


Name:.....

Set: .....



## WJEC AS Biology

# Plants: Leaf Structure, Transport & Reproductive Strategies

<b>Specification Points:</b>	
2.2 (e) The structure of the angiosperm leaf. The role of leaf structures in allowing the plant to function and photosynthesise effectively. The leaf as an organ of gaseous exchange. Stomatal opening and closing.	
2.3 (d) Structure of the dicotyledon root. Absorption of water. Movement of water through the root: apoplast, symplast and vacuolar pathways. Structure and role of endodermis. The structure of xylem. Movement of water from root to leaf. Transpiration stream, cohesion-tension theory. Environmental factors affecting transpiration. Angiosperm adaptations: hydrophytes, xerophytes	
2.3 (e) The structure of phloem as seen by the light and electron microscope. Translocation of organic materials from source to sink. Phloem transport: diffusion; cytoplasmic strands; mass flow models. Experimental evidence that solutes e.g. sucrose, are carried in the phloem. Use of aphids and autoradiographs.	
2.4 (a) Types of reproduction: Asexual and sexual reproduction in plants and animals.	
2.4 (d) Comparison of reproductive strategies in plants and animals. The reasons for the successful colonisation of land by angiosperms. The link between angiosperms and insects. The concept of the seed.	

## Gas Exchange in Leaves

What are the adaptations of a good gas exchange surface?

What gases do leaves transfer in and out at day and at night? What are the symbol equations for these biochemical processes?

Draw a labelled diagram of the cross section of a leaf in the space below, highlighting adaptations for gas exchange.

For each statement, give the parts of the leaf and how these are adapted to its function.

**Photosynthesis:**

Structure(s):

Adaptation(s):

**Gas Exchange:**

Structure(s):

Adaptation(s):

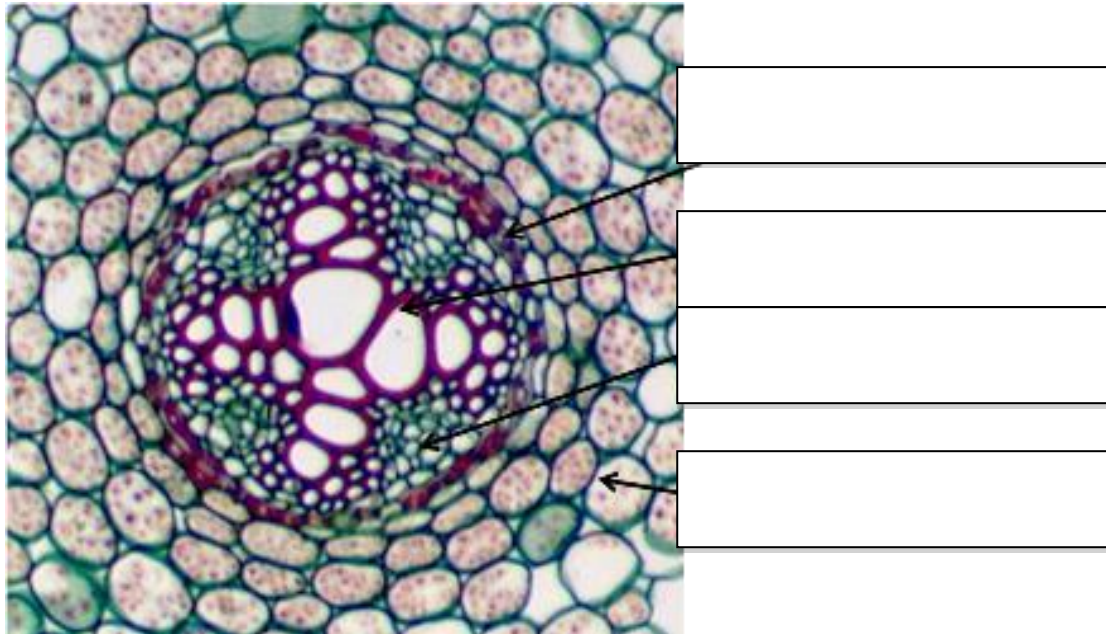
## The stomata

Draw a labelled diagram of a stoma (pl. stomata).

