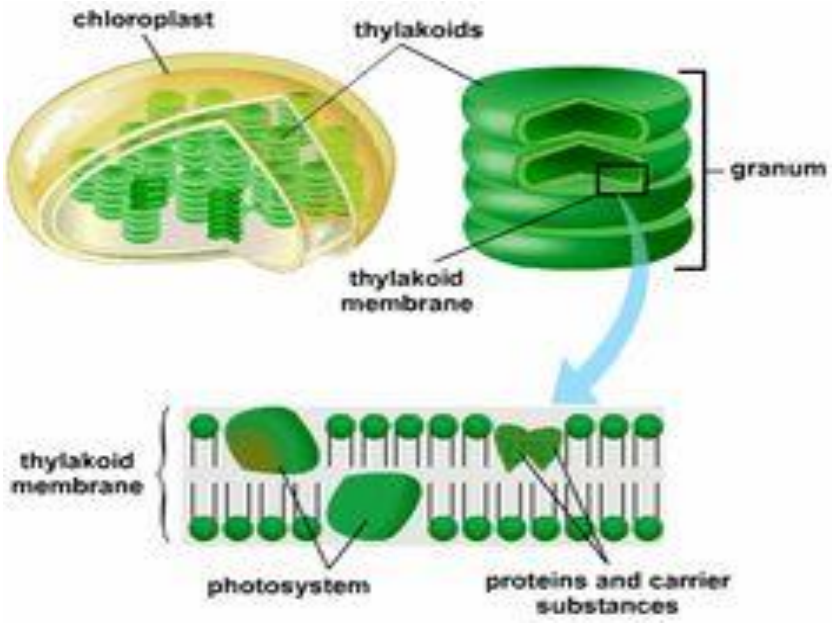
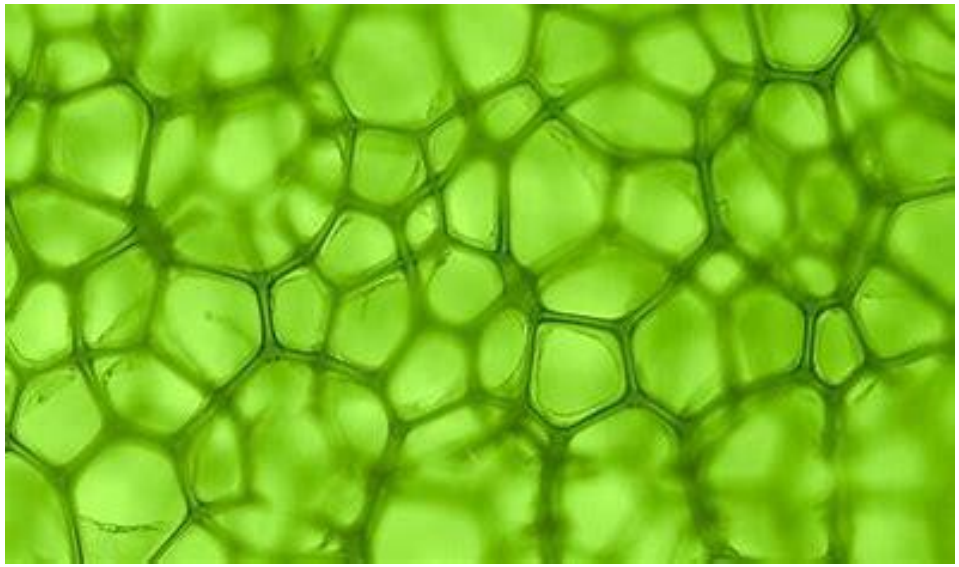
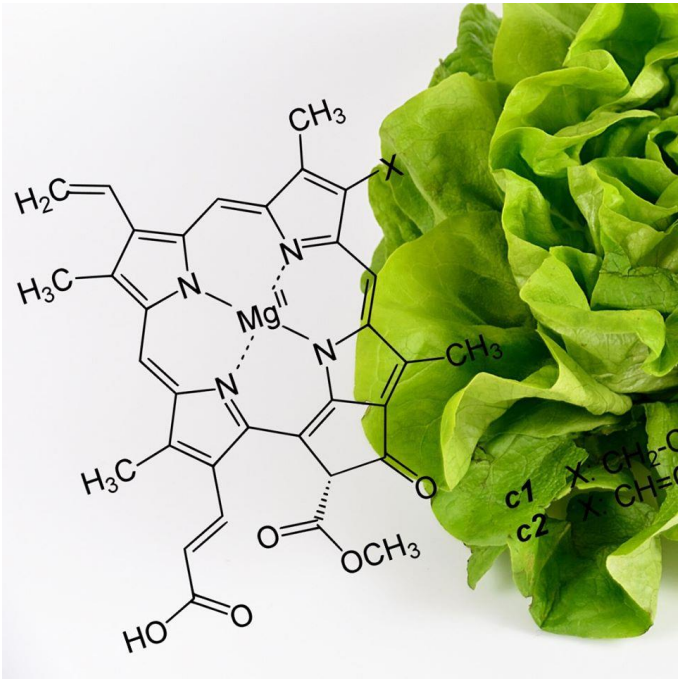
- Another factor without which photosynthesis could not take place are chloroplasts - the entire reaction takes place in them



