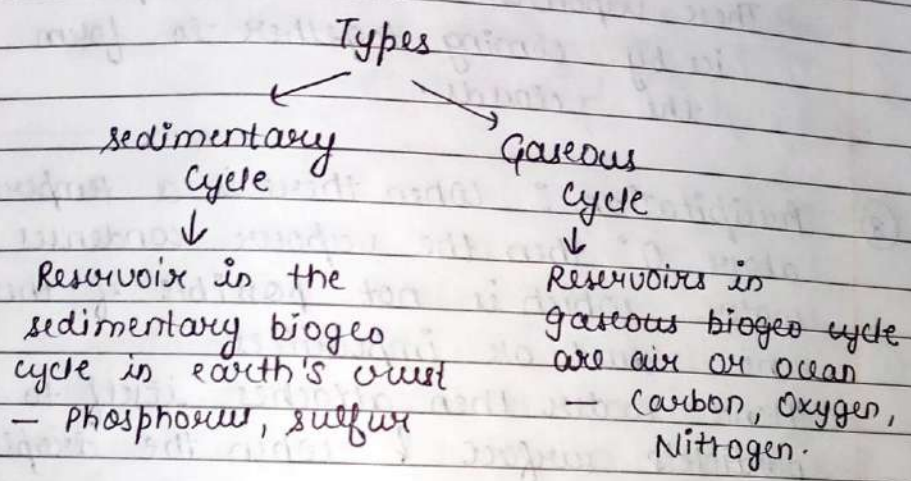


## Biogeochemical cycle

→ Movement of nutrients & other elements by biotic and abiotic factors.

The natural pathway through which essential elements in living matter undergo circulation is known as a biogeochemical cycle.



## Water cycle:

It relates to the movement through various stages such as -

① Evaporation: sun - ultimate source of energy

↓  
Generate process of evaporation.

↓  
When water molecules present on water bodies tend to rise into the air.

This process allows a large amount of water to be present in atmosphere.

(Evapotranspiration) by plants.

② Condensation: Water vapour will then get accumulated in the atmosphere

↓  
cool down due to cool temp. seen at high altitudes.

↓  
These vapours turn into droplets and ice by coming together to form the clouds.

③ Precipitation: When there is a temperature above  $0^{\circ}$  then the vapour condenses to water which is not possible if there is no dust or impurities.