How is stomatal opening and closing caused? How are the stomata adapted to perform this?

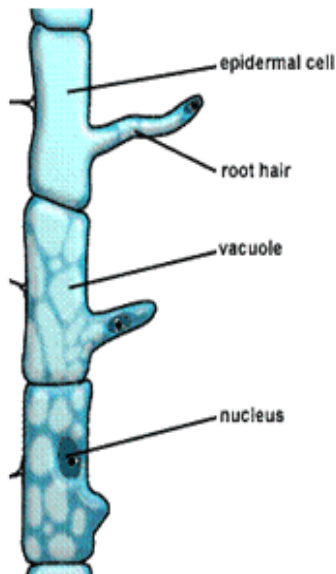
# Plant Transport: Root Structure

Label the picture of a dicotyledon root.

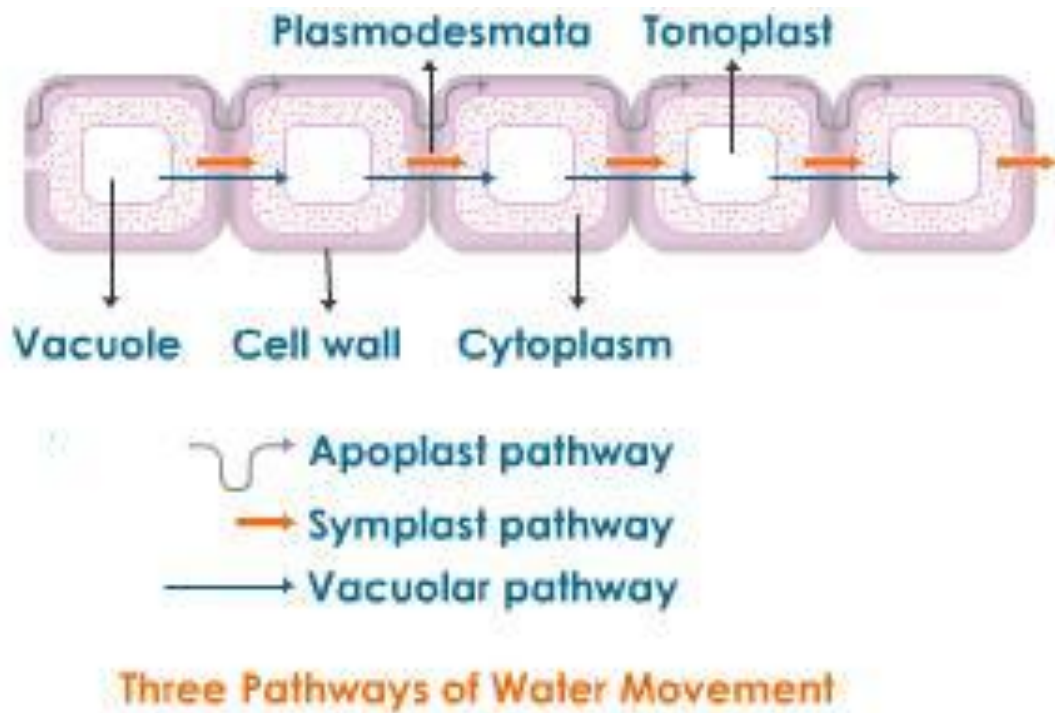


How does the positioning of the xylem and phloem in the root aid the plant?

How is water absorbed into a root hair cell?



