

EDEXCEL GCSE PLANT STRUCTURES AND FUNCTION part 2

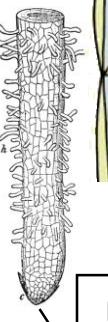
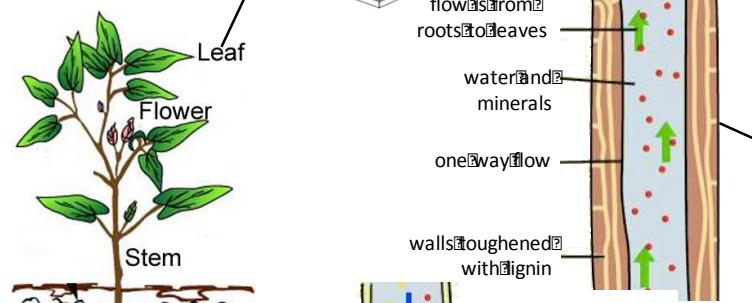
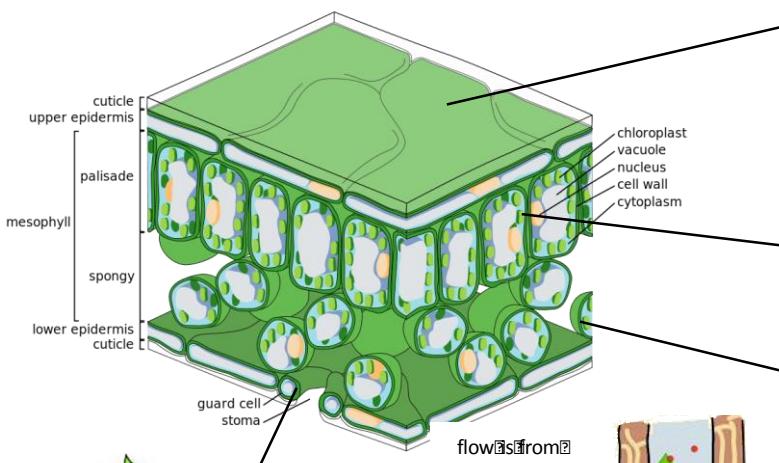
Plant organ systems

Plant tissues

The roots, stem and leaves form a plant organ system for transport of substances around the plant

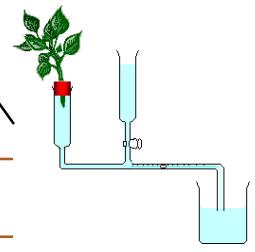
In extreme conditions (high temperature, low water) plants have adapted by reducing the size of the leaf to reduce surface area and have fewer stomata to reduce water loss

Plant hormones



Root hair cells have an increased surface area for absorbing water and mineral ions.

A potometer is used to measure the amount of water lost over time (rate of transpiration)

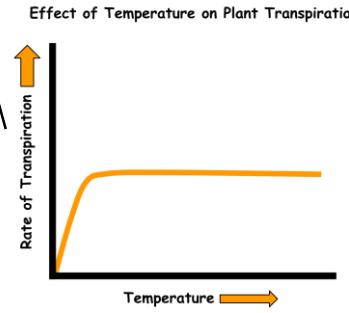
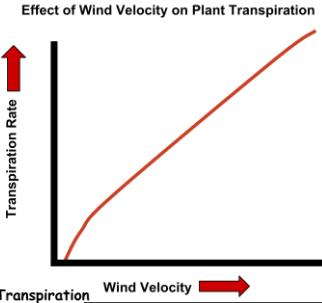
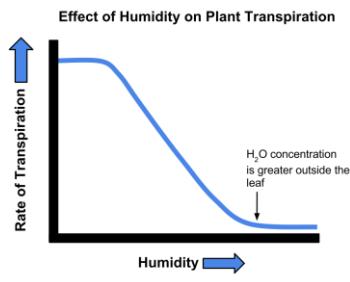


