

Structure of Flowering Plants



You need to know details on...

- 1. Structure & function of root and shoot systems**
- 2. Root zonations and all outer stem parts**
- 3. Meristem function / location in root & shoot**
- 4. Location of 3 tissue types in transverse and long sections of root and stem**
- 5. Xylem & Phloem structure and function**
- 6. Distinguish between Moncots and Dicots**
- 7. Mandatory Activity....TS Dicot stem**

What Flowering Plant typically have

1. Transport (Vascular) Structures

2. Roots

3. Stems

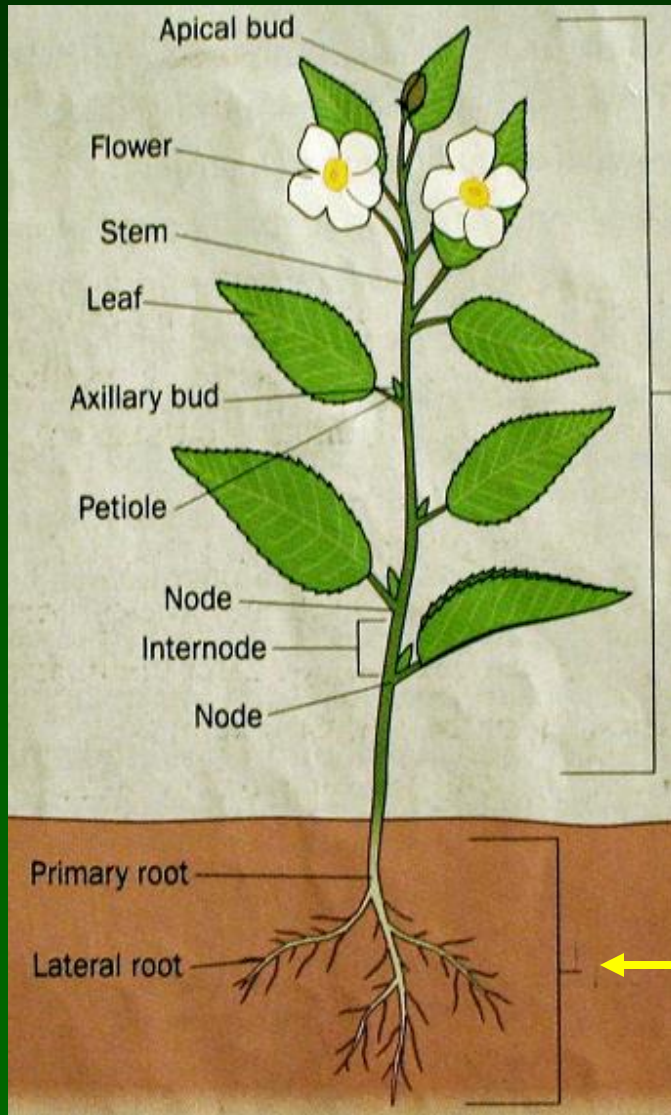
4. Leafs

5. Flowers

6. Fruits & Seeds



Plants are divided into two portions

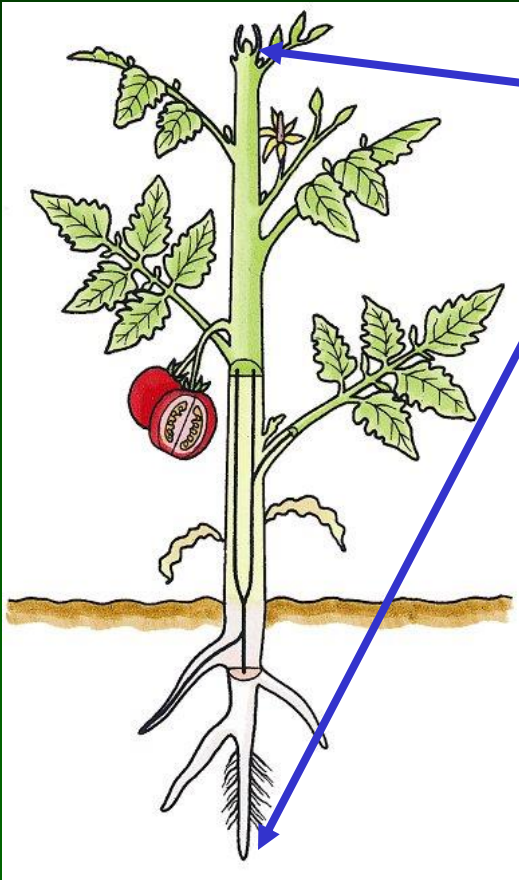


Over ground shoot system

Under ground root system

Meristem

An area of active cell division



Apical meristems are found at the tip of the shoot and tip of the root and give an increase in length

Lateral meristems are found around the edges of some plants and give an increase in width

