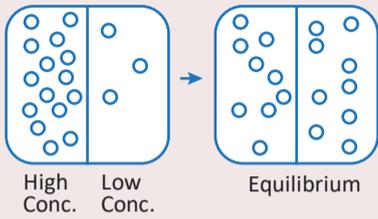


Transport in Plants - Means of Transport, Phloem Transport

- * Materials transported in plants – Water, Minerals, Organic solutes (translocation)
- * Transportation of water and minerals occur in xylem in **one direction**
- * Translocation occurs in phloem **bidirectionally**, source-sink relationship is variable

Means of Transport in Plants

Diffusion

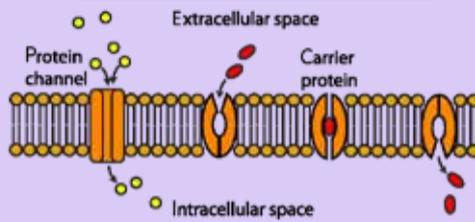


- * Movement of solutes from their higher concentration to their lower concentration until equilibrium has reached
- * Diffusion pressure - Potential ability of molecules to diffuse from an area of their higher concentration to an area of their lower concentration

Factors affecting diffusion

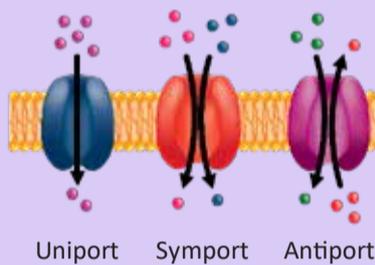
- * Temperature: Directly related to diffusion
- * Density of diffusing substance: Inversely related to rate of diffusing substance
- * Medium in which diffusion occurs: Gas diffuses more rapidly through vacuum than air

Facilitated diffusion/ Passive transport

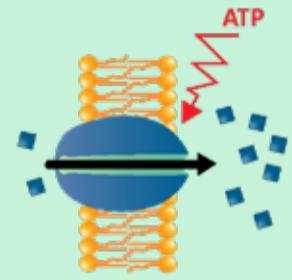


- * Movement of molecules and ions across a membrane through specific carrier proteins
- * Specific in nature and sensitive to inhibitors
- * Doesn't utilise energy
- * Along the concentration gradient
- * Porin is protein, provides passage to large molecules and ions

Types of transport

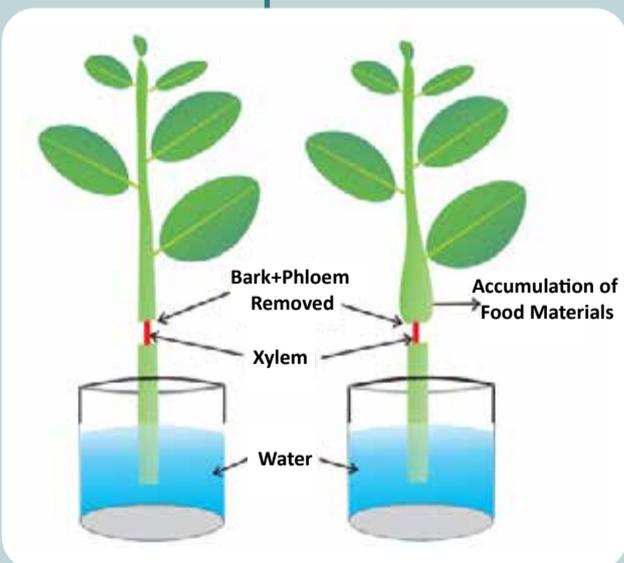


Active transport

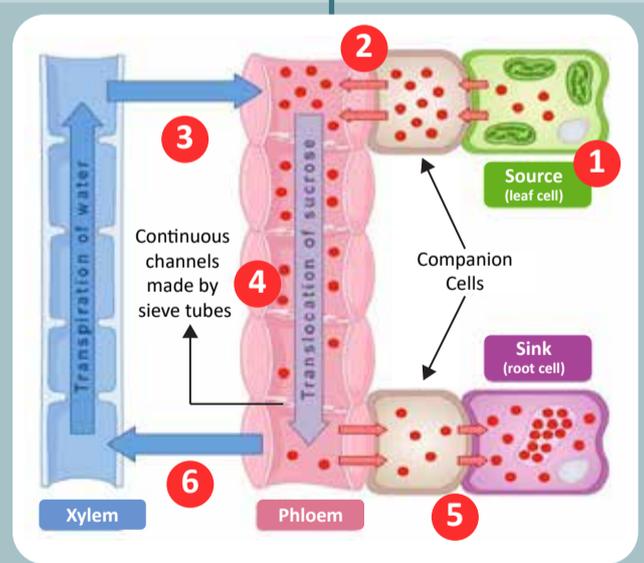


- * Non-spontaneous transport
- * Energy requiring process
- * Transport of materials from region of lower concentration to higher concentration
- * Carried out by membrane proteins, that are specific in nature and sensitive to inhibitors
- * Transportation saturates when all carrier proteins are being used

Evidences for Translocation



Ringing or Girdling Experiment



Mass Flow Hypothesis

Mass Flow Hypothesis

1. Food in the form of glucose is made in the leaves by photosynthesis and converted into sucrose
2. Active transportation of sucrose from source cells to companion cells and then to sieve tubes
3. Endosmosis by adjacent xylem and rise of osmotic pressure
4. Flow of phloem sap from high osmotic pressure to low osmotic pressure towards sink
5. Active transport of sucrose from phloem sap to sink
6. Water moves back to the xylem