SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
COIMBATORE-35
Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

UNIT II:BIODIVERSITY

TOPIC: **Photosynthesis and Nitrogen Fixation**

TOPIC OUTLINE

- Biodiversity
- Photosynthesis
- Nitrogen Fixation

Biodiversity

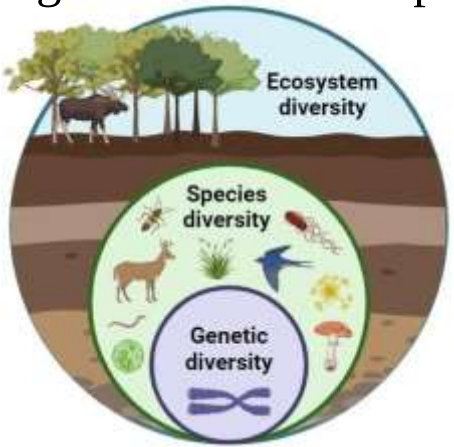
Biodiversity is the variety of all living things and their interactions. It changes over time as extinction occurs and new species evolve. Scientists often speak of three levels of diversity: species, genetic, and ecosystem diversity.

Types Of Biodiversity

• **Species** : It is defined as a group of organisms that consist of similar individuals capable of interbreeding or exchanging genes among themselves.

• **Genetic** : It is the study of genes. Our genes carry information that gets passed from one generation to the next.

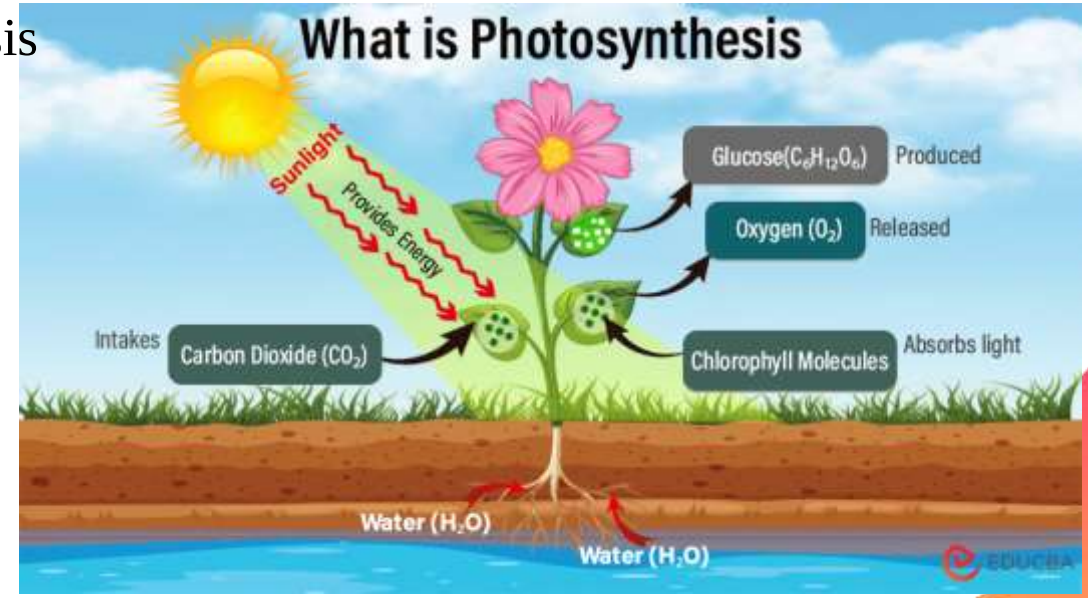
• **Ecosystem** : It is a community of organisms and their physical environment interacting together.



Photosynthesis

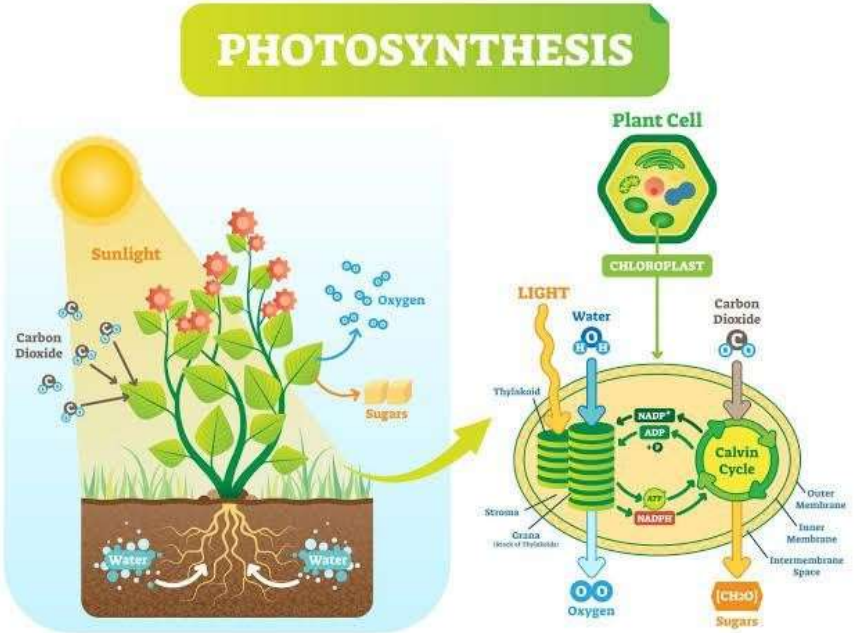
Photosynthesis is a biochemical process that uses light energy from the sun to convert water and carbon dioxide into glucose and oxygen.

