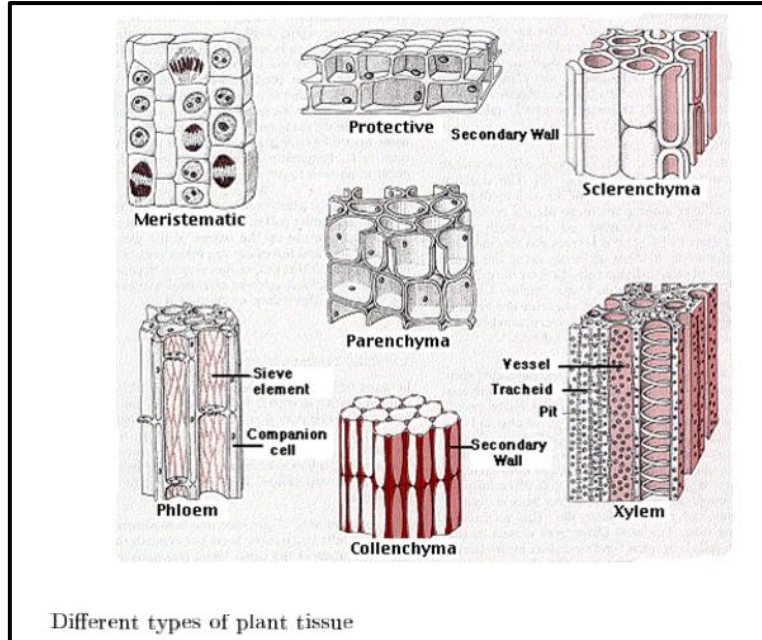
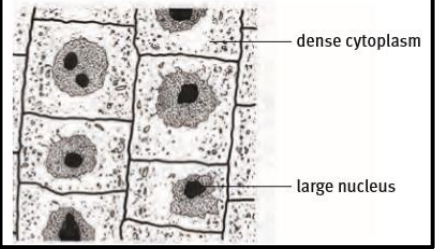
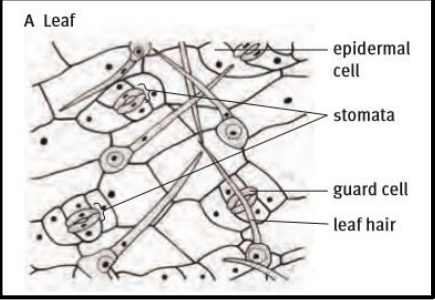
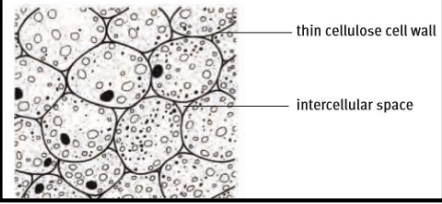
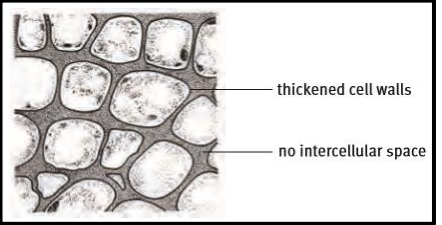
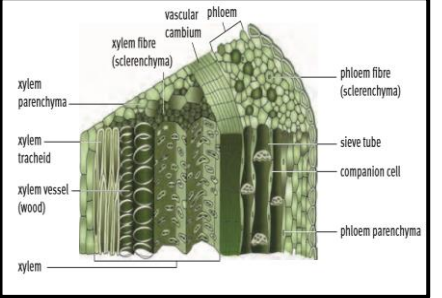

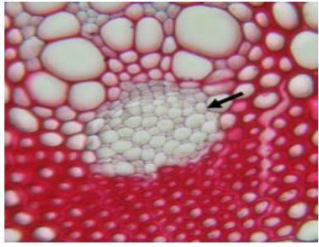


WHAT IS A TISSUE

A tissue is a group of cells, not necessarily identical, but from the same origin, that together carry out a specific function. These are called tissues because of they are functioning together.



TISSUE	STRUCTURE	FUNCTION
 <p>Meristematic tissue: dense cytoplasm, large nucleus.</p>	<p>Thin-walled, immature cells that divide often</p> <ul style="list-style-type: none"> •Cells tightly packed in layers or rows •No intercellular spaces •Single large nucleus •Dense cytoplasm •Small or no vacuole 	<p>Make new cells for growth</p> <ul style="list-style-type: none"> •Some new cells stay meristematic •Some cells differentiate and become permanent tissues
<p>MESISTEMATIC TISSUE</p>  <p>A Leaf: epidermal cell, stomata, guard cell, leaf hair.</p> <p>EPIDERMAL TISSUE</p>	<p>Single layer of tightly packed, thin walled cells</p> <ul style="list-style-type: none"> •Cover the plant •Aerial parts covered with a waxy layer cuticle •Cuticle protects plant •Cuticle prevents too much water loss •Often adapted for extra functions, e.g. Root hairs increase surface area to absorb water 	<p>Forms an outer cover and protect plant</p> <ul style="list-style-type: none"> •Controls movement of water out of plant • Roots absorb water

