BY 124 SI Session 4

Acquiring Resources

- What are xylem sap and phloem sap? In which directions are both transported?

- Where does gas exchange occur in the plant?

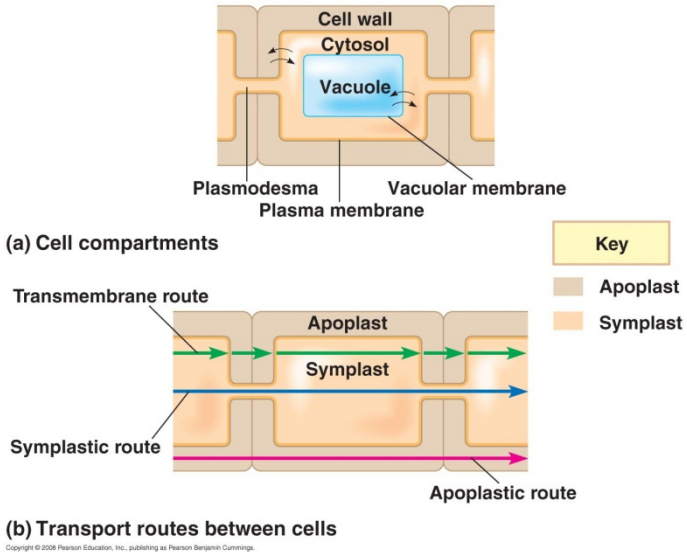
Transport

- What is the difference between passive and active transport?

- What is a membrane potential, and how is it formed?

- What are the three main compartments of most plants?

- List and describe the three major pathways of transport found in a cell (refer to below picture).



- What is bulk flow, where does it occur, and why is it more efficient than diffusion and active transport?

- What is the difference between positive and negative pressure? During bulk transport, which type of pressure is used in the xylem? What about the phloem?

- What is root pressure? What is the transpiration-cohesion-tension mechanism? How are they different?

- Bulk transport in the xylem: Water and minerals are absorbed by the _____, transported through the _____, released into the _____ and _____ of the xylem, and carried to the tops of plants via bulk flow, which is driven by _____.

- What are sugar sources and sugar sinks, and how are they important to bulk transport of phloem sap?

- Bulk transport in the phloem: The bulk movement of sugars in the phloem is called _____. First, the sugar is loaded into the sieve tube elements at the sugar _____, a processes requiring

_____ by means of proton pumps and cotransporters. Once the sugar is loaded into the sieve tube elements, the water potential there is reduced, causing the tube to take up water by _____ from the xylem. This uptake of water generates a _____ pressure that forces the phloem sap to flow along the tube. The pressure is relieved by the unloading of sugar and the consequent loss of water (back to the xylem) at the sugar _____. The xylem recycles the water from sugar _____ to sugar _____.

Bulk Flow by Positive Pressure (Label the steps, 1-5)