# WHAT DOES PHOTOSYNTHESIS TAKES PLACE

- Assimilatory dyes are also necessary = pigments stored in chloroplasts
- we call them chlorophylls





# WHICH IS NECESSARY FOR PHOTOSYNTHESIS?

- Since plants draw energy for photosynthesis from the sun, the presence of visible light (400-700 nm) is essential
- CO2 is needed, which they bind and reduce
- Water - participates in the synthesis of glucose
- coenzymes

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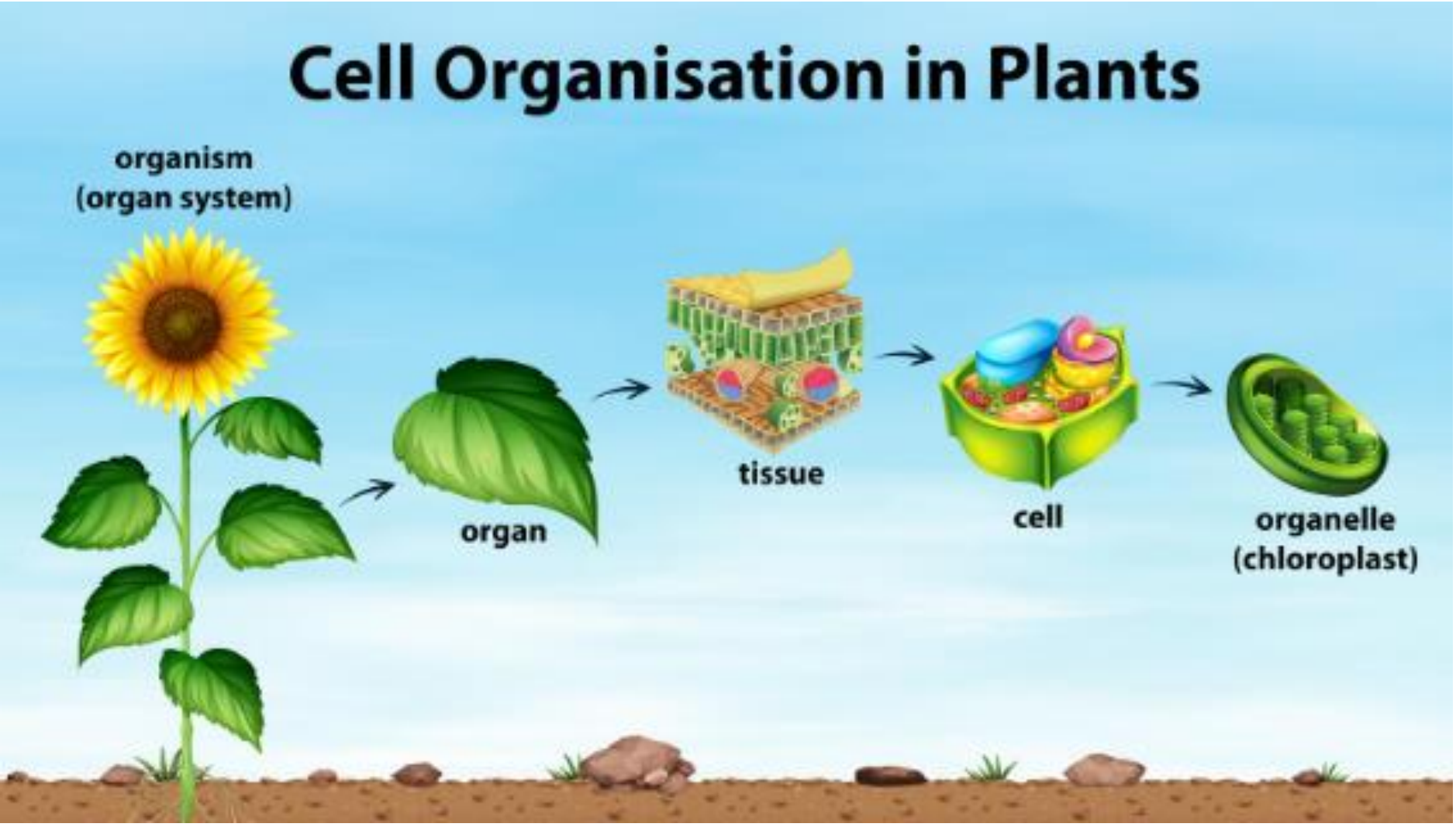
Cell Organisation in Plants
organism
(organ system)
organ
tissue
cell
organelle
(chloroplast)

