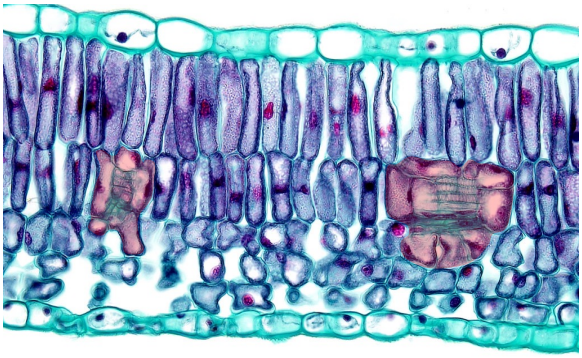
8.1 – PLANT STRUCTURE

B3.1.7	Adaptations for gas exchange in leaves
B3.1.8	Distribution of tissues in a leaf
B3.2.9	Distribution of tissues in a transverse section of the stem of a dicotyledonous plant
B3.2.10	Distribution of tissues in a transverse section of the root of a dicotyledonous plant

LEAVES

Construct a labelled plan diagram of leaf tissue (remember: plan diagrams do not show individual cells)

Leaf Micrograph



Plan Diagram

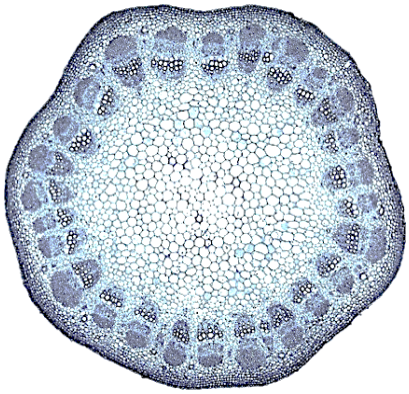
Outline how the different leaf structures are adapted for gas exchange

Waxy cuticle	
Epidermis	
Palisade mesophyll	
Spongy mesophyll	
Stomatal guard cells	
Vascular bundle	

STEMS

Construct a labelled plan diagram of stem tissue (remember: plan diagrams do not show individual cells)

Stem Micrograph



Plan Diagram

Outline the main functions of the following structures

Epidermis: _____

Cortex: _____

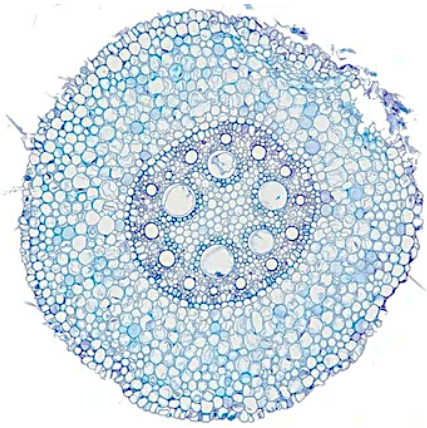
Xylem: _____

Phloem: _____

ROOTS

Construct a labelled plan diagram of root tissue (remember: plan diagrams do not show individual cells)

Root Micrograph



Plan Diagram

Differentiate between the structure of the root system in small plants versus larger plants

_____

_____

_____

_____

8.2 – TRANSPIRATION

B3.1.9	Transpiration as a consequence of gas exchange in a leaf
B3.1.10	Stomatal density
B3.2.7	Transport of water from roots to leaves during transpiration
B3.2.8	Adaptations of xylem vessels for water transport