Root Functions

Anchor

Absorb Water

Absorb minerals

Transport absorbed materials to shoot

Store food

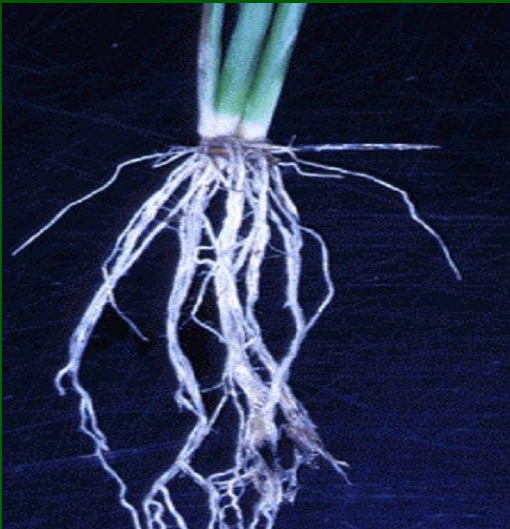


Two Root Types



1. Tap Roots

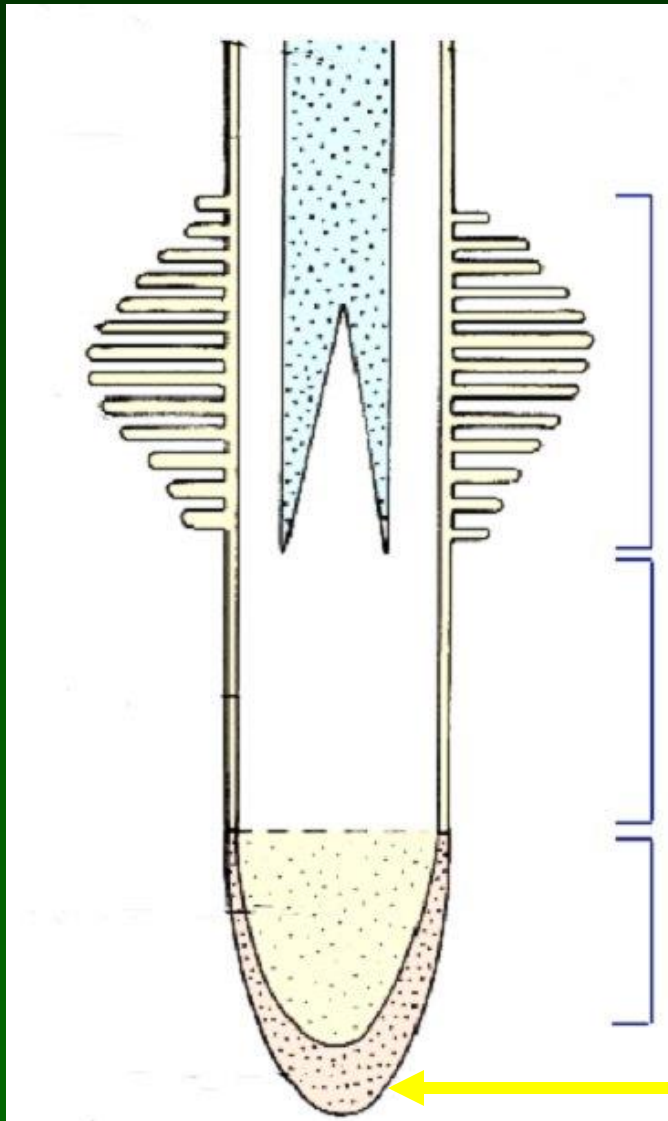
*One main root growing from the radicle
eg Carrot*