# HOW IS $CO_2$ CONVERTED TO $O_2$?

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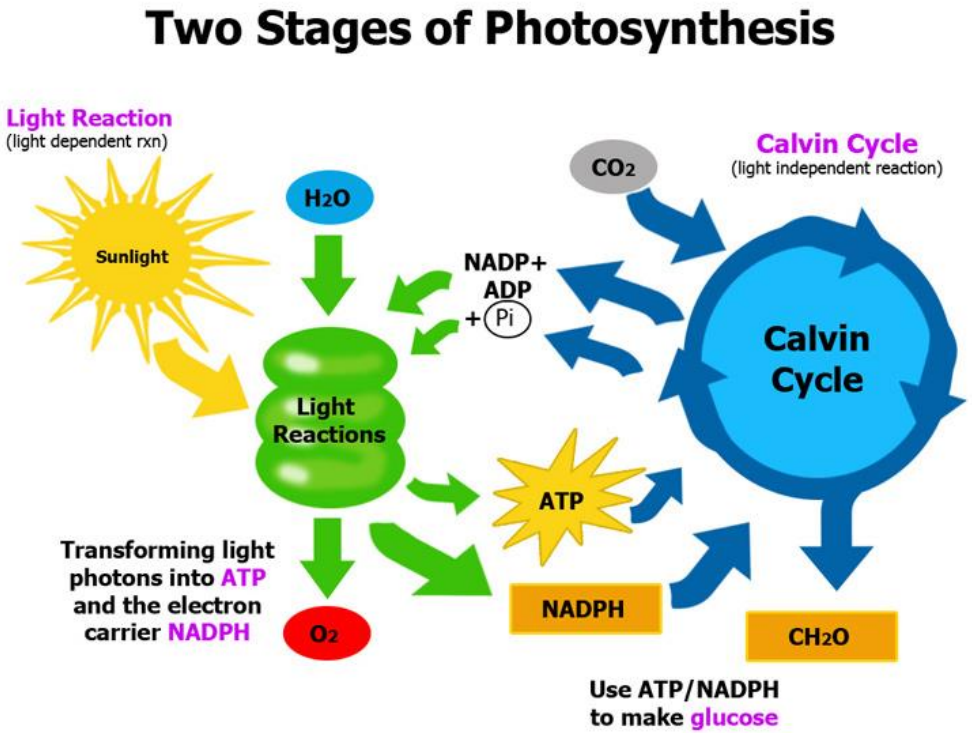
- Photosynthesis consists of 2 consecutive and subsequent phases:
  - Primary phase (light)
  - Secondary phase (dark or synthetic phase)