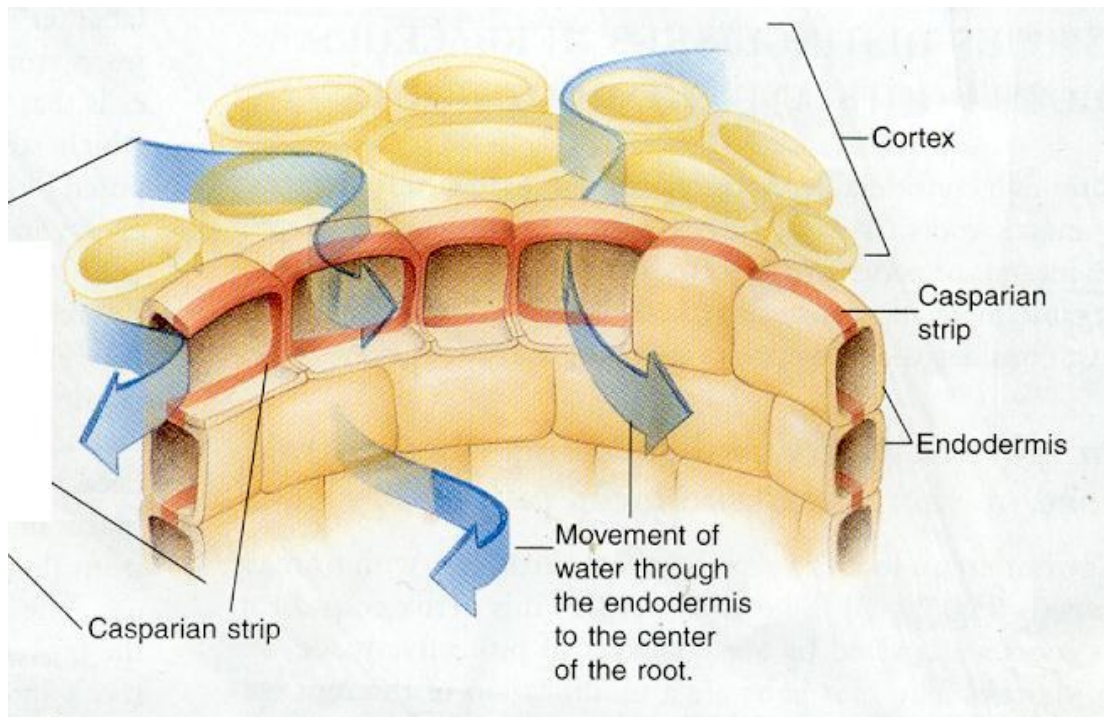
How does water move through the root into the xylem vessels?



What are plasmodesmata?

What is the difference between the apoplast and symplast pathways?