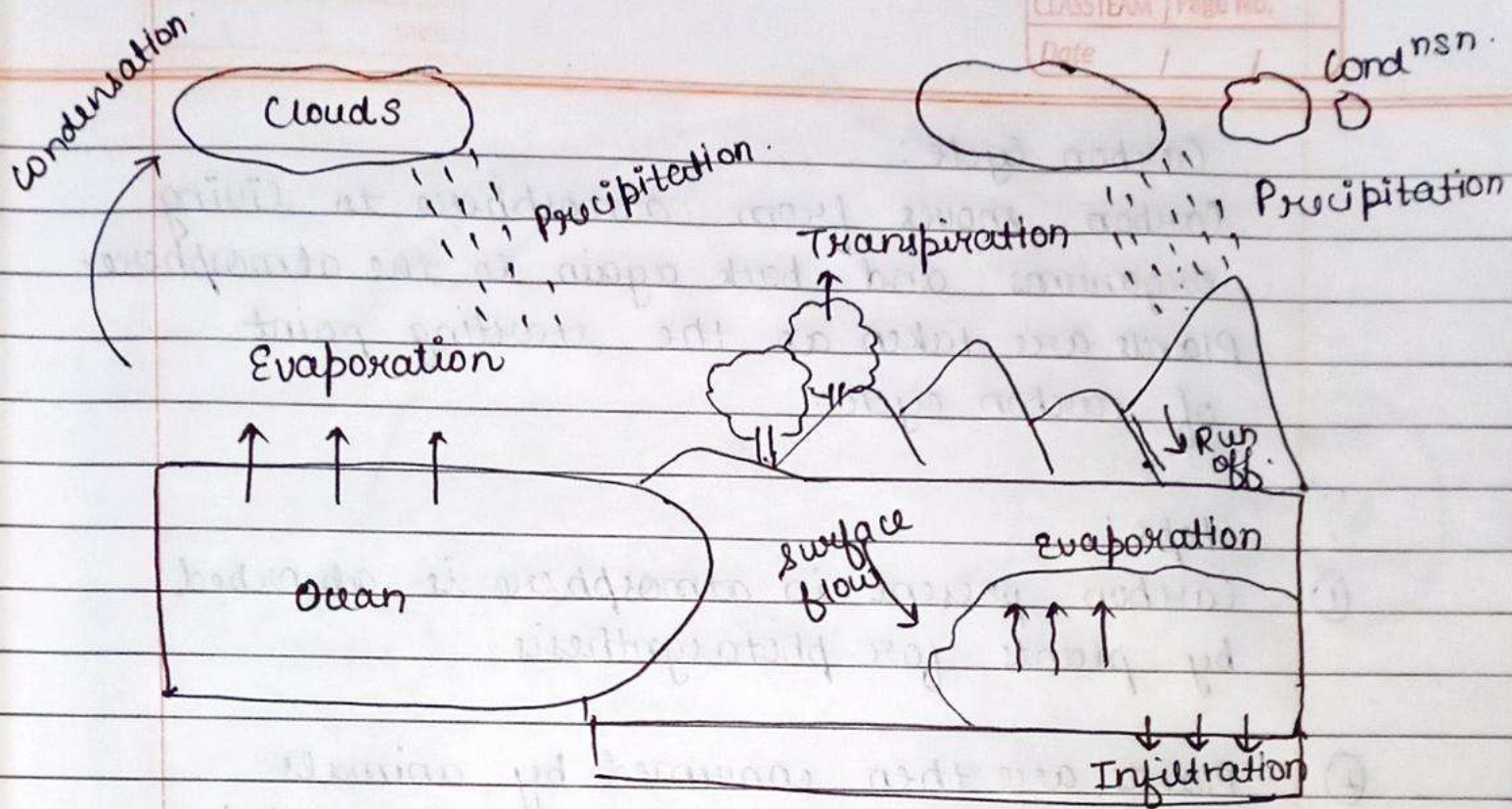
— Hence water then attaches itself to the particle's surface & when the droplets are large enough they start precipitating from the clouds.

④ Infiltration:

Water is seeped into various layers of soil and it is seen rocks hold less water than soil.

⑤ Run-off: If the water does not form aquifers and follows gravity then they start flowing down the sides of mountains & hills — hence forming the rivers.





### Implications of Water Cycle:

- Tremendous impact on climate.
- Without the evaporative cooling effect of water cycle, temp. on earth would rise drastically.
- Water cycle - integral part of other biogeochemical cycle.
- Affects all life processes on earth.
- Water cycle is also known the clean of the air.



Carbon cycle:  
Carbon moves from atmosphere to living organisms and back again to the atmosphere. Plants are taken as the starting point of carbon cycle.