2. Fibrous Roots

*Many equal sized roots arising from stem base
eg grass*

Four Root Zones



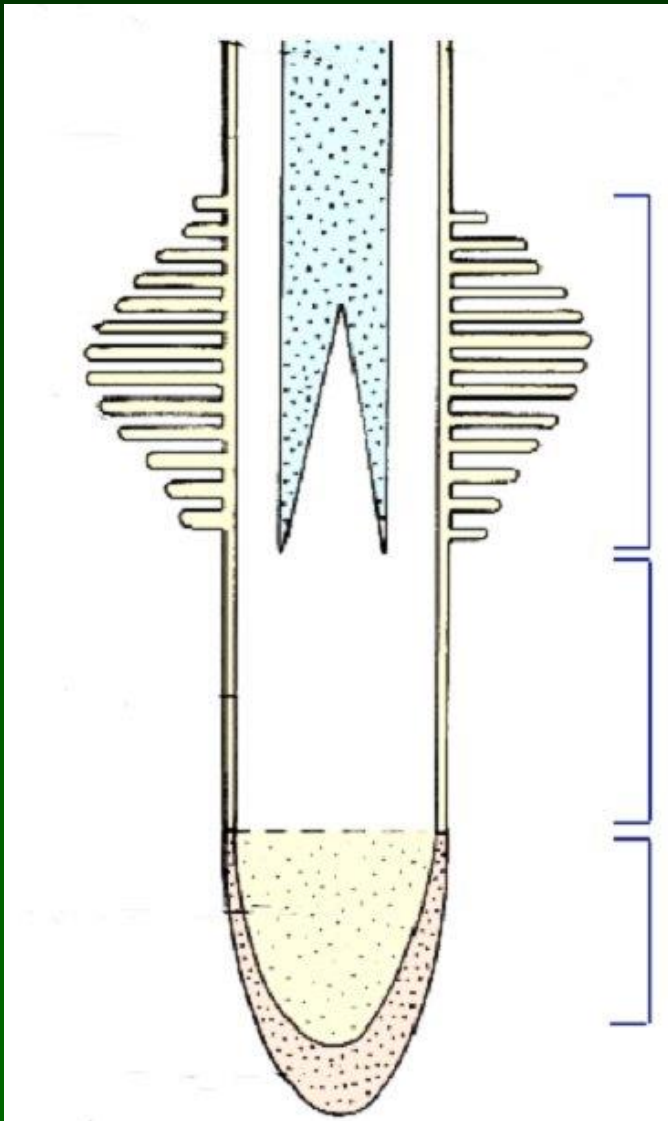
← **Differentiation Zone**

← **Elongation Zone**

← **Meristematic Zone**

← **Protection Zone**

Root Zones



Differentiation Zone

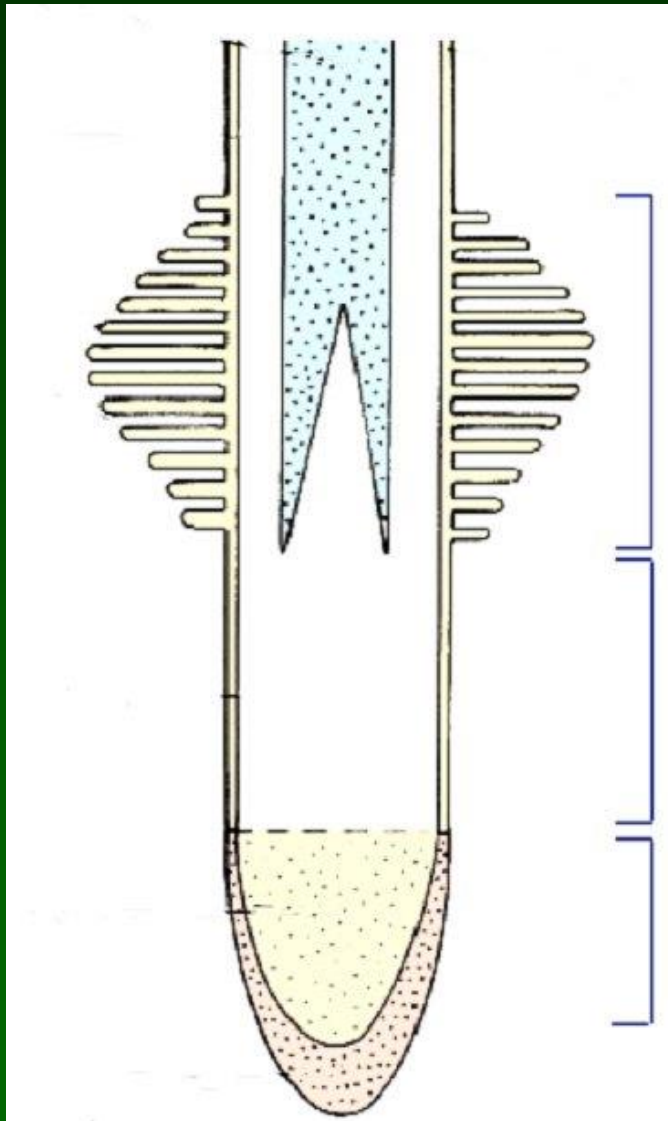
Here cells develop into 3 different types of tissue

