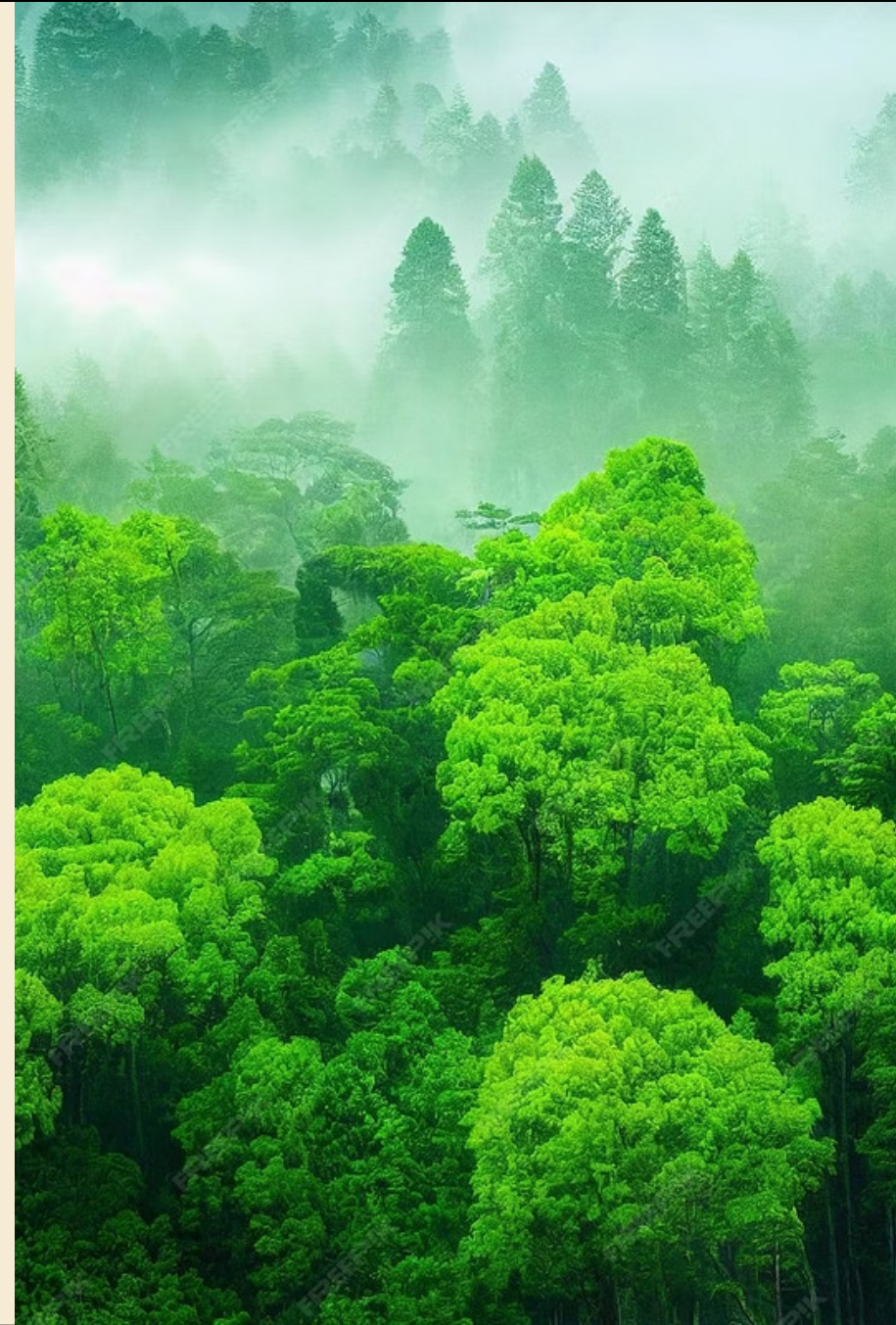


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Photosynthesis

Hello everyone, I am Nicola Palmieri from the association Il Pianeta Naturale, partner of the European project WAVE approved under the Erasmus+ KA 210 program. In this presentation, we will explore the process of photosynthesis and the fundamental role of CO₂ in life on Earth.





