

***Explain the way H<sub>2</sub>O is absorbed into a root, and the pathways followed by water from roots to leaves in conjunction to the mechanism by which water is transported to the leaves***

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Plants like all living things need a healthy dose of oxygen and nutrients in order to survive and keep their parts working. Unlike mammals, plants do not have a pump action system, which transports chemicals around the body; instead plants use another form of transport.

Because of the huge size gap between mammals and plants, and the difference in energy consumption, the energy requirements are also greater as a result the plants have a much slower transport system to plants.

Firstly the water in the soil is received through the root hair cells, whilst the actual root acts as a pillar for the plant helping it to stand upright. The water is then moved across the root into the xylem, this is because of the potential water

gradient in the xylem is lower than the potential water gradient in the roots. Once inside the xylem the water has the option to take two different possible routes, the apoplast pathway and the symplast pathway. The apoplast pathway is when the water enters the cell wall and moves through the cell and also it can move from cell wall to cell wall through little blotches of open space and it may move directly from cell wall to cell wall thus making the water not touch the cytoplasm at all. The symplast pathway is different because it lets the water enter the cytoplasm and move through it, the water reached the cytoplasm via the semi-permeable membrane. Then it moves into the vacuole through the tonoplast. Water within the symplast pathway may move from cell to cell through the plasmodesmata.

Once inside the xylem the water begins its journey from the xylem to the stem. The water moves up the stem via xylem vessels going towards the leaves. Then once reached the leaves, the water either evaporates into the leaf air spaces or transpiration occurs where the water vapour is reduced.