1. Dermal tissue

2. Ground Tissue

3. Vascular tissue

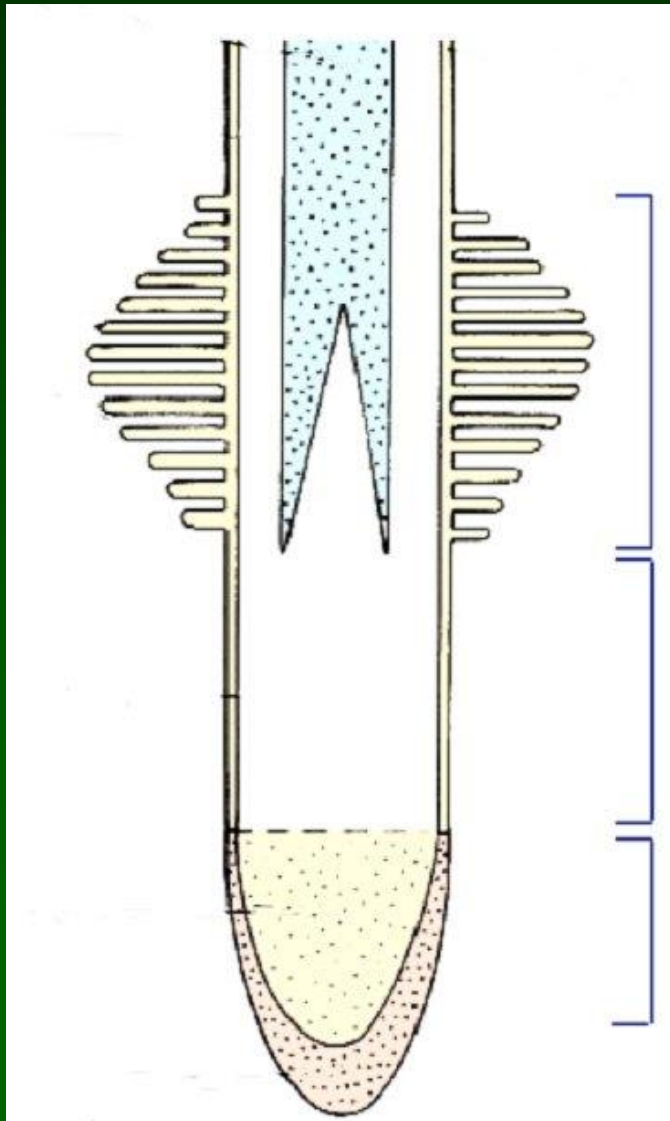
Root Zones



Elongation Zone

Here cells increase in size

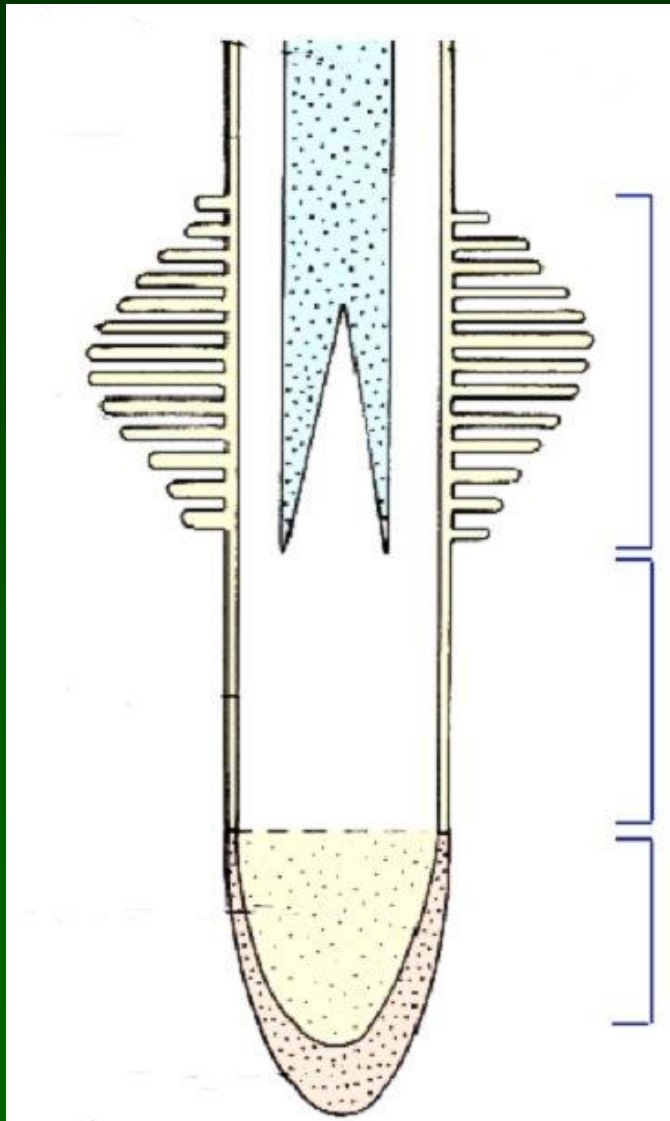
Root Zones



Meristematic Zone

Here new cells are produced by mitosis divisions

Root Zones



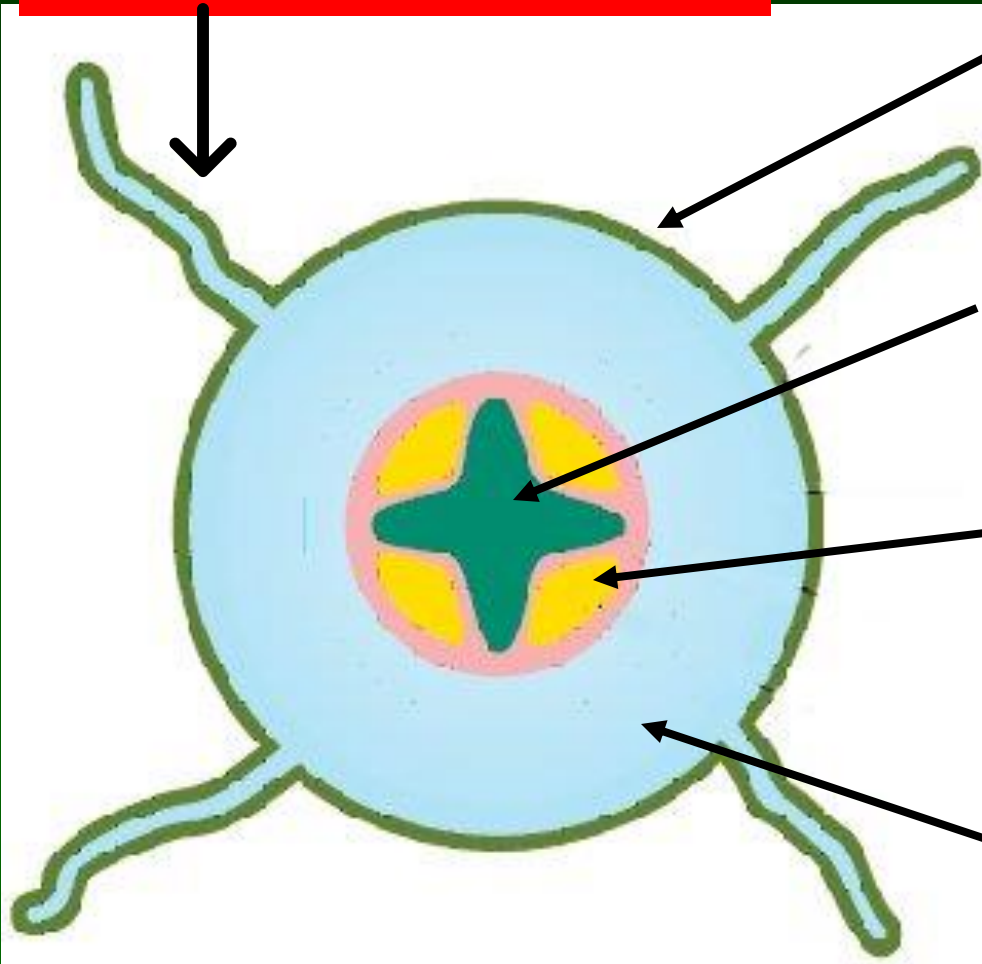
Protection Zone

A root cap protects the cells as the root pushes through the soil

Tissue location in the root

(transverse section)

