Phloem

Made up from 4 different parts:

- Phloem fibres
- Phloem parenchyma
- Sieve tubes
- Companion cells

The sieve tubes and companion cells are both involved with the mass flow hypothesis.

Sieve Tubes

- Cell membrane broken down
- Fluid cytoplasm
- No vacuole
- No nucleus

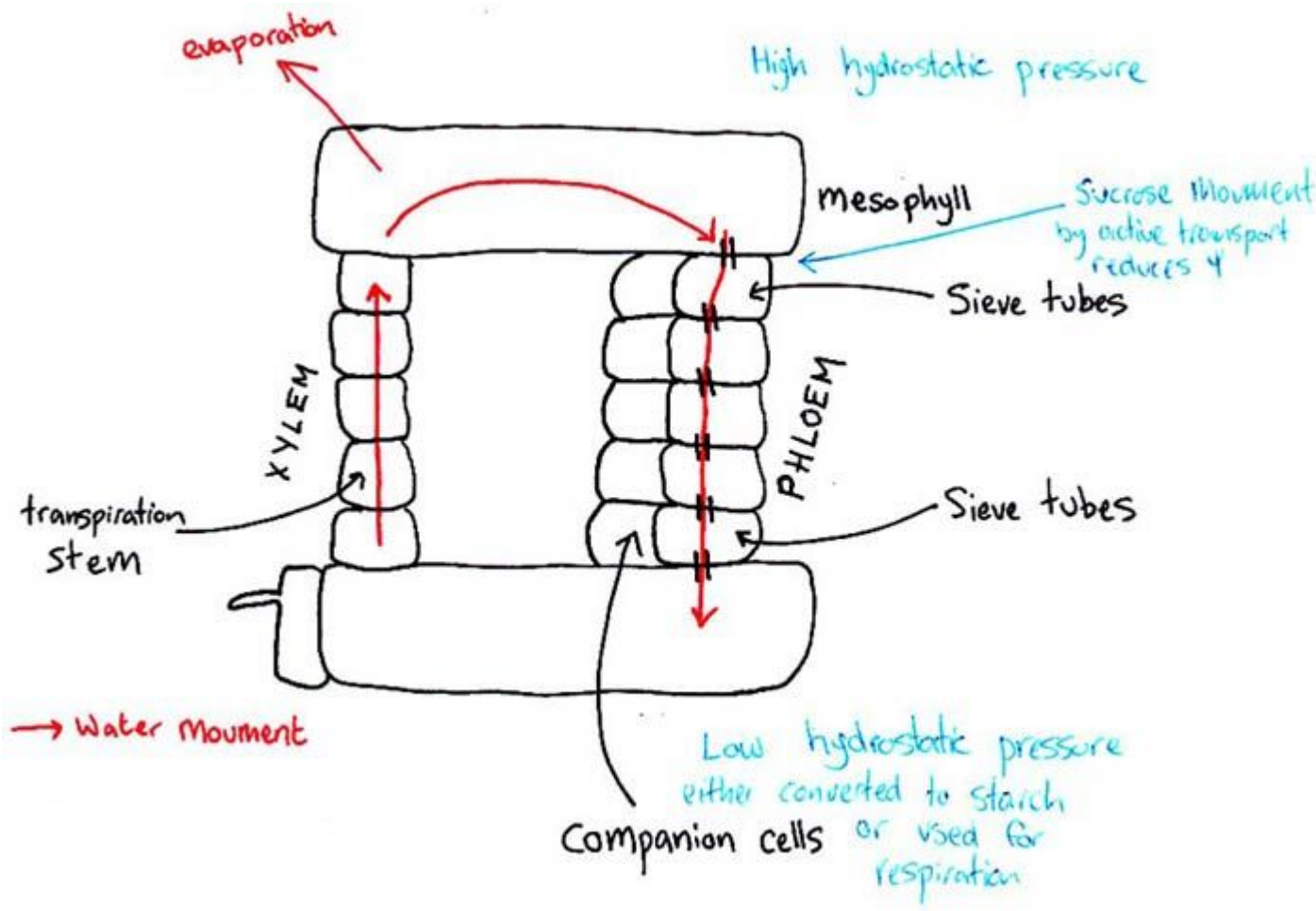
With the end of the sieve wall broken down it allows inter cellular movement.

Translocation from Source (e.g. sugar in leaves) to Sink (roots)

- Have plasmodesmata.
- Very metabolically active.
- High number of mitochondria.
- May provide energy for translocation (mass movement).