- Oxygenic photosynthesis
- Anoxygenic photosynthesis



Oxygenic Photosynthesis

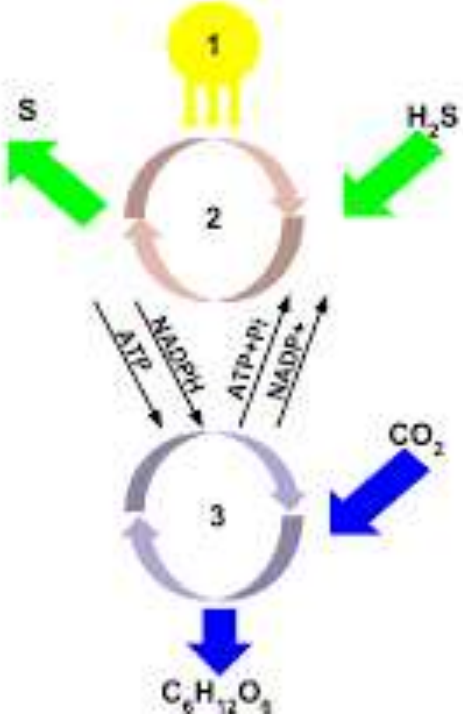
In plants, algae and cyanobacteria, photosynthesis releases oxygen. This is called oxygenic photosynthesis. Although there are some differences between oxygenic photosynthesis in plants, algae, and cyanobacteria, the overall process is quite similar in these organisms. Photosynthesis is not only needed by photosynthetic organism for energy but also for carbon fixation.



Anoxygenic Photosynthesis

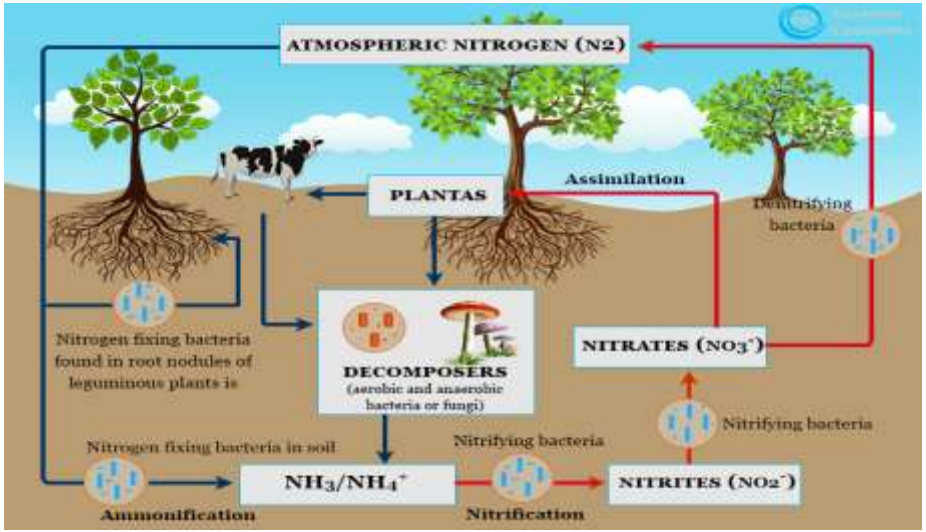
$$6CO_2 + 12H_2S + Light \rightarrow C_6H_{12}O_6 + 12S + 6H_2O$$

Anoxygenic photosynthesis is the phototrophic process where light energy is captured and converted to ATP, without the production of oxygen; water is, therefore, not used as an electron donor. There are several groups of bacteria that undergo anoxygenic photosynthesis: green sulfur bacteria, green and red filamentous anoxygenic phototrophs (FAPs), phototrophic purple bacteria, phototrophic acidobacteria, and phototrophic heliobacteria.