Root hairs



Dermal Tissue

Xylem

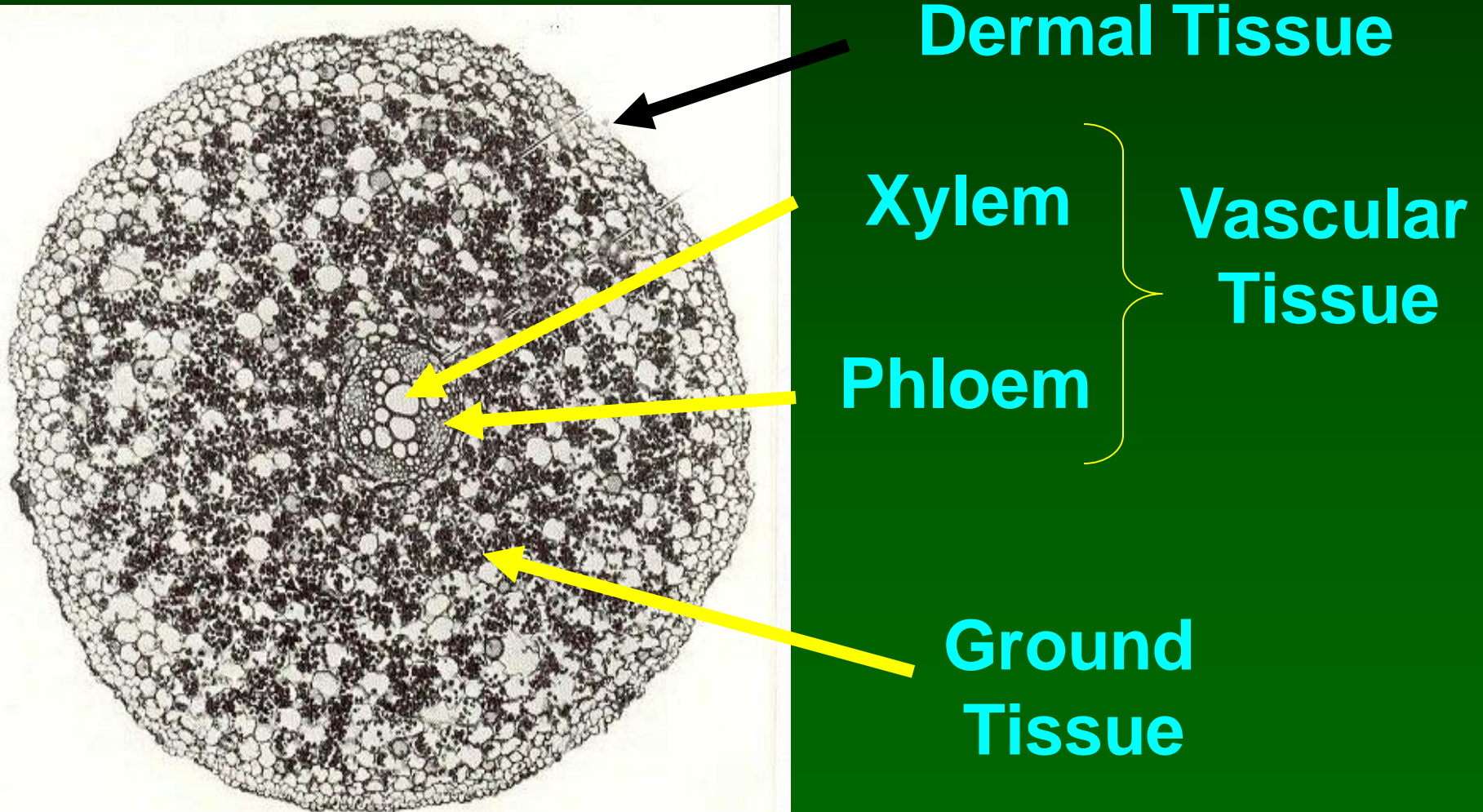
Vascular Tissue

Phloem

Ground Tissue

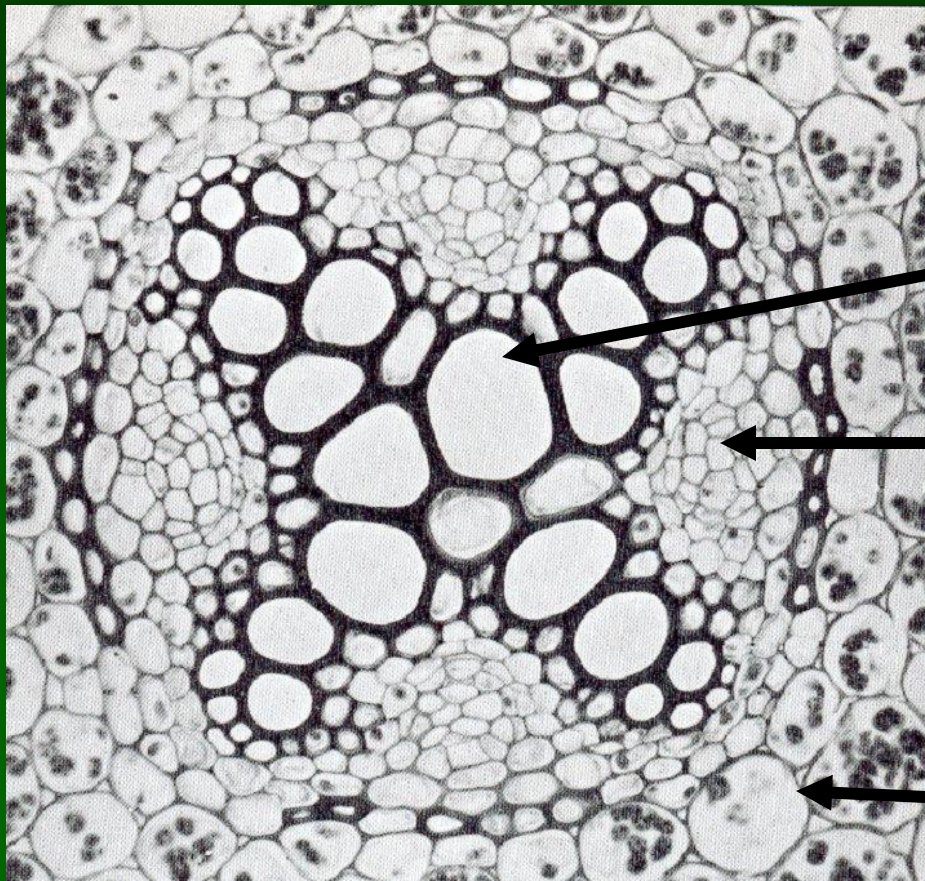
Tissue location in the root

(transverse section)



Tissue location in the root (transverse section)

(Center part of root)