Osmotic Pressure

The movement of solutes from a high hydrostatic pressure to a low hydrostatic pressure.



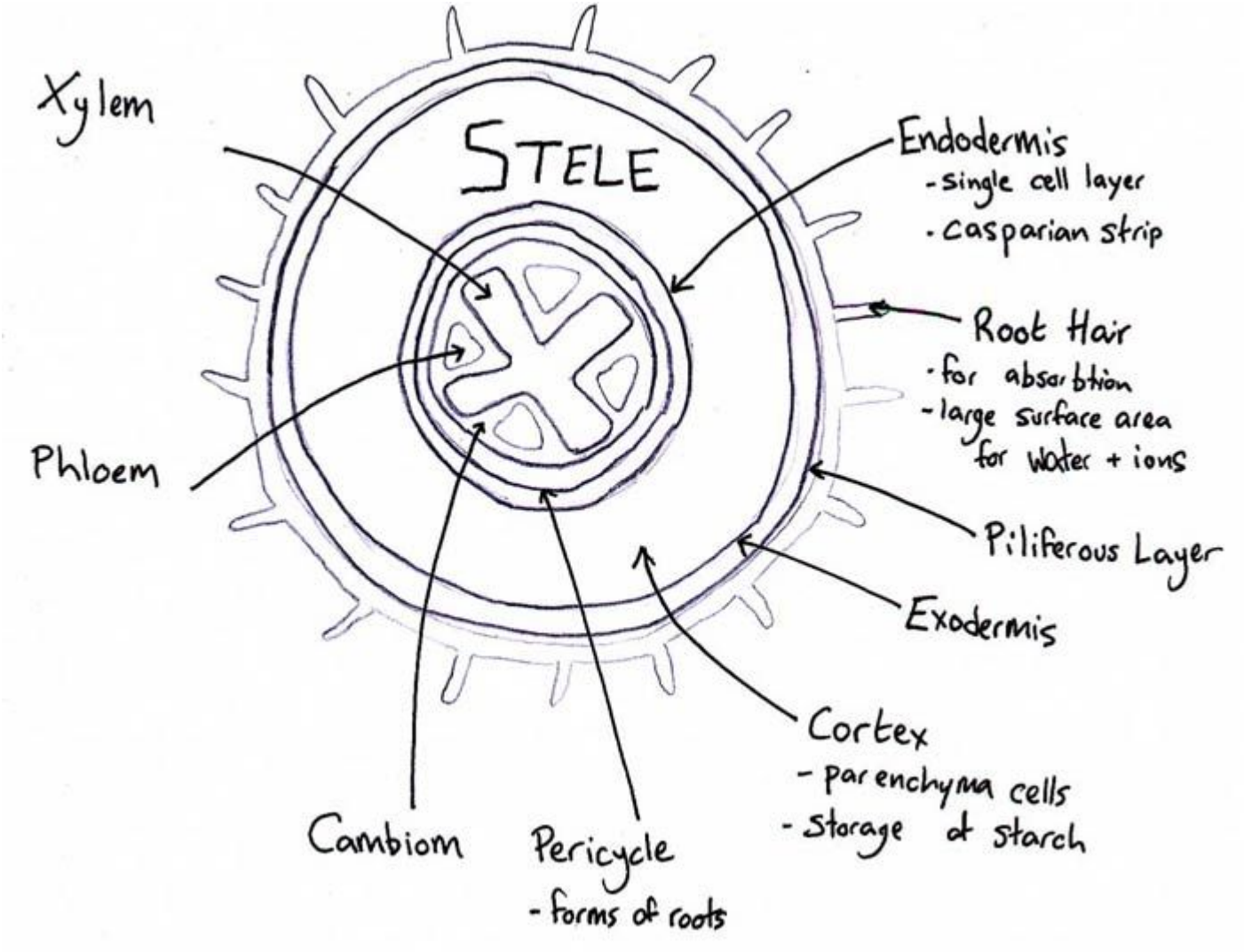
Simplified diagram of water and energy movement in a Plant

Evidence to support Mass Flow hypothesis

- Solution under pressure.
- Evidence for concentration gradient.
- Observation of sieve tubes.
- Movement of virus through plant.
- No movement of virus when no photosynthesis.

Evidence against Mass Flow hypothesis

- Get the impression of steady flow, this is wrong.
- Certain things move different ways.



Phloem in a Root