TRANSPIRATION

Define transpiration

_____

_____

Explain the transport of water from roots to leaves during transpiration

1. Evaporation of water from leaves

_____

_____

_____

2. Water uptake by the roots

_____

_____

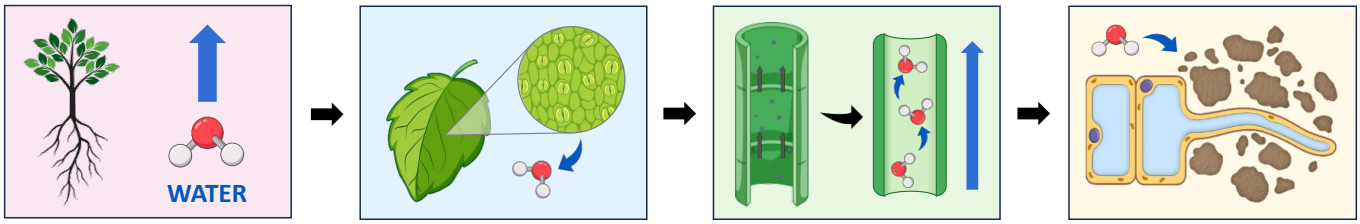
_____

3. Mass flow up the stem

_____

_____

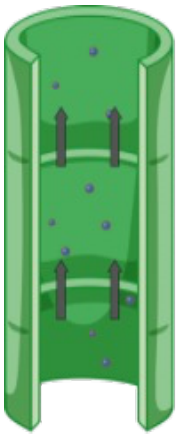
_____



Transpiration **Leaves:** Evaporation **Stem:** Mass Flow **Roots:** Osmosis

XYLEM VESSELS

Describe the adaptations of xylem vessels for water transport



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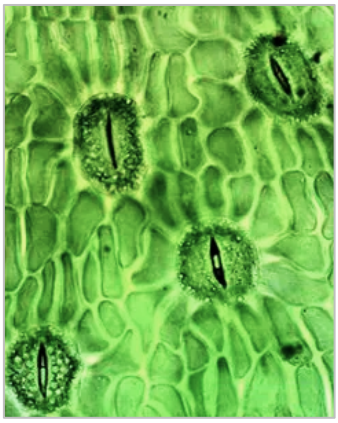
STOMATA

Outline the role of stomata in regulating evaporation



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_____

Describe a method via which stomatal density may be measured

_____

_____

_____

_____

TRANSPIRATION FACTORS

List five factors that may affect the rate of transpiration in plants

1. _____
2. _____
3. _____
4. _____
5. _____

8.3 – GERMINATION

D3.1.8 Sexual reproduction in flowering plants

D3.1.9 Features of an insect-pollinated flower

D3.1.10 Methods of promoting cross-pollination

D3.1.11 Self-incompatibility mechanisms to increase genetic variation within a species

D3.1.12 Dispersal and germination of seeds

PLANT REPRODUCTION

Identify the four stages of sexual reproduction in flowering plants

1. _____

2. _____

3. _____

4. _____

FLOWERS

Draw a labelled diagram of an insect pollinated flower (monoecious)

Outline the components of the male and female reproductive organs

Stamen (male)	
Pistil (female)	

POLLINATION

Describe the different methods of promoting cross-pollination in flowering plants

_____

_____

_____

_____

_____

Outline self-incompatibility mechanisms in flowering plants

_____

_____

_____

_____

SEED GERMINATION

Outline the process of germination in seeds

_____

_____

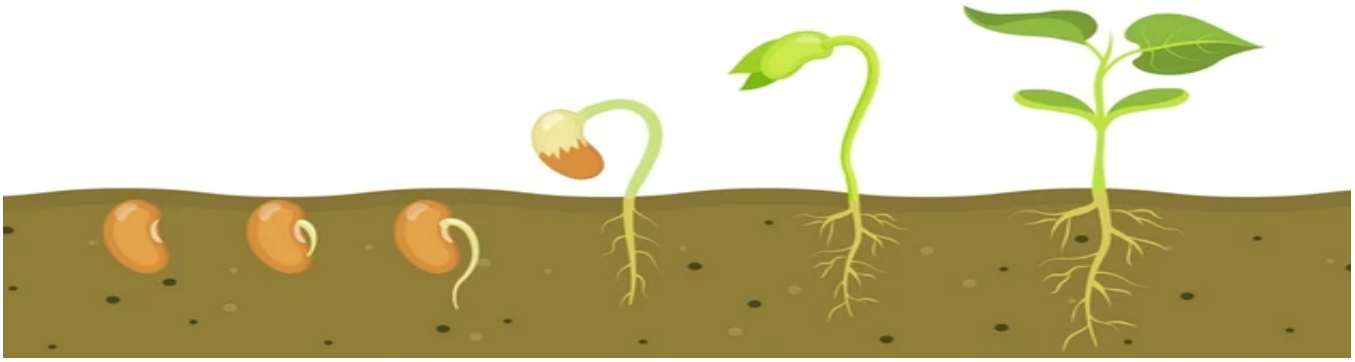
_____

_____

Identify the conditions required for the germination of seeds

Essential: _____

Optional: _____



8.4 – PLANT TRANSPORT (AHL)

D2.3.8	Water potential as the potential energy of water per unit volume
D2.3.9	Movement of water from higher to lower water potential
D2.3.10	Contributions of solute potential and pressure potential to water potential of cells with walls
D2.3.11	Water potential and water movements in plant tissue
B3.2.17	Generation of root pressure in xylem vessels by active transport of mineral ions
B3.2.18	Adaptations of phloem sieve tubes and companion cells for translocation of sap