Xylem

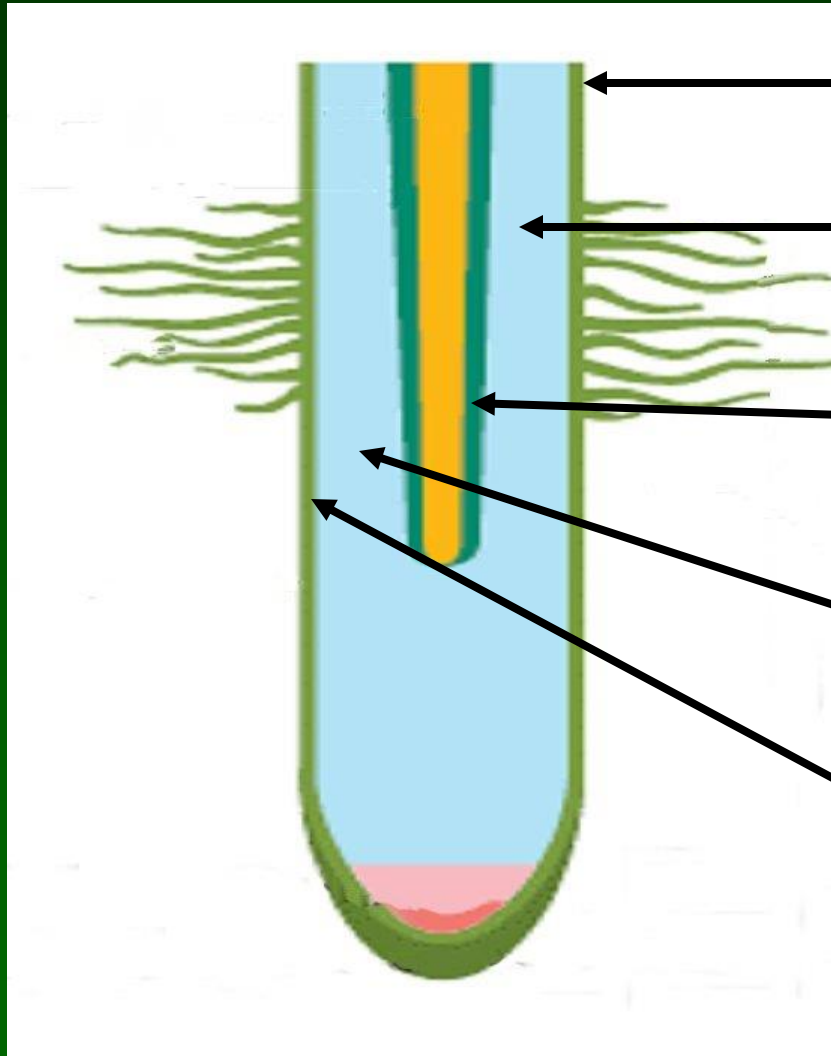
Phloem

**Vascular
Tissue**

**Ground
Tissue**

Tissue location in the root

(Longitudinal section) **DRAW**



Dermal Tissue

Ground Tissue

Vascular Tissue

Ground Tissue

Dermal Tissue

Stem Functions



1. Support the arial parts of the plant
2. Transport water and minerals from roots to leafs
3. Transport food from leafs to roots
4. Sometimes store food