A Remarkable Process

At the foundation of every form of life on our planet lies a remarkable process: photosynthesis. Through this chemical reaction, six molecules of carbon dioxide and six molecules of water, thanks to solar energy, are transformed into one molecule of glucose and six molecules of oxygen.

Total Dependence

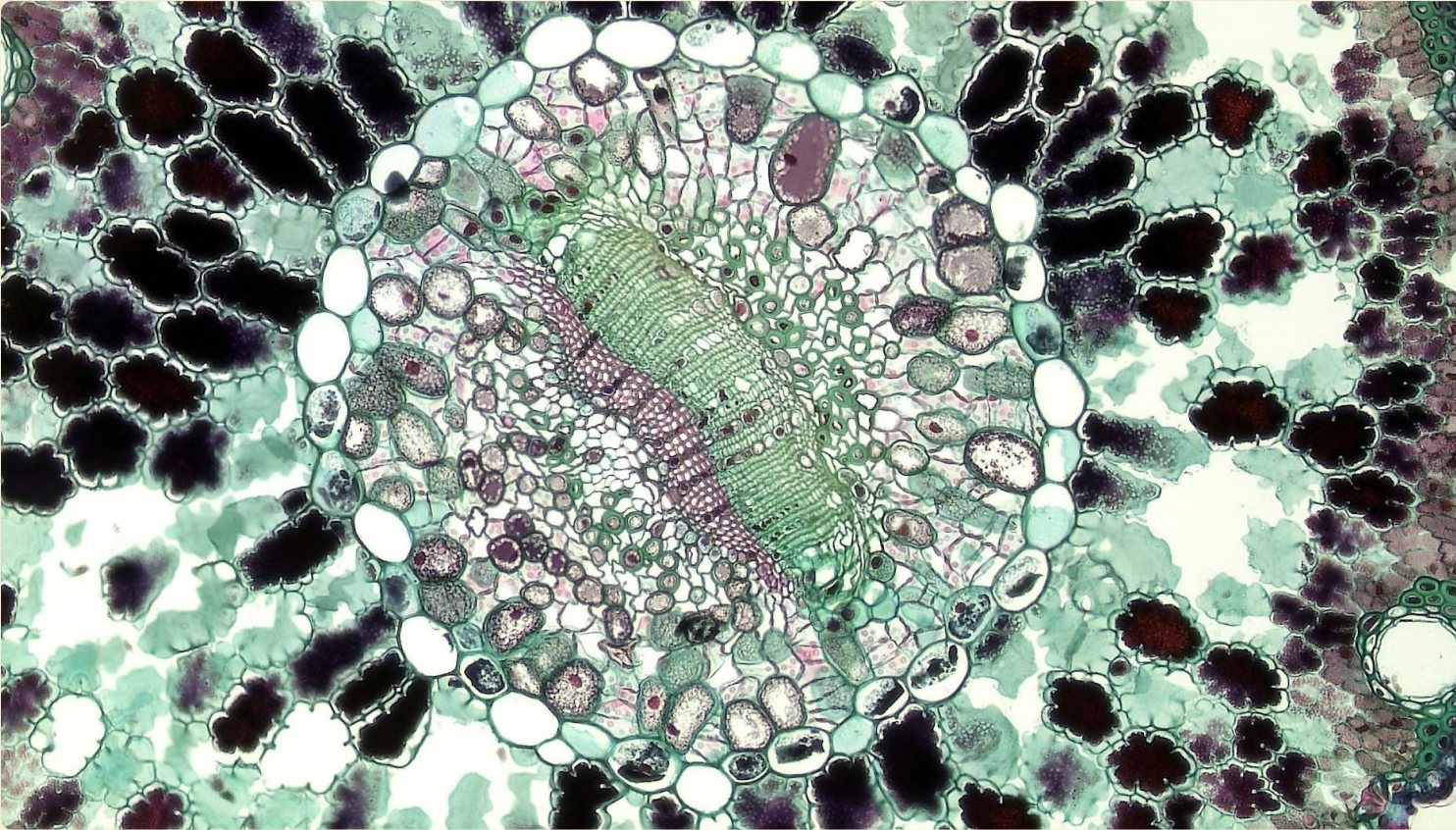
And this is why every form of life on Earth depends completely on plants: all organisms depend on autotrophs - cyanobacteria, plants, algae - but autotrophs do not depend on anyone else for their basic existence.