WATER POTENTIAL

Define water potential (including units and relative conditions)

_____

_____

State the equation for water potential and explain how each of its components affect potential energy

[ ] = [ ] + [ ]

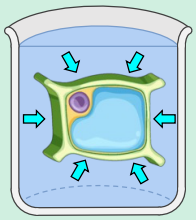
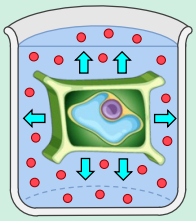
Ψs: _____

Ψp: _____

State the direction of water movement according to water potential

_____

Explain the changes that occur when plant tissue is bathed in hypotonic or hypertonic solutions

 **HYPOTONIC**	
 **HYPERTONIC**	

ROOT PRESSURE

Outline how the active uptake of mineral ions generates root pressure in xylem vessels

_____

_____

_____

_____

_____

TRANSLOCATION

Describe the movement of sap by active translocation

_____

_____

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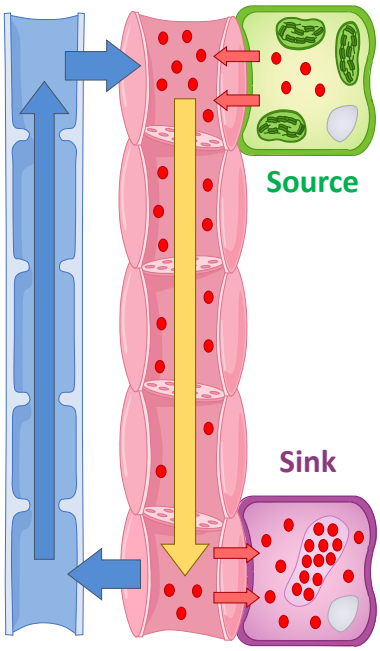


PHLOEM

Identify the adaptations of phloem sieve tubes and companion cells that support the translocation of sap

Sieve Tubes:

- S: _____
- C: _____
- A: _____

Companion Cells:

- M: _____
- P: _____

8.5 – PLANT SIGNALLING (AHL)

C3.1.17 Observation of tropic responses in seedlings

C3.1.18 Positive phototropism as a directional growth response to lateral light in plant shoots

C3.1.19 Phytohormones as chemicals controlling growth, development and response to stimuli

C3.1.20 Auxin efflux carriers as an example of maintaining concentration gradients of phytohormones

C3.1.21 Promotion of cell growth by auxin

C3.1.22 Interactions between auxin and cytokinin as a means of regulating root and shoot growth

C3.1.23 Positive feedback in fruit ripening and ethylene production

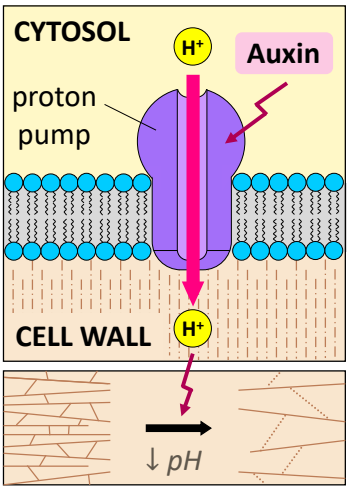
PHYTOHORMONES

Describe the function of the following phytohormones within plant tissues

Auxins	
Cytokinin	
Ethylene	

AUXIN

Describe the mechanism by which auxin promotes cell growth



Explain how auxin efflux carriers can be used to establish concentration gradients of auxin in plant tissues

PHOTOTROPISM

Define phototropism and suggest a way it could be measured in seedlings

_____

_____

_____

Outline the role of auxin in positive phototropism

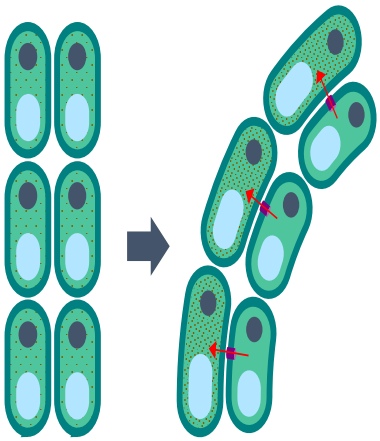
_____

_____

_____

_____

_____



APICAL GROWTH

Outline how the interaction between auxin and cytokinin regulates apical growth of the shoots and roots

_____

_____

_____

_____

Explain why removing the shoot or root tip increases branching (lateral growth)

_____

_____

FRUIT RIPENING

Outline the role of ethylene and positive feedback in fruit ripening

_____

_____

_____

_____