Epidermal tissues	<i>Waxy cuticle (top layer of the leaf)</i>	Reduces water loss from the leaf
	<i>Guard cells and stomata</i>	Guard cells open and close the stomata to control water loss and allow for gas exchange (oxygen and carbon dioxide).
Palisade mesophyll	<i>Palisade cells</i>	Cells near the top surface of the leaf that are packed with chloroplasts that contain chlorophyll. Both adaptations maximize photosynthesis.
Spongy mesophyll	<i>Air spaces in the leaf between cells</i>	Increased surface area for gas exchange so that carbon dioxide can diffuse into photosynthesising cells.
xylem	<i>Hollow tubes strengthened by lignified dead cells adapted for the transportation of water and mineral ions through the plant in the transpiration stream</i>	Allows transport of water and mineral ions from the roots to the stem and the leaves.
phloem	<i>Cell sap moves from one phloem cell to the next through pores in the end walls</i>	Transports dissolved sugars from the leaves to the rest of the plant for immediate use or storage (translocation).
Meristem tissue	<i>New cells (roots and shoot tips) are made here including root hair cells</i>	Root hair cells have an increased surface area for the uptake of water by osmosis, and mineral ions by active transport.

Plant responses using hormones (auxins)							
Light (phototropism)	Light breaks down auxins and they become unequally distributed in the shoot. The side with the highest concentration of auxins has the highest growth rate and the shoot grows toward the light.						
Gravity (geotropism or gravitropism)	Gravity causes an unequal distribution of auxins. In roots the side with the lowest concentration has the highest growth rate and the root grows in the direction of gravity.						
Plant growth hormones have commercial uses (HT only)	<table border="1"> <tr> <td>Auxins</td> <td>Weed killers, rooting powders, promoting growth in tissue culture.</td> </tr> <tr> <td>Ethene</td> <td>Control ripening of fruit during storage and transport.</td> </tr> <tr> <td>Gibberellins</td> <td>End seed dormancy, promote flowering, increase fruit size.</td> </tr> </table>	Auxins	Weed killers, rooting powders, promoting growth in tissue culture.	Ethene	Control ripening of fruit during storage and transport.	Gibberellins	End seed dormancy, promote flowering, increase fruit size.
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Transpiration

Transpiration	<i>The rate at which water is lost from the leaves of a plant. The transpiration stream is the column of water moving through the roots, stem and leaves</i>	Temperature, humidity, air movement and light intensity affect the rate of transpiration.
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The shape of the graph for light intensity is the same for temperature (energy)

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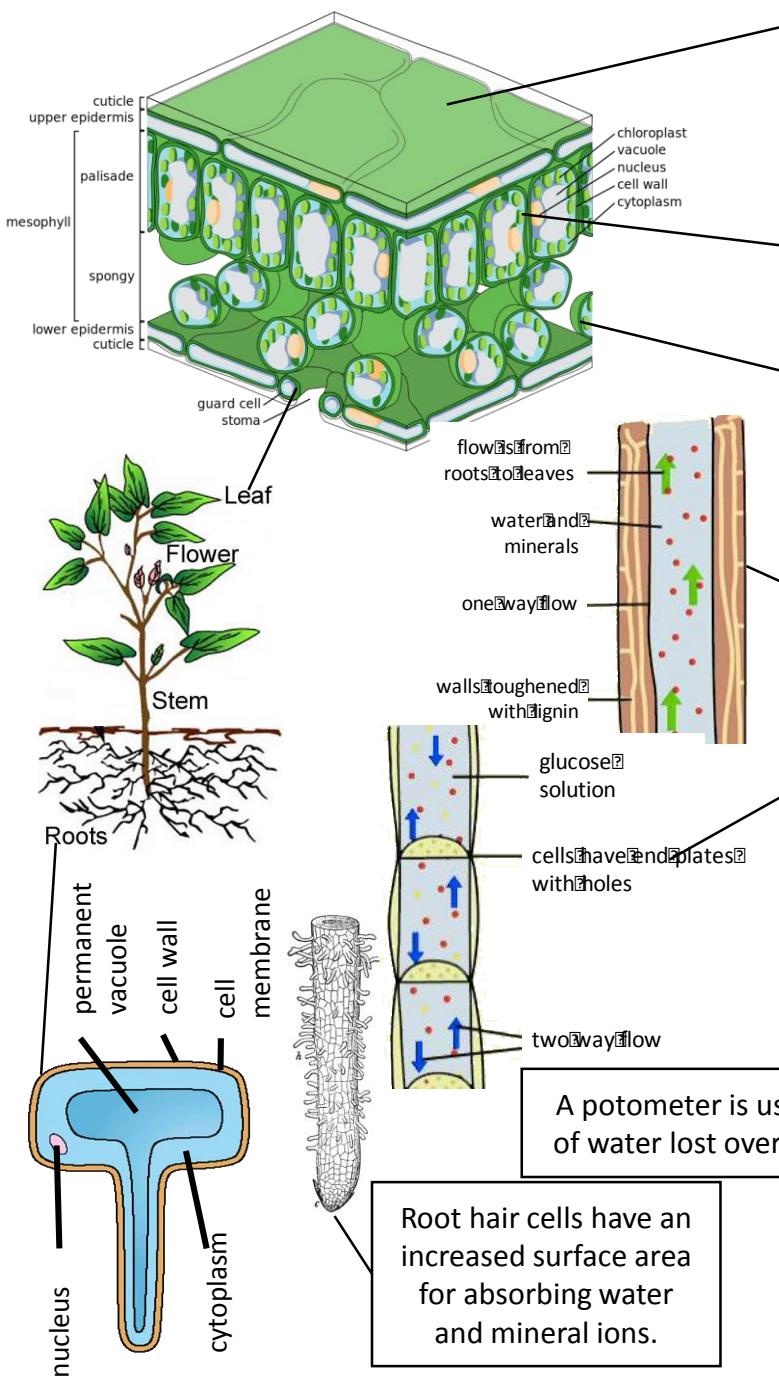
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Plant tissues