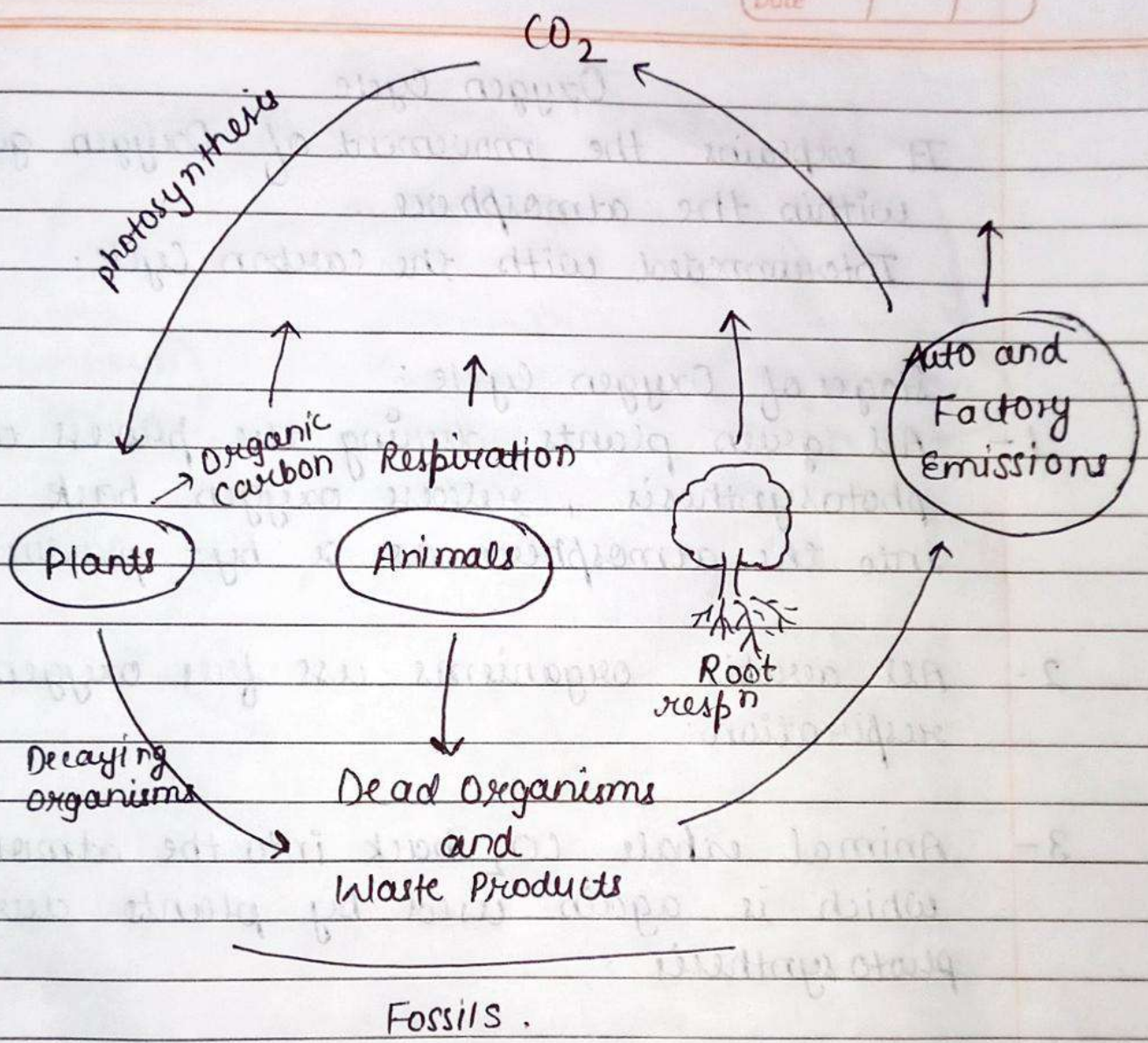
Steps:

- ① Carbon present in atmosphere is absorbed by plants for photosynthesis.
- ② Plants are then consumed by animals & carbon gets bioaccumulated into their bodies.
- ③ Animals & plants eventually die, and upon decomposing, carbon is released back into the atmosphere.
- ④ Some of the carbon that is not released back into the atmosphere eventually become fossil fuels.
- ⑤ These fossil fuels are then used for man-made activities, which pump more carbon back into atmosphere.

Importance of carbon cycle:

- Found in small traces in atmosphere — vital role in balancing energy and traps the long-wave radiations from the sun.
- Therefore it acts like a blanket over the planet.
- If carbon cycle is disturbed — result in serious consequences — climatic changes & global warming.





Carbon Cycle.



## Oxygen Cycle

It explains the movement of Oxygen gas within the atmosphere.

Interconnected with the carbon cycle.

### Stages of Oxygen Cycle:

- 1- All green plants during the process of photosynthesis, release oxygen back into the atmosphere as a by-product.
- 2- All aerobic organisms use free oxygen for respiration.
- 3- Animals exhale  $\text{CO}_2$  back into the atmosphere which is again used by plants during photosynthesis.