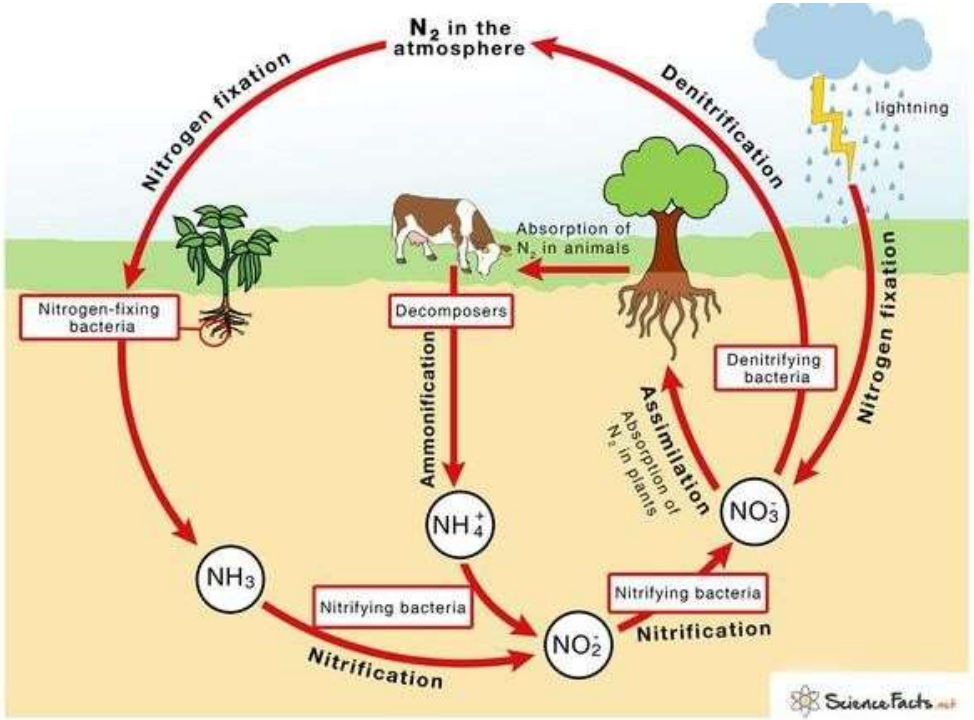
Nitrogen Fixation

Nitrogen fixation is a chemical process that converts atmospheric nitrogen gas (N2) into a reactive form that can bond with other elements. This process can occur biologically or abiologically, and can be catalyzed by enzymes or industrial processes



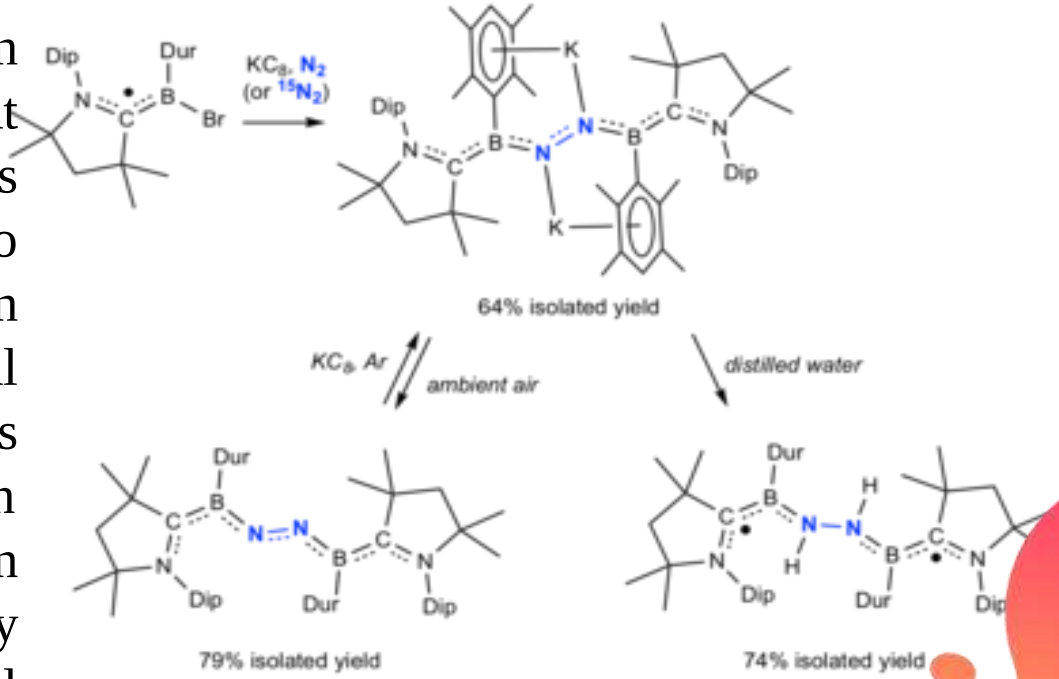
Biological Nitrogen Fixation

Microorganisms like bacteria and cyanobacteria use enzymes called nitrogenases to break the triple covalent bond between nitrogen atoms in N2, allowing it to bond with other elements like carbon, hydrogen, and oxygen. This process is called biological nitrogen fixation or diazotrophy.



Abiological Nitrogen Fixation

Abiological nitrogen fixation is a chemical process that converts nitrogen molecules in the atmosphere into nitrogen compounds that can be used in other biochemical processes. It's also known as physical nitrogen fixation. Abiological nitrogen fixation can occur naturally or through industrial processes.



RECAP….

…THANK YOU