TISSUE	STRUCTURE	FUNCTION
 <p>thin cellulose cell wall</p> <p>intercellular space</p>	<p>Many-sided, thin-walled cells</p> <ul style="list-style-type: none"> • Large vacuoles • Loosely packed • Large intercellular spaces 	<p>Store food and water</p> <ul style="list-style-type: none"> • Allow gases, water and substances to move throughout the plant
<p>PARENCHYMA TISSUE</p>  <p>thickened cell walls</p> <p>no intercellular space</p>	<p>Cell wall thickened at corners of cells</p> <ul style="list-style-type: none"> • Cells tightly packed with no intercellular spaces 	<p>Collenchyma cells give flexible support to parts of plant</p>
<p>COLLENCHYMA TISSUE</p>  <p>vascular cambium</p> <p>phloem</p> <p>xylem fibre (sclerenchyma)</p> <p>phloem fibre (sclerenchyma)</p> <p>xylem parenchyma</p> <p>sieve tube</p> <p>companion cell</p> <p>xylem tracheid</p> <p>phloem parenchyma</p> <p>xylem vessel (wood)</p> <p>xylem</p>	<p>Has three live cell types:</p> <ul style="list-style-type: none"> • sieve tubes • companion cells • parenchyma cells <p>Has one dead cell type:</p> <ul style="list-style-type: none"> • sclerenchyma fibres <p>Sieve tubes have no nuclei; Kept alive by companion cells</p> <ul style="list-style-type: none"> • Where the sieve tubes meet, walls form a sieve plate; together, they form a continuous pipeline 	<p>Transports manufactured organic food produced through photosynthesis</p> <ul style="list-style-type: none"> • Takes it from leaves to the rest of plant
<p>PHLOEM TISSUE</p>		
<p>Diagram</p>  <p>Phloem</p> <p>Figure 5.17: Longitudinal section: phloem tissue transports nutrients throughout the plant.</p>	<p>Micrograph</p>  <p>Figure 5.18: Cross-section: the arrow indicates the location of the phloem in the vascular bundle.</p>	

Structure	Function
Companion cells:	
Contain large number of ribosomes and mitochondria.	Due to absence of organelles or nucleus in sieve tube, companion cells perform cellular functions of sieve tube.
Has many plasmodesmata (intercellular connections) in the wall attached to the sieve tube.	Allows transfer of sucrose-containing sap over a large area.
Sieve tubes	
Sieve tube elements are long conducting cells with cellulose cell walls.	Form good conducting tubes over long distances. Allows for transfer over a large area.
They are living cells with no nucleus or organelles such as vacuoles or ribosomes.	Allows for more space to transport sap. It is also why sieve elements need companion cells to carry out all cellular functions.

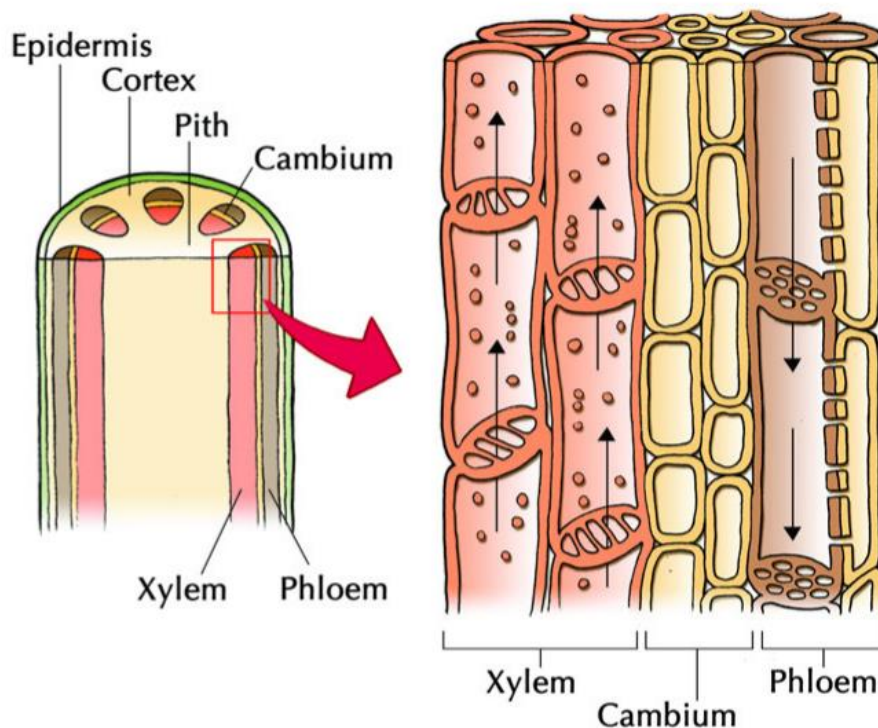


Figure 5.19: Xylem and phloem are the main transport vessels in plants. The figure above shows how vascular tissues are arranged in a vascular bundle.

