

# Roots

Two types of Root Systems		_____ are the ancestors of all land plants. As aquatic organisms they were able to use _____ for the transport of water between cells. As plants began to journey onto land they had to adapt the plant body into _____, which absorb _____ and minerals from the soil, and shoots which are exposed to light and _____. This created a problem: how to _____ materials between the two areas. Roots and shoots are connected by two different _____ tissues. _____, which transports sap, and _____, which moves water throughout the plant body. Each system depends on the other. Lacking c_____ and living in the dark, roots would die without the _____ and other organic nutrients imported from the _____ tissues of the shoot system. While the shoots depends on _____ and _____ absorbed from the soil by the roots.
Tap Roots	Fibrous Roots	
Example: carrots	Example: grass	
ROOT PRIMARY STRUCTURE		
<b>Epidermis –</b>	<b>Cortex -</b> Composed of loosely packed parenchyma cells with lots of air spaces, makes up the greatest area of the root. Used to store starch. Substances may move between the cells by slowly diffusing through the plasmodesmata (the symplast) or in the spaces between adjacent cell walls (the apoplast).	
<b>Root hairs</b>		
<b>Endodermis.</b> Contains a water-impermeable substance known as suberin which forms the <b>Casparian strip.</b>		
<b>Pericycle</b>	<b>Vascular cylinder (stele)</b>  Xylem transports  Phloem transports	

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Root Growth		ROOT SYMBIOSIS	
<p>Roots grow at their tips by the activity of the apical meristem. The growing part of a root is divided into four regions; these regions are not sharply delimited but blend into each other.</p>		Mycorrhizae –	Root Nodules -
<p><b>Root Cap-</b></p>	<p><b>Apical Meristem -</b> creates new cells via mitosis.</p> <p>Protected by the root cap.</p>		
<p><b>Zone of Elongation</b></p>	<p><b>Zone of Maturation</b></p>		
<p><b>Functions of the Root</b></p>			
<p>Anchorage</p>	<p>Absorption</p>		
<p>Reproduction</p>	<p>Storage</p>		