

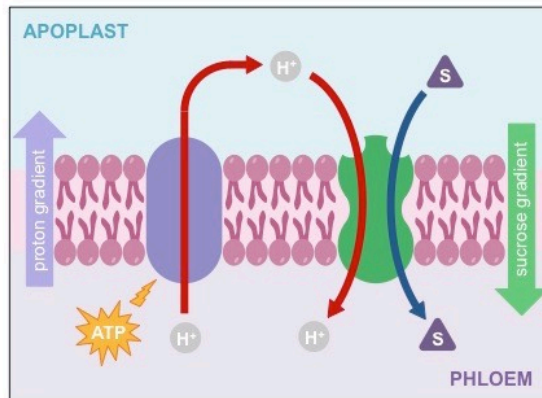
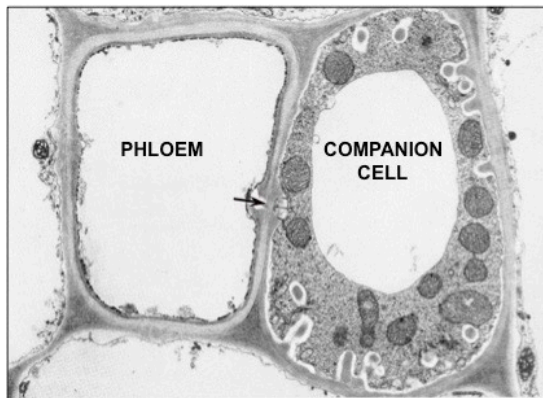
Transport in a Leaf – Phloem

Translocation

- Translocation is the movement of organic solutes in a plant
- Sink – is where the organic solutes go to
- Source – is where the organic solutes are produced or stored
- Phloem Sap includes – sucrose and other sugars, amino acids, and plant hormones.

Sources	Sinks
-Photosynthetic Tissues (green leaves, green stems)	-Roots that are growing or absorbing mineral ions
-storage tissues in growing seeds -tubers, tap roots (carrots) at the start of the growing season.	-Parts of the plant that are growing (fruits, seeds, growing leaves, tubers)

Phloem Loading

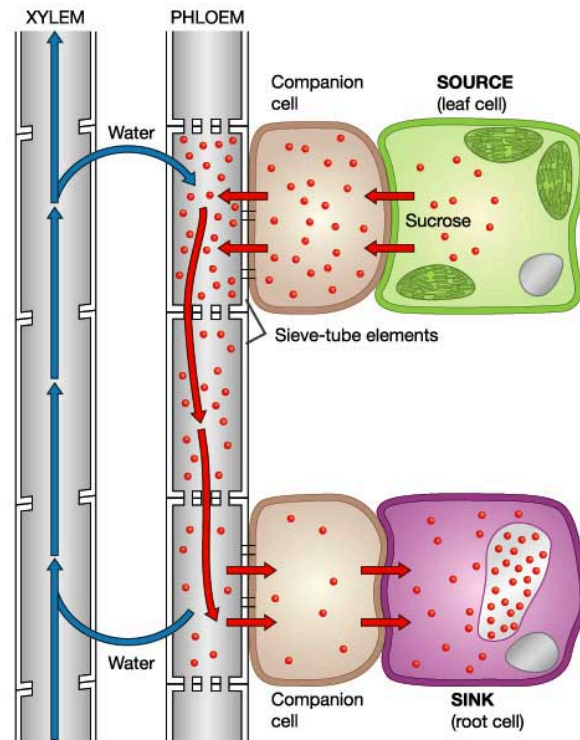


-Hydrogen protein pumps (see purple integral) moves H⁺ ions out of the phloem and into the companion cell. Companion cells help load the sucrose into the phloem.

-The H⁺ is needed to move sucrose (the S) into the phloem through a co-transport pump. This uses energy (see the ATP) and is active transport.

-Sugars are translocated into sieve tubes in the phloem from the source through active transport.

-Causes high concentrations of sugar in the sieve tube elements in the phloem.



Phloem Pressure and Water Potential

- the high sucrose concentrations cause water to enter the phloem – Osmosis. This raises the hydrostatic pressure in the source.
 - Mass flow occurs because of the high pressure at the source causes the flow of water into the sink as it is at lower pressure.
 - The high hydrostatic pressure in the source moves the sap toward the sink.
 - Low pressure at the sink – sucrose is removed and converted into starch or used – reduces osmotic pressure and the water is drawn back into the transpiration stream in the xylem.
 - plasmodesmata (gaps between the companion cell and sieve elements of the phloem provide a path between sieve tubes and companion cell
- The flow can be in either direction depending on the needs of the plant

Hydrostatic Pressure and water potential

