

Transport in Plants

Biology

Xylem and phloem, and the mechanisms that move each.

Xylem

- Water and minerals
- Roots to leaves, one direction
- Dead, hollow vessels
- Transpiration pull, cohesion, adhesion
- Passive — no ATP

Phloem

- Sucrose and amino acids
- Source to sink, either direction
- Living sieve tube elements
- Mass flow driven by pressure
- Active loading at the source

THE DIFFERENCE THAT MATTERS

Transpiration pull works because water molecules cohere: evaporation at the leaf pulls the whole column upward.

The cohesion-tension theory means the water column is under negative pressure, which is why a cut stem draws air in.