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In extreme conditions (high temperature, low water) plants have adapted by reducing the size of the leaf to reduce surface area and have fewer stomata to reduce water loss

Plant hormones



	Waxy cuticle (top layer of the leaf)	Reduces water loss from the leaf
	Guard cells and stomata	Guard cells open and close the stomata to control water loss and allow for gas exchange (oxygen and carbon dioxide).
	Palisade cells	Cells near the top surface of the leaf that are packed with chloroplasts that contain chlorophyll. Both adaptations maximize photosynthesis.
	Air spaces in the leaf between cells	Increased surface area for gas exchange so that carbon dioxide can diffuse into photosynthesising cells.
	Hollow tubes strengthened by lignified dead cells adapted for the transportation of water and mineral ions through the plant in the transpiration stream	Allows transport of water and mineral ions from the roots to the stem and the leaves.
	Cell sap moves from one phloem cell to the next through pores in the end walls	Transports dissolved sugars from the leaves to the rest of the plant for immediate use or storage (translocation).
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Gravity (geotropism or gravitropism)	Gravity causes an unequal distribution of auxins. In roots the side with the lowest concentration has the highest growth rate and the root grows in the direction of gravity.
	In new shoots from a seedling the unequal distribution of auxins causes the shoot to grow away from gravity.

Auxins	Weed killers, rooting powders, promoting growth in tissue culture.
Ethene	Control ripening of fruit during storage and transport.
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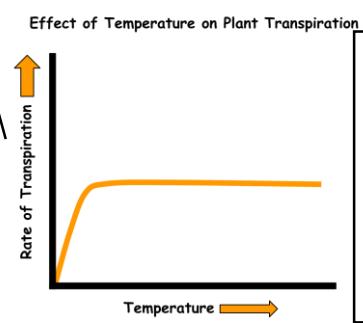
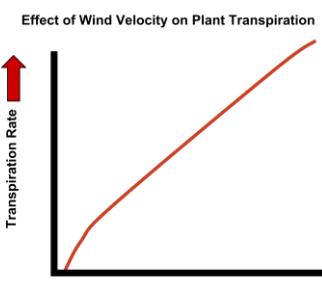
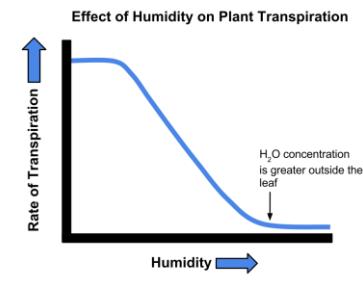
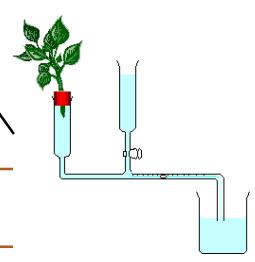
A potometer is used to measure the amount of water lost over time (rate of transpiration)

Root hair cells have an increased surface area for absorbing water and mineral ions.

Transpiration

The rate at which water is lost from the leaves of a plant. The transpiration stream is the column of water moving through the roots, stem and leaves

Temperature, humidity, air movement and light intensity affect the rate of transpiration.



