Nitrogen Fixation and Nitrogen Cycle

What is Nitrogen?

Nitrogen gas (N_2) makes up 78% of the air we breathe. But plants and animals cannot use nitrogen gas directly from the air. It must be changed into a usable form like nitrates or ammonia.

What is Nitrogen Fixation?

Nitrogen fixation is the process of converting nitrogen gas (N_2) from the atmosphere into a form that plants can use, like nitrates or ammonia.

Types of Nitrogen Fixation:

- i. Biological Nitrogen Fixation
 - Done by bacteria like Rhizobium.
 - These bacteria live in the root nodules of leguminous plants (peas, beans).

ii. Atmospheric Nitrogen Fixation

- Happens during lightning.
- High temperature and pressure change nitrogen gas into nitrates that mix with rain and go into the soil.

iii. Industrial Nitrogen Fixation

• Humans make nitrogen fertilizers in factories (like urea or ammonium nitrate).

The Nitrogen Cycle

The nitrogen cycle is the natural process by which nitrogen moves between the atmosphere, soil, plants, animals, and back to the atmosphere.

Steps in the Nitrogen Cycle:

- i. Nitrogen Fixation: Converts nitrogen gas into nitrates or ammonia.
- **ii. Absorption by Plants:** Plants absorb nitrates from the soil and use them to make proteins.
- **iii.Consumption by Animals:** Animals eat plants and get nitrogen for building proteins in their bodies.

- **iv.Decomposition:** When plants and animals die, decomposers (bacteria and fungi) break them down and release nitrogen back into the soil.
- v. Nitrification: Soil bacteria convert ammonia into nitrates, which plants can use again.
- vi.Denitrification: Other bacteria convert nitrates back into nitrogen gas, releasing it into the air.

Diagram Idea for the Nitrogen Cycle:



Quick Summary Table:

Step	Process	By Whom
Nitrogen Fixation	$N_2 \rightarrow Nitrates$	Rhizobium, Lightning
Nitrification	Ammonia → Nitrates	Nitrifying bacteria
Absorption	Plants absorb nitrates	Plants
Consumption	Animals eat plants	Animals
Decomposition	Dead matter → Ammonia	Decomposers
Denitrification	Nitrates \rightarrow N ₂ (Back to air)	Denitrifying bacteria