## The Endodermis and the Casparian Strip

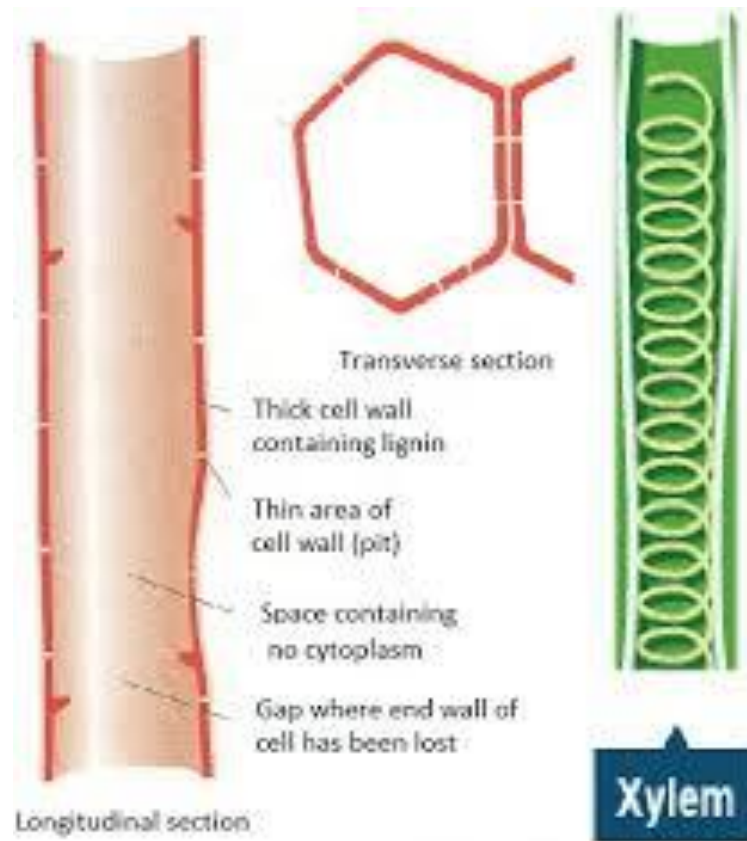


What is the endodermis?

What is the casparian strip made of?

What is the function of the casparian strip?

## Xylem Structure

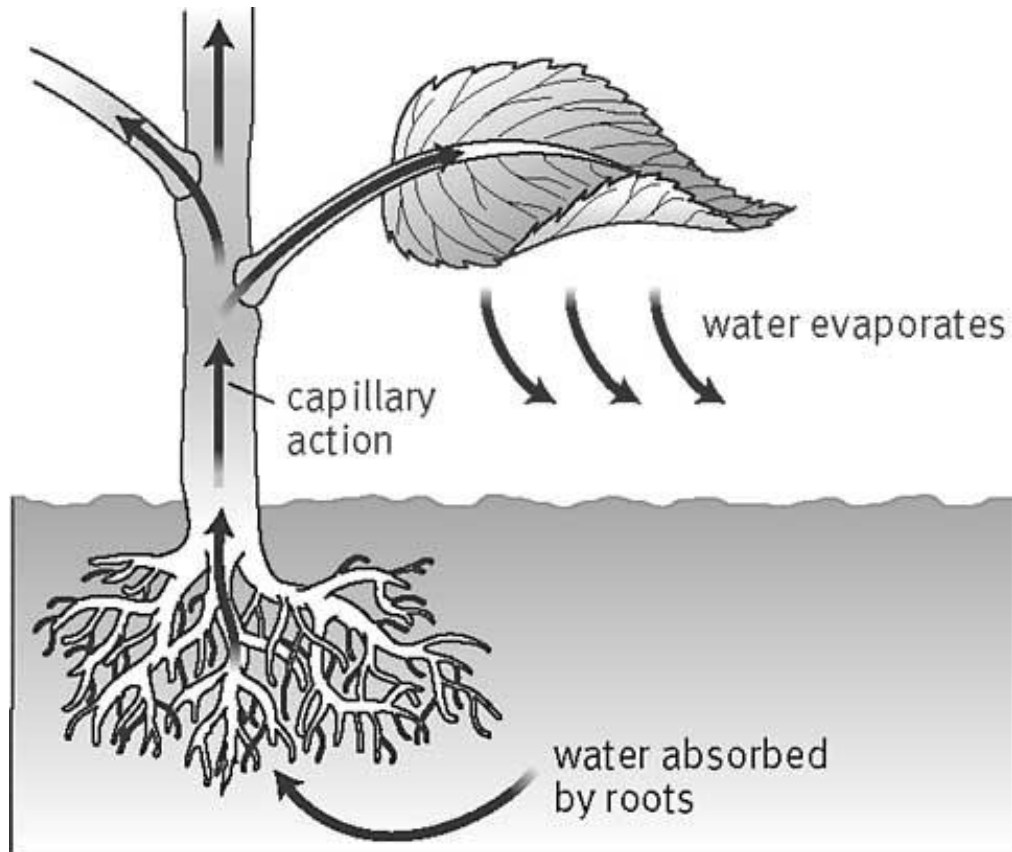


Which pathway will water be transferred to by the xylem?



