Minerals uptake

• Plants absorb minerals from the soil and translocate them to other parts of the body.

• Minerals are absorbed in the form of soil solution contained in the pore spaces between the soil particles and the root hair.

• The soil solution contains the mineral salts in the dissolved state.

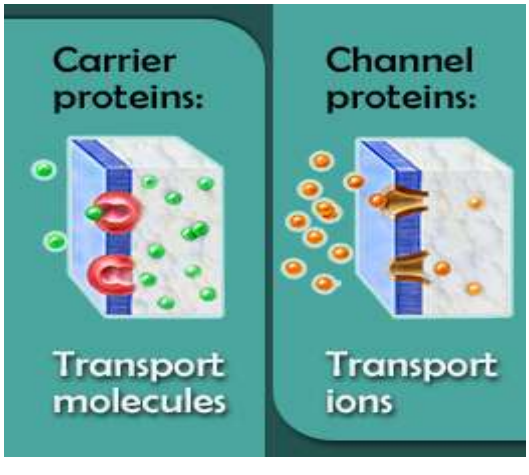
• In order for mineral nutrients to be taken up by a plant, they must enter the root by crossing the plasma membranes of root cells. From there they can be transported through the symplast to the interior of the root and eventually find their way into the rest of the plant.

- **Basic modes of transport: includes**

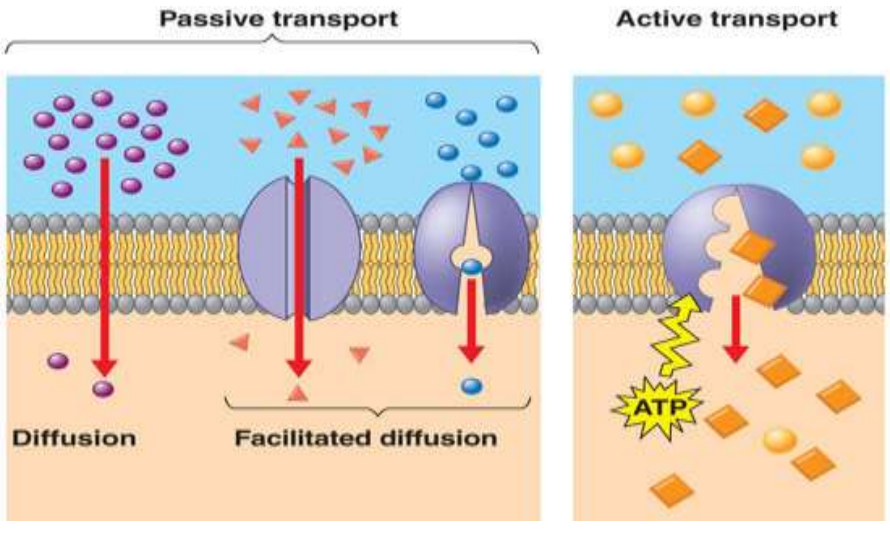
A. **Passive transport:** includes:

1. **Simple diffusion:** In simple diffusion, molecules move down the concentration gradient.

2. **Facilitated diffusion:** is the passive movement of molecules along the concentration gradient. It is a selective process, i.e., the membrane allows only selective molecules and ions to pass through it. It, however, prevents other molecules from passing through the membrane. Facilitated diffusion, on the other hand, occurs through the action of transmembrane proteins such as carrier proteins, channel proteins.



B. **Active transport:** The absorption of ions against the concentration gradient with the expenditure of energy is called active absorption.



- **<u>Nitrogen</u>**
- Nitrogen is an inert gas which constitutes 78% of the atmosphere.
- It is an important mineral present in the bodies of living organisms. It forms a component of proteins and amino acids, nucleic acids, chlorophyll, vitamins, and so on.
- Nitrogen cannot be used directly and is converted to Nitrites, Nitrates and Ammonia.
- There are many free living organisms like bacteria and blue-green algae and symbiotic nitrogen fixers like rhizobium which are involved in nitrogen fixation from the air.
- The ammonia and urea present in the soil are directly absorbed by plants.
- Cycle in Soil–Plant Systems
- The main input sources of N to the soil–plant system are chemical fertilizers, organic manures, and biological N2 fixation.
- **Mineralization** is the conversion of an element from an organic form to an inorganic state as a result of microbial activity. Includes

1. **Ammonification:** Conversion of organic nitrogen to ammonium ions by microbes present in the soil is called ammonification. By bacteria such as *Bacillus* and certain soil fungi.

2. **Nitrification:** Conversion of ammonia to nitrite (NO2 -) and then nitrate (NO3 -) is known as nitrification.

3. **Biological nitrogen fixation:** The living organisms especially bacteria, convert nitrogen gas of the atmosphere or air into compounds of nitrogen, which can be used by the plants The process of converting atmospheric nitrogen into ammonia, which plants require, is known as Nitrogen fixation.

- **What is denitrification?**

- **Denitrification**: The conversion of nitrates into nitrogen gas which is then released into the atmosphere. This process is performed by bacterial species such as Pseudomonas and Clostridium in anaerobic conditions.