# THE PRIMARY PHASE OF PHOTOSYNTHESIS

- During it, solar energy is absorbed and transformed
- The condition is the presence of sunlight - that's why it's called the light phase
- This phase takes place in the thylakoids = structure in the chloroplast
- Light energy is transformed into the energy of chemical bonds – this energy is used in the secondary phase

# SECONDARY PHASE OF PHOTOSYNTHESIS

- Carbon dioxide is fixed and reduced to form glucose
- It uses energy from the primary phase - therefore it is not directly dependent on solar energy and is referred to as the dark phase
- It takes place in the stroma of chloroplasts
- The result is an organic compound = glucose and $O_2$ is released

# PHOTOSYNTHESIS PHASE

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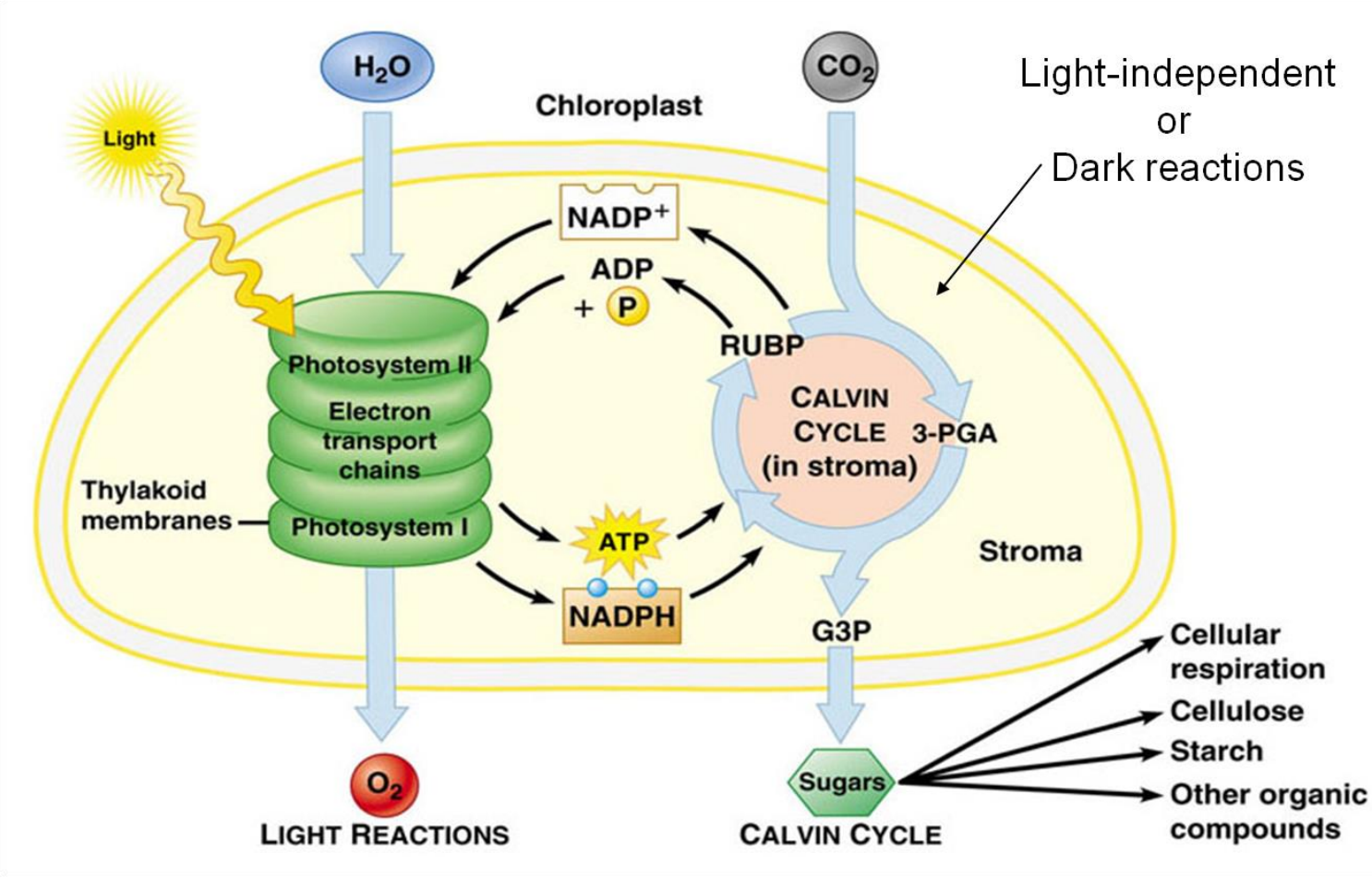
## Photosynthesis summary