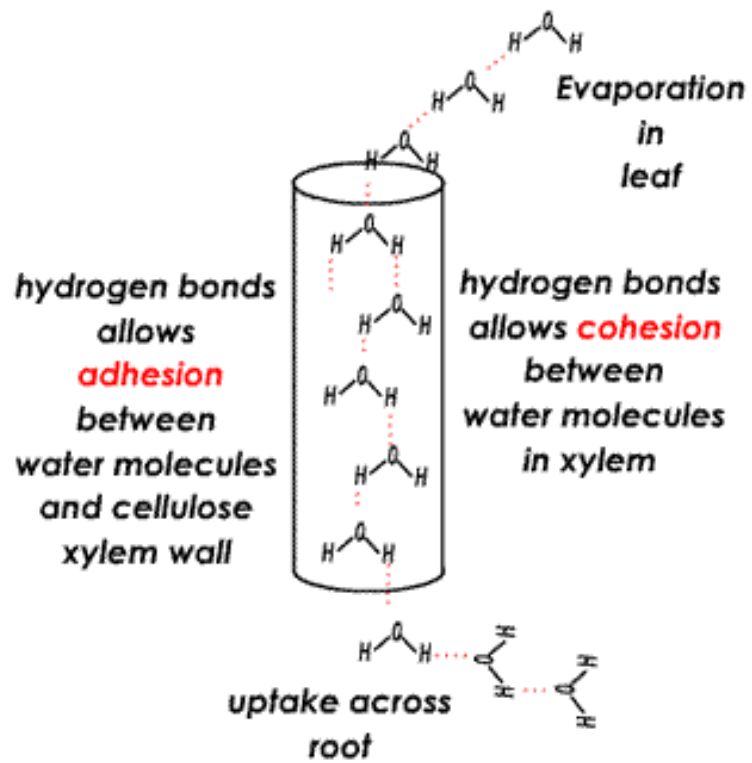
## Movement of water from root to tip

What is transpiration?



## Cohesion-tension theory

What is cohesion tension theory?



## Factors affecting transpiration

What factors affect transpiration?

Why do these factors affect transpiration?

## Xerophytes and Hydrophytes

**TASK:** Research the adaptations of xerophytes and hydrophytes.

Xerophytes are plants which live in dry areas. Hydrophytes are plants which live in wet areas.



A cactus is a xerophyte and a lily is a hydrophyte.

**Success criteria:**

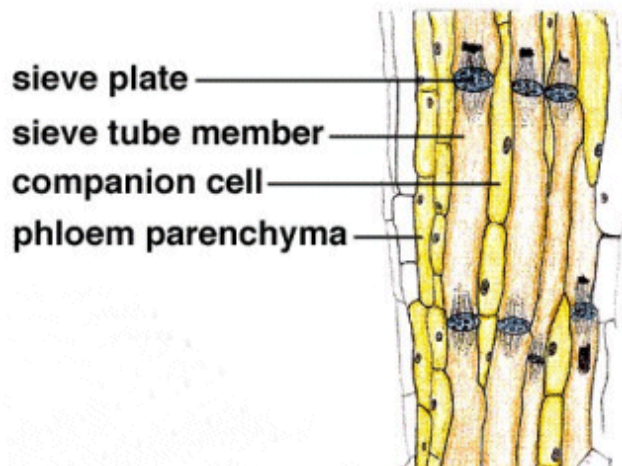
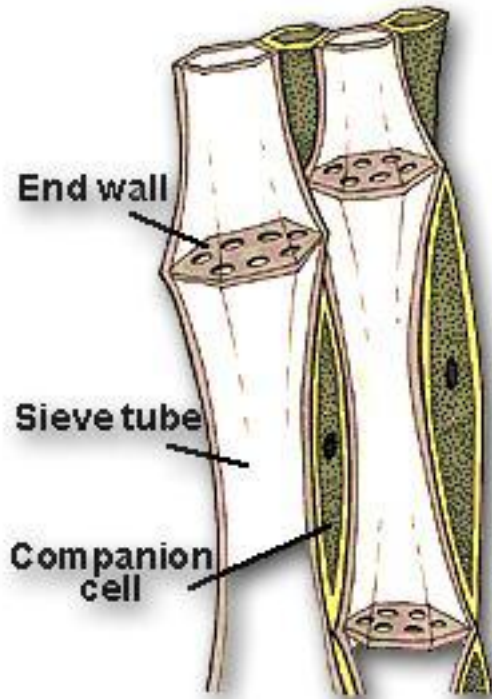
**(C grade)** list the adaptations of xerophytes and hydrophytes