Function of outer stem parts



Terminal Bud

Increase stem length

Lateral Bud

Grow side branches

Lenticels

Gas exchange

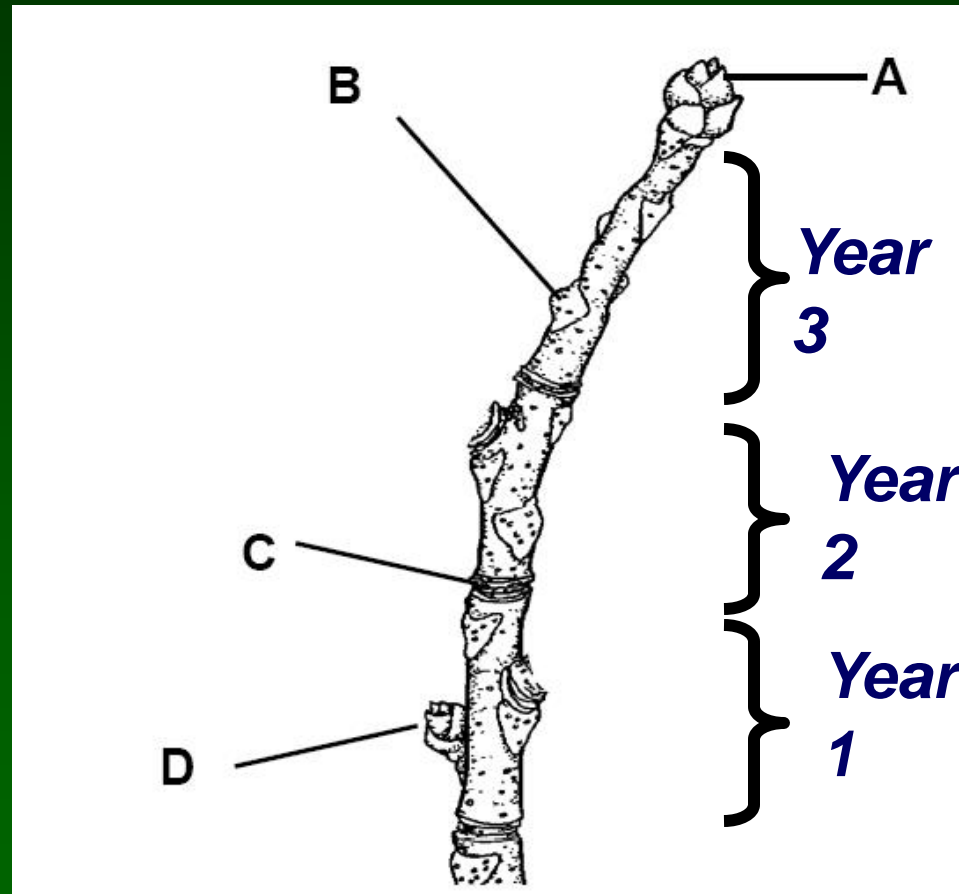
A= Terminal Bud

B= Leaf Scar

C= Scale Scar