The shape of the graph for light intensity is the same for temperature (energy)

EDEXCEL GCSE PLANT STRUCTURES AND FUNCTION part 2

Plant organ systems

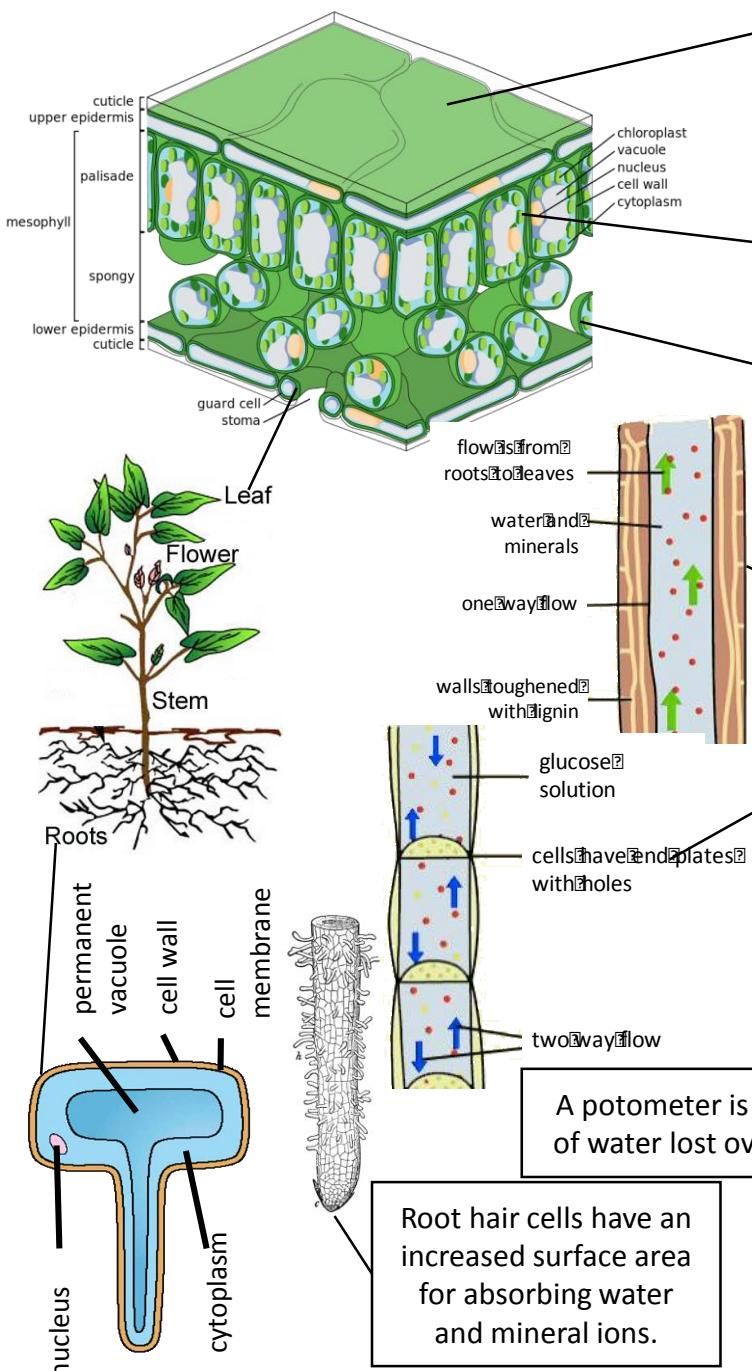
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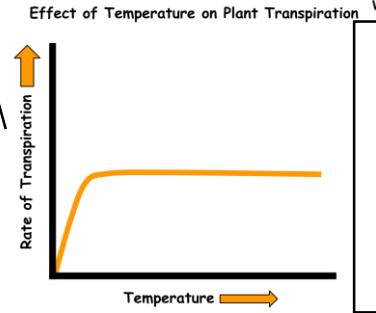
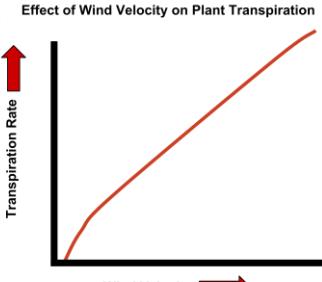
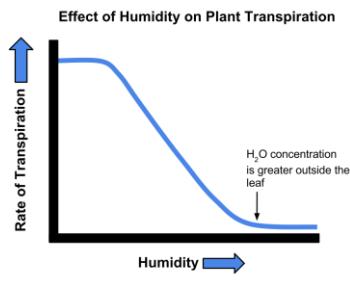
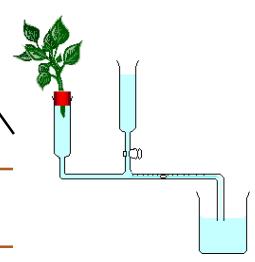