Plants are the only link
in the chain that doesn't have
to rely on the previous link

The Miracle at the **Molecular**



But how does this miracle of nature work at the molecular level? Inside plant cells we find chloroplasts, structures that contain chlorophyll, capable of absorbing blue and red light and reflecting green light - and that is why we see plants in that characteristic color.

The Two Phases of Photosynthesis



Light Phase

Solar energy, water, oxygen, ATP, and NADPH.



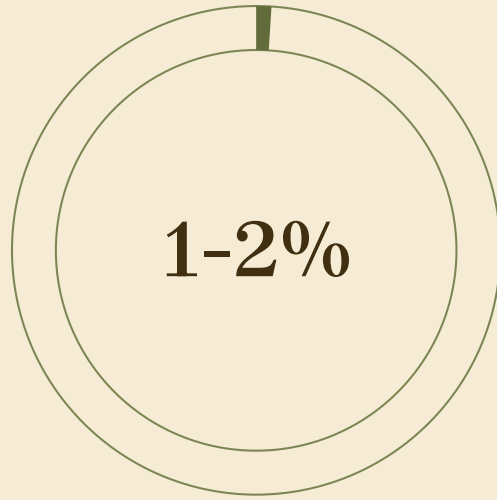
Dark Phase

Carbon dioxide, ATP, NADPH, and glucose.

The process is divided into two distinct phases.

During the light phase, solar energy splits water molecules, releasing oxygen and creating two precious energy molecules: ATP and NADPH.