# FACTORS AFFECTING PHOTOSYNTHESIS

- The amount of water in the environment - oxygen comes from it, which is released into the atmosphere during the photosynthetic reaction
- Light – the intensity and duration of solar energy, is considered a limiting factor
- Temperature – also a limiting factor, the optimum temperature for temperate plants is 20-30 ºC
- Carbon dioxide - the decomposition of organic substances, breathing, but especially the burning of fossil fuels increases the concentration of $CO_2$ in the air

# IMPORTANCE OF PHOTOSYNTHESIS

- Production of organic substances - they are a source of nutrition for organisms that are heterotrophic
- It maintains a constant ratio of oxygen and carbon dioxide in the atmosphere
- Creation of material that is a prerequisite for the creation of fossil fuels (oil, natural gas)

# PICTURES –USED SOURCES

https://stylzycia.polki.pl/choroby,kapiel-w-wodzie-z-sinicami-czy-jest-grozna-dla-zdrowia,10030159,artykul.html

https://blog.avoskinbeauty.com/sering-digunakan-dalam-produk-skin-care-algae-memiliki-banyak-manfaat-untuk-kulit/

https://www.vecteezy.com/vector-art/295449-cell-organisation-in-plants

http://e-chembook.eu/fotosynteza

https://oskole.detiamy.sk/clanok/fotosynteza-1559207939

https://www.ta3k.sk/biokutik/index.php/rastlinypp/95-fyziologia-rastlin/100-fotosynteza

https://www.bing.com/images/search?q=ChLOROPHYLL&qs=n&form=QBIDMH&sp=-1&pq=chlorophyll&sc=10-11&cvid=D6F065F67F9B437DB227375DDF424DFA&ghsh=0&ghacc=0&first=1&tsc=ImageHoverTitle

https://www.bing.com/images/search?view=detailV2&ccid=OYTvOG9Z&id=E03983DD8BA3FF59A761129FCFE114D9B3978DB7&thid

https://www.bing.com/images/search?view=detailV2&ccid=bN2TE5P3&id=C3B7C25AEBCF758DBD5410C1322F0DEE92491CEE&thid

https://www.bing.com/images/search?view=detailV2&ccid=P3Yjsp%252fG&id=E4931F6F0FAFC6713DDC497CFF061B1A16F34C57&thid=OIP.P3Yjsp_GZLiKVsWzBfqpxAHaFb&mediaurl