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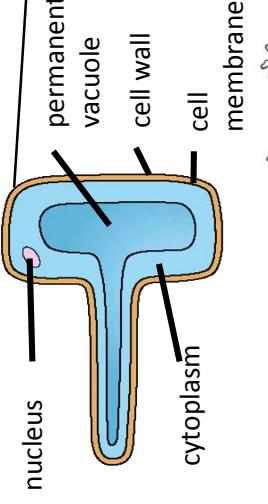
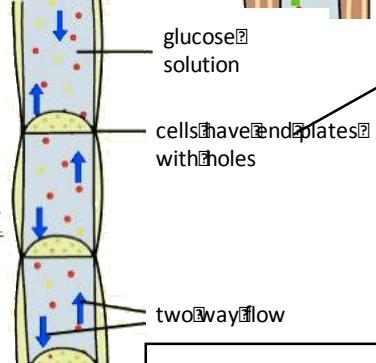
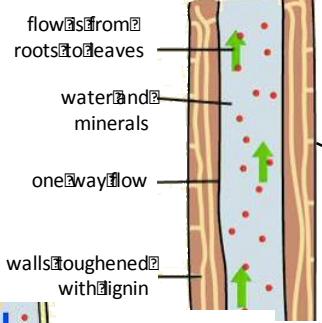
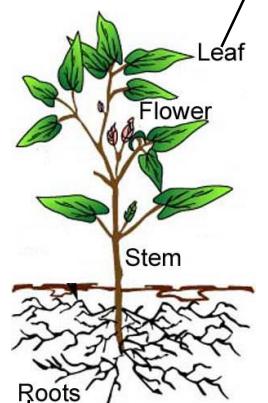
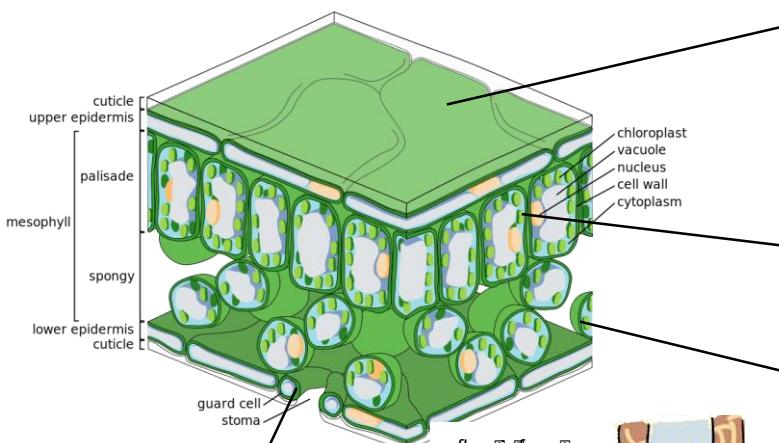
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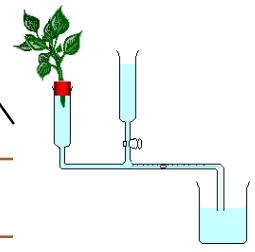
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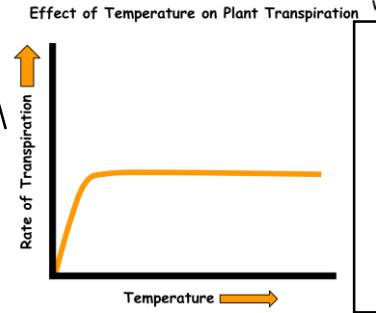
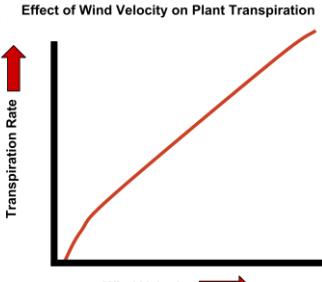
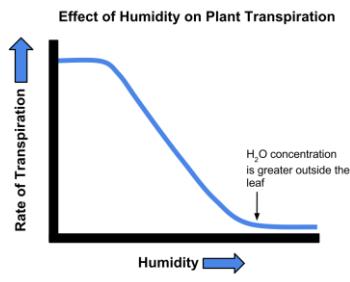


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