### Importance of Oxygen Cycle:

Required for -

Breathing

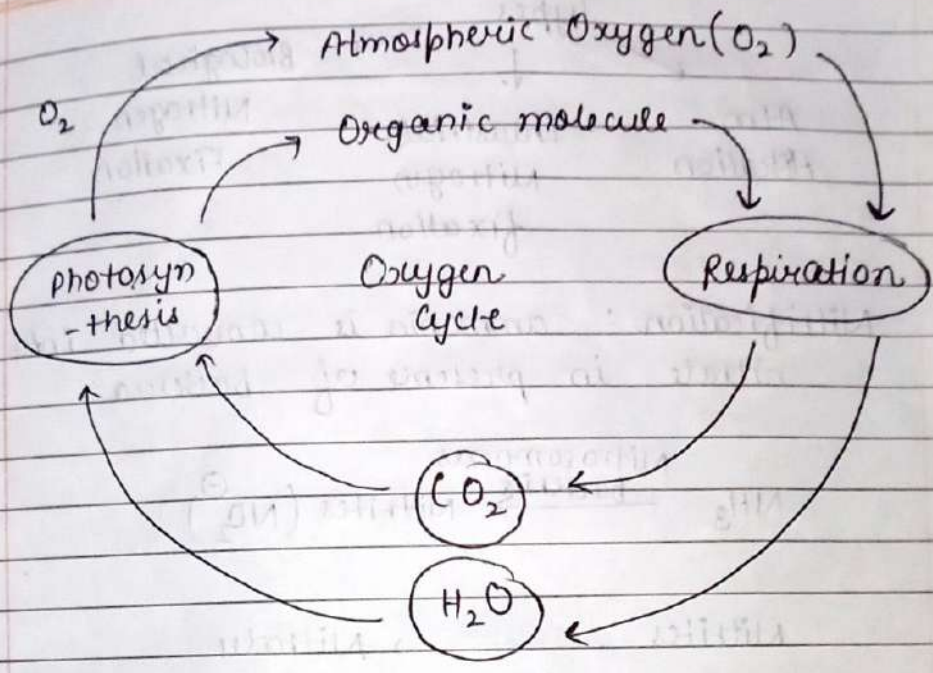
Combustion

Supporting aquatic life

Decomposition of organic waste

Maintaining level of oxygen in atm.

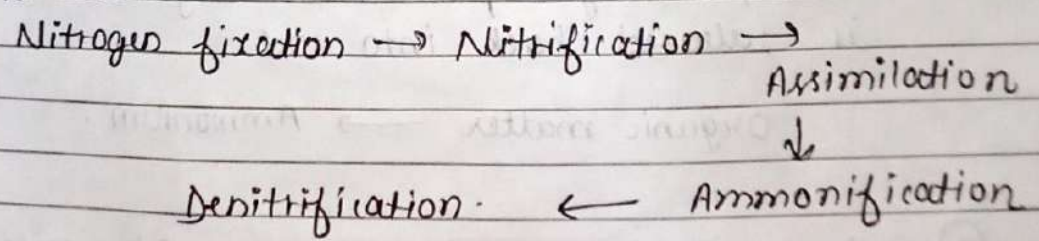




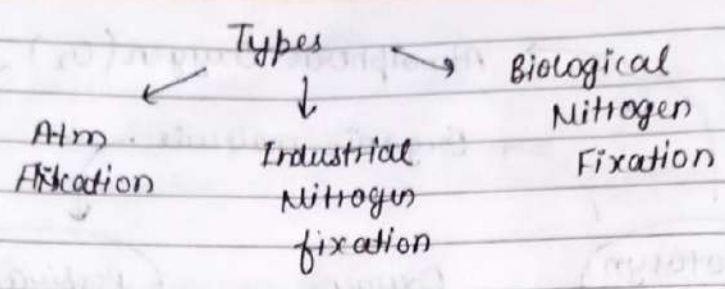
### Nitrogen Cycle

It is a biogeochemical process which transform the inert nitrogen present in the atmosphere to a more usable form for living organism.

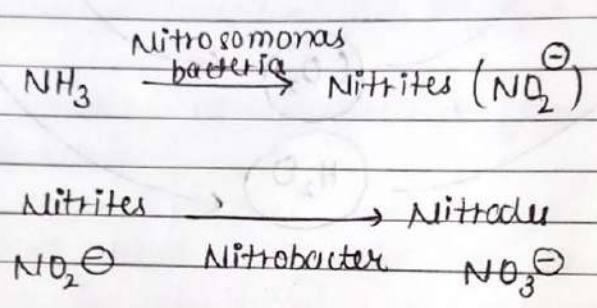
Process :



- ① Nitrogen fixation process: Atmospheric nitrogen ( $N_2$ ) primarily available in an inert form, converted into usable form -  $NH_3$ .

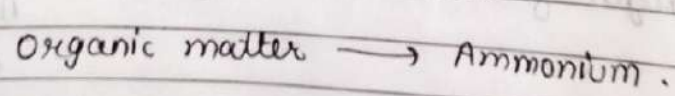


② Nitrification: ammonia is converted into nitrate in presence of bacteria.