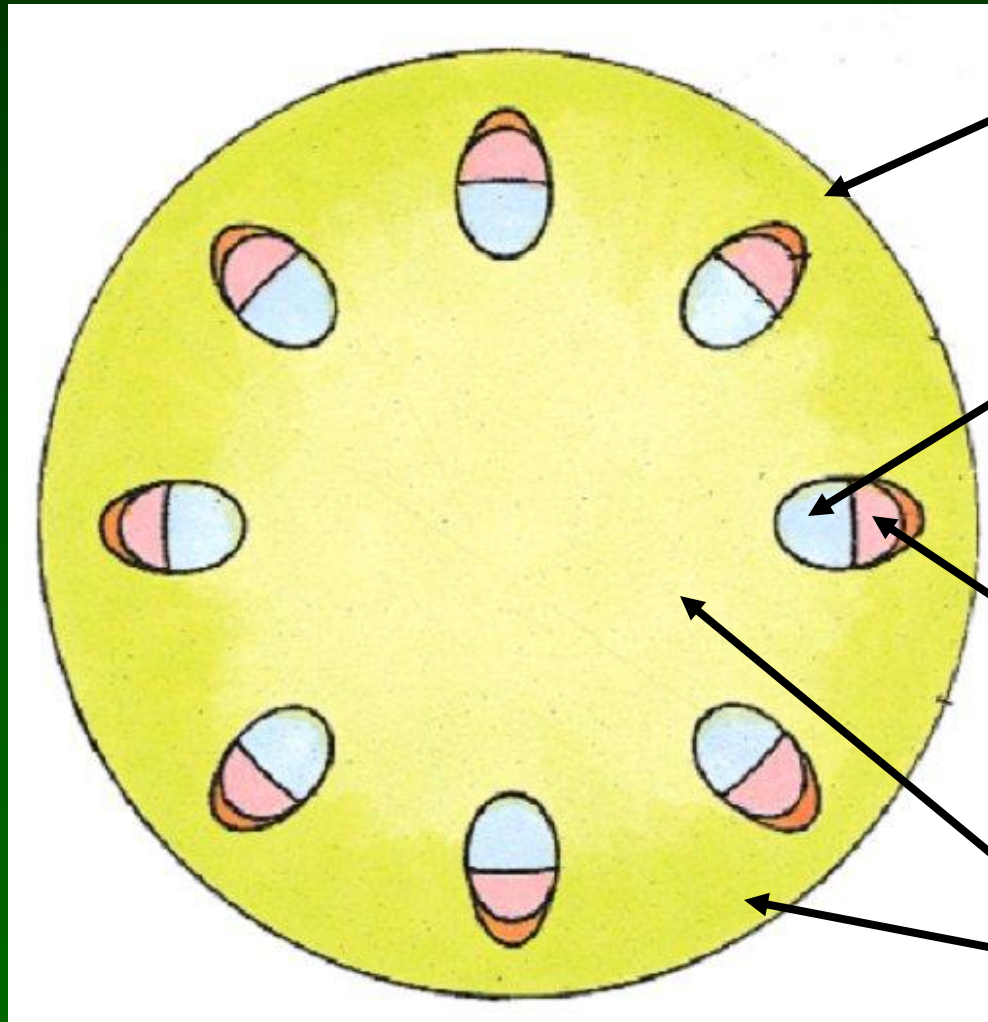
D= Lateral Bud

Lenticels



Tissue location in stem

(Transverse section) **DRAW**



Dermal Tissue

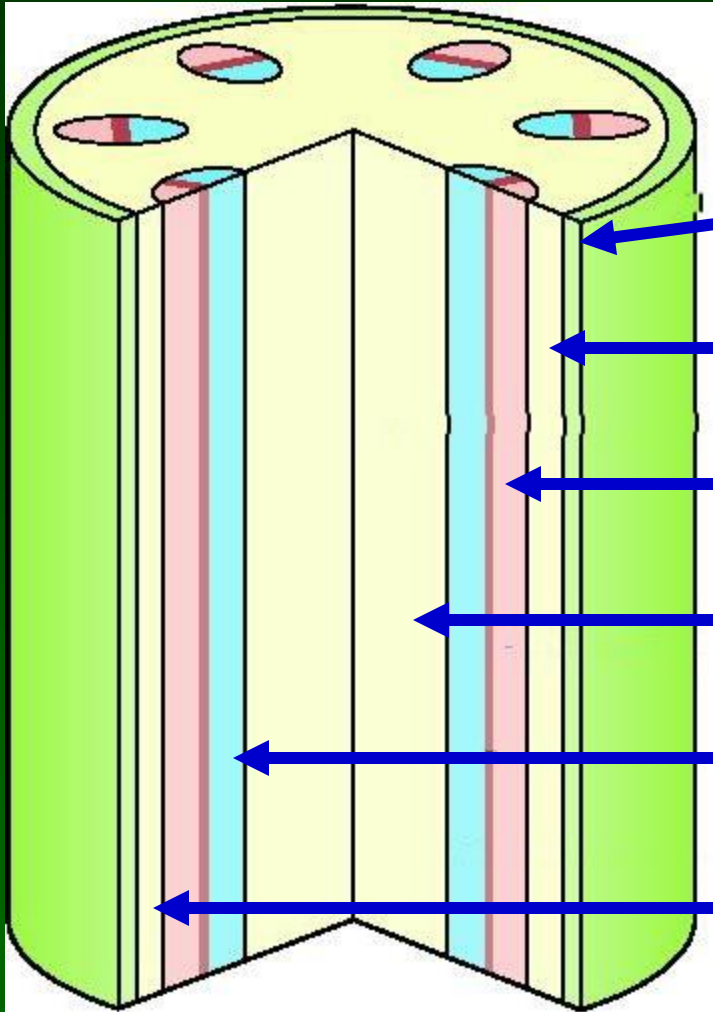
Xylem

**Vascular
Tissue**

Phloem

**Ground
Tissue**