**(B grade)** include labelled diagrams of xerophytes and hydrophytes

**(A grade)** explain how these are adaptations for the plants

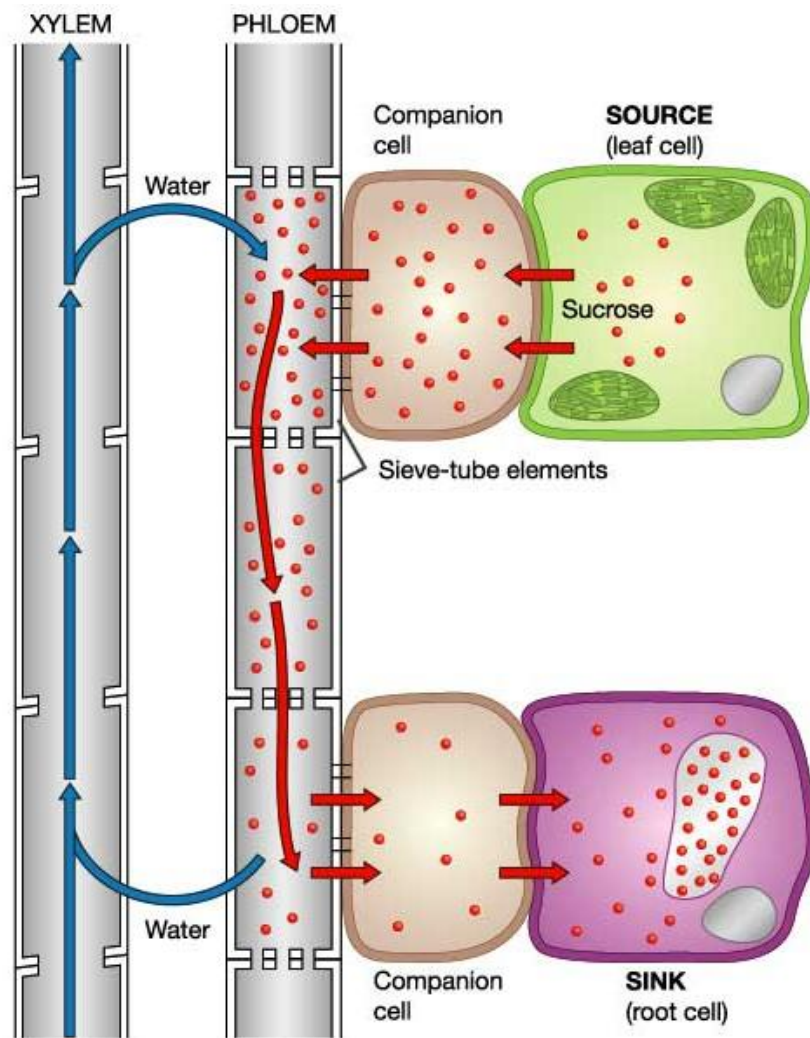
# Phloem: Transport of sugars

Structure:



Draw a labelled diagram of phloem from under the microscope (hint: this may form part of BY3...)