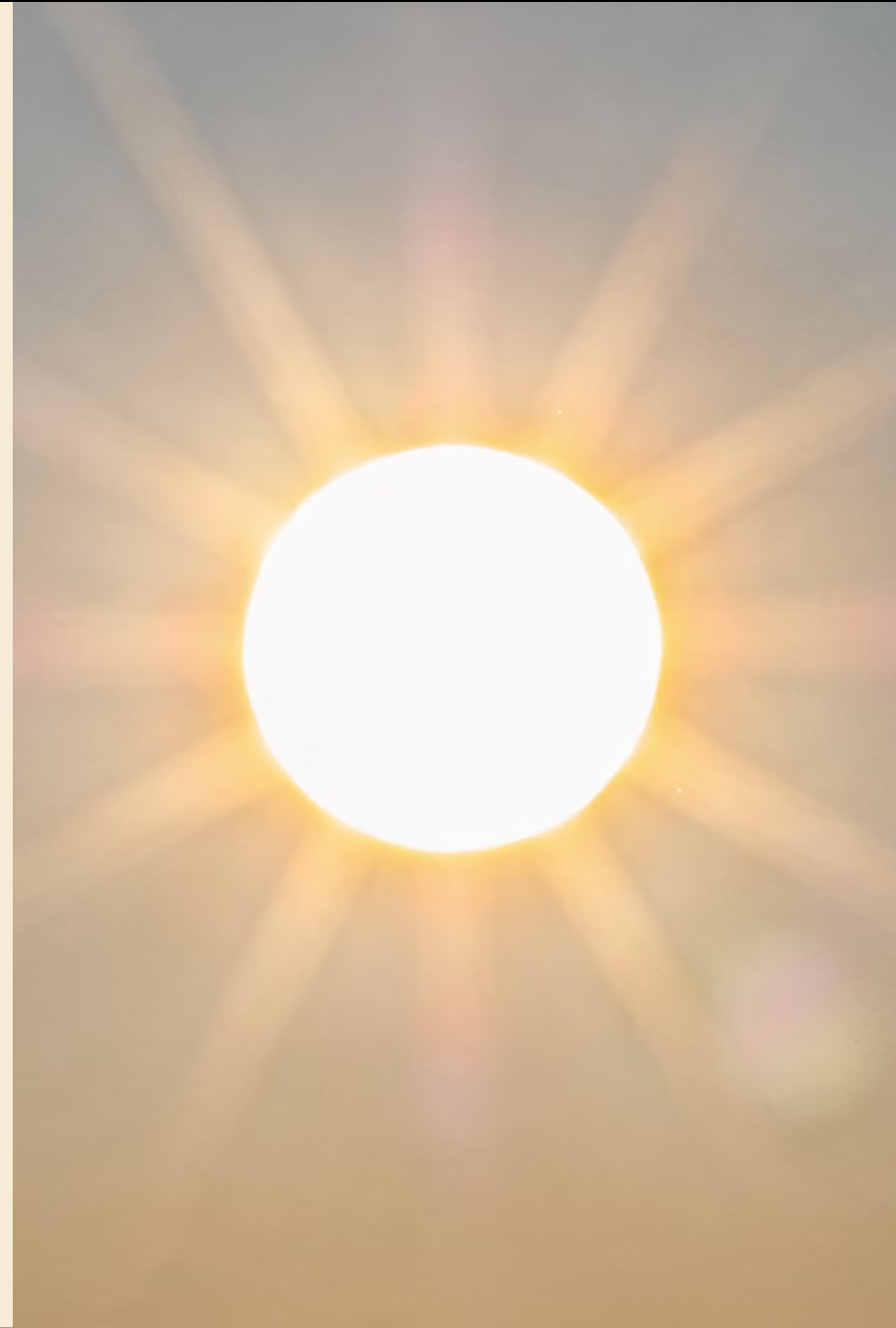
Subsequently, in the dark phase - also known as the Calvin Cycle - carbon dioxide is captured and transformed into glucose, using the ATP and NADPH produced in the previous phase.



Converted Energy

Of solar energy is converted into plant biomass

A surprising fact: only 1-2% of solar energy is converted into plant biomass under real conditions, yet this small percentage is enough to sustain all life on Earth!



A big misconception about CO₂

Contrary to what is often believed, CO₂ is not a "pollutant" in itself, but the essential raw material for life on Earth. It is a natural and vital component of the atmosphere.

The misunderstanding arises when people do not distinguish between CO₂ as an integral part of natural life cycles and the excess carbon dioxide released by human activities, which disrupts the climate balance. It is the disruption of the natural carbon cycle, not CO₂ itself, that is an environmental concern.

Without Carbon Dioxide

Without carbon dioxide, food chains would not exist:
CO₂ feeds plants, which transform solar energy into biomass.
This biomass (plant nourishment) is essential for all living organisms:
first for herbivores, then for carnivores that feed on them
and finally for decomposers that recycle organic matter



The Fundamental Role of CO₂

Food Chains

Herbivores, carnivores, and decomposers feed directly or indirectly on plants

Fossil Fuels

CO₂ stored by prehistoric plants over millions of years

Atmospheric Oxygen

The "waste" product of the photosynthesis process that we breathe



Fossil Fuels

Without CO₂, we would not have fossil fuels.

These are the result of the transformation of prehistoric plant biomass, grown thanks to photosynthesis that converts CO₂ into organic matter.

Over millions of years, this biomass was transformed into coal, oil, and natural gas.