

# Structure and Function of the...

## Xylem

### Functions:

- Transport water and dissolved mineral salts from the roots to the rest of the plant
- Provides mechanical support for the plant

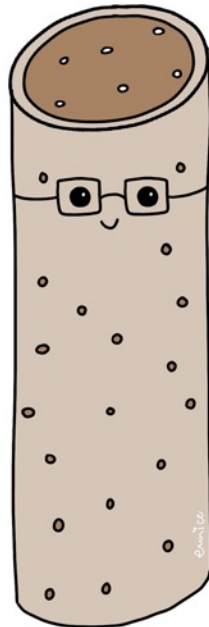
**Note:** Direction is uni-directional (upwards to leaves)

## Adaptations of the Xylem Vessel

**Hollow continuous lumen with no cross walls; Dead with no protoplasm**  
To transport water efficiently, without disruption

**Narrow lumen**  
To allow water to also move up by capillary action

**Lignified cell wall**  
To prevent vessel from collapsing and to provide mechanical support to the plant



## Phloem

### Function:

- Transport manufactured food like sucrose and amino acids from the leaves (source) to the rest of the plant (sink) in a process called translocation

**Note:** Direction is bi-directional (upwards to growing shoots or downwards to roots and storage organs)

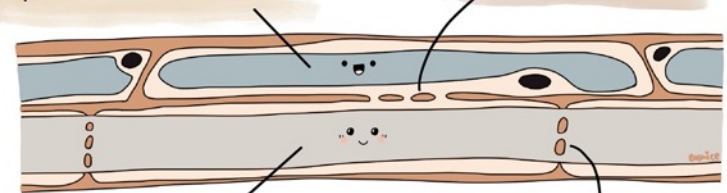
## PHLOEM TISSUE

### companion cell

- Has a nucleus and many mitochondria to carry out respiration, protein synthesis and other metabolic activities for the sieve tubes, and to provide energy for translocation

### plasmodesmata

- connects cytoplasm of sieve tube to cytoplasm of companion cell



### sieve tube

- Little cytoplasm, no nucleus or other cytoplasmic organelles so no obstruction to flow of sucrose and amino acids during translocation

### sieve plate

- cross walls with large pores to allow sucrose and other organic molecules to pass through