## Transport from source to sink



# Phloem transport:

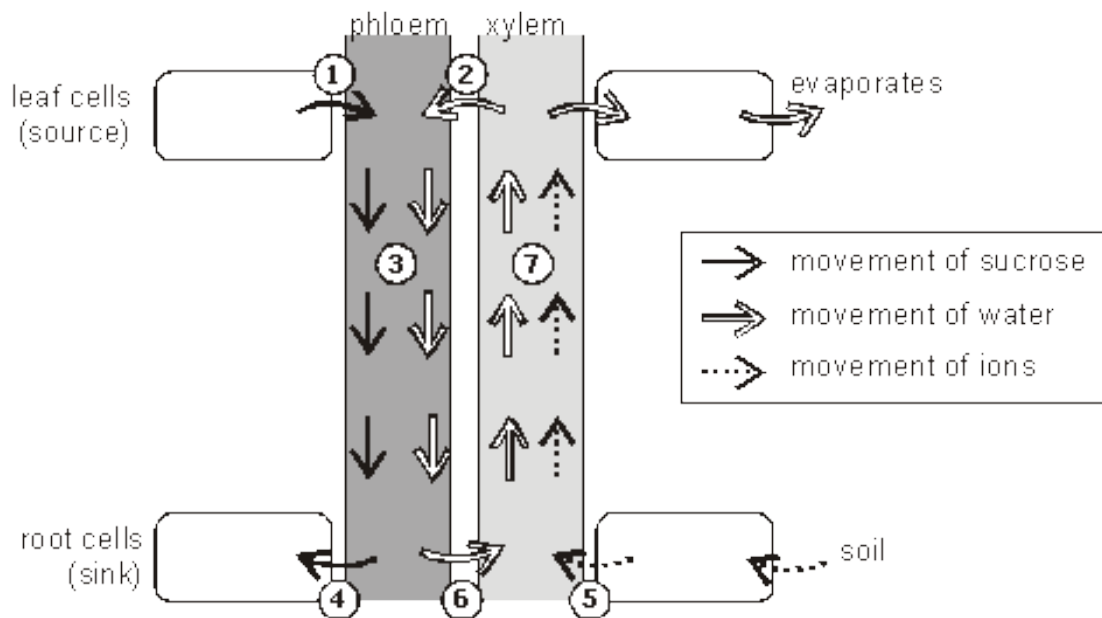
Diffusion, cytoplasmic strands & mass flow

**Diffusion:**

**Cytoplasmic Strands:**

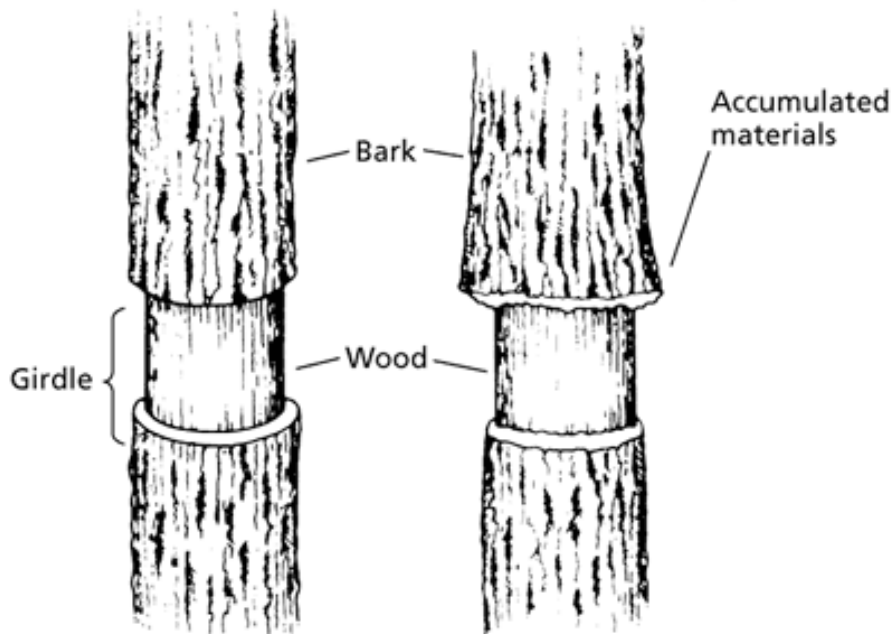
**Mass Flow:**

Mass flow is driven by a combination of active transport (energy from ATP) and evaporation (energy from the sun).