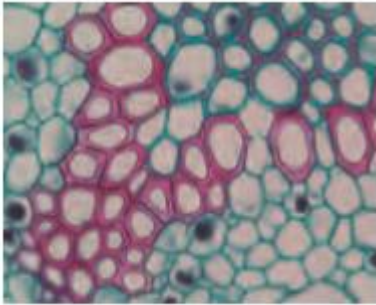

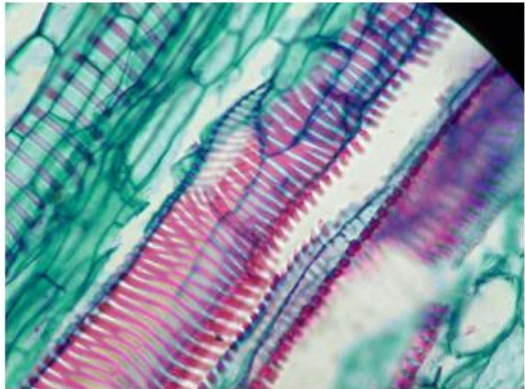
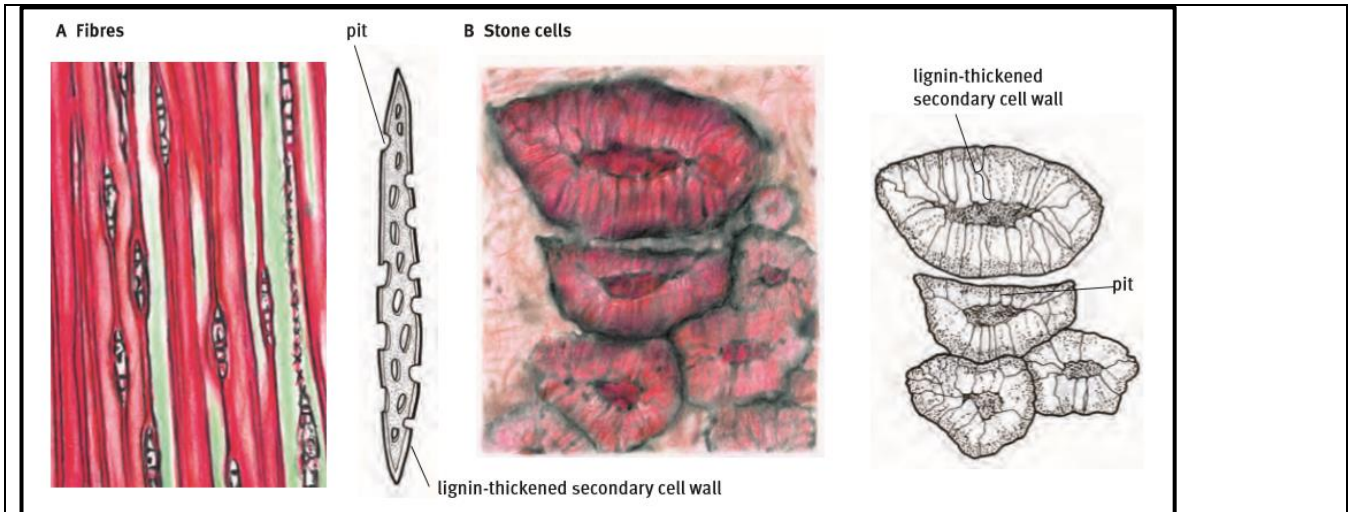
<p>A</p>  <p>XYLEM TISSUE</p>	<p>Three types of non-living, empty, tube-like cells:</p> <ul style="list-style-type: none"> • vessel elements • tracheid's • sclerenchyma fibres • Living parenchyma cells • Cell walls contain lignin • Walls of vessels and tracheid's have pores called pits • Patterned secondary thickening: that are either annular, spiral, pitted • Vessels have no cross walls forming tubes • Tracheid's and fibres have pointed tips with holes are thus perforation plates 	<p>Transports water and mineral salts (ions)</p> <ul style="list-style-type: none"> • Takes substances from roots, up stem, to eaves • Give support, strength and structure
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Diagram	Micrograph
 <p>Xylem</p> <p>Figure 5.15: Longitudinal section through a xylem vessel to show hollow lumen to allow for transport of water and nutrients.</p>	 <p>Figure 5.16: Xylem vessel fibres with rings of lignin thickening.</p>



SCHERENCHYMA TISSUE

	<p>Two types of sclerenchyma:</p> <ul style="list-style-type: none"> • long and slender fibres • short and irregular sclereids (stone cells) • Cell walls thickened evenly with lignin and strong 	<p>Provide structure and support</p>
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REFERENCES

1. Grade 10 Siyavula Textbook
2. Grade 10 Via Afrika Study Guide