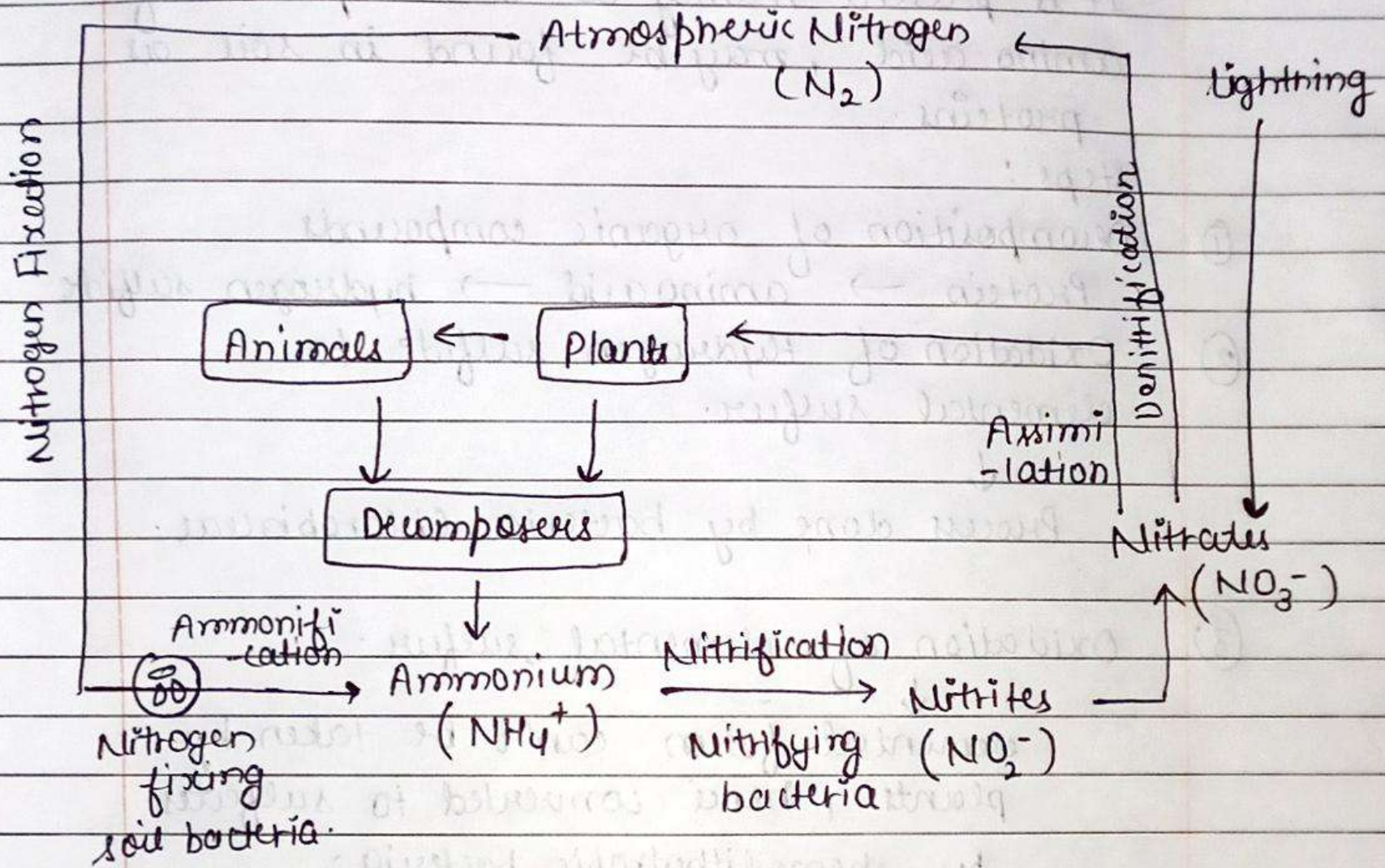
③ Assimilation: Plant take in nitrogen in form of  $\text{NH}_3$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$  and used in formation of plant and animal proteins.

④ Ammonification: When plants or animals die, nitrogen present in organic matter is released back into soil.



⑤ Denitrification: process in which nitrogen compounds make their way back into atmosphere by converting nitrate ( $\text{NO}_3^-$ ) into gaseous nitrogen ( $\text{N}_2$ ).  
 (Clostridium & Pseudomonas)





Nitrogen Cycle.