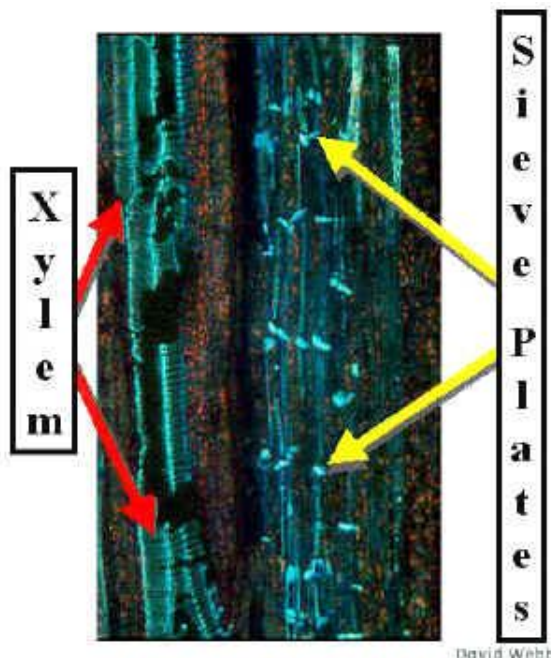


## Experimental evidence that solutes are in phloem

Early evidence about translocation of solutes was obtained from ringing experiments.



The technique of radioactive tracing combined with using aphid mouthparts demonstrated that translocation is a rapid process.



Radioisotope labelling using carbon dioxide combined with autoradiography shows that sucrose is transported bi-directionally to sinks.

## Asexual Reproduction in Plants

What is the difference between sexual and asexual reproduction?

What are the disadvantages of asexual reproduction?

How do plants reproduce asexually?



## Reproductive Strategies in Plants

Flowering plants are well adapted for life on land in terms of their morphology and reproduction.

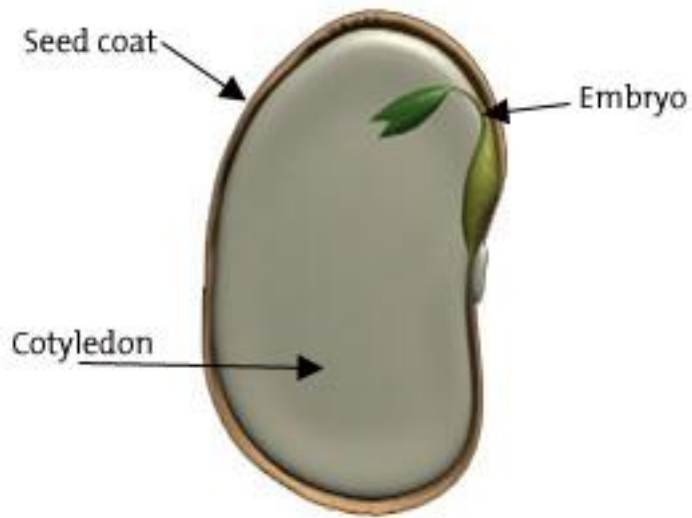
How?

Plants and animals underwent similar changes in order to colonise land and be able to reproduce effectively. What were these changes?

### Angiosperms and insects

How do angiosperms (flowering plants) 'work' with insects and other animals?

## The concept of the seed



The cotyledon contains sugars. Why?

Why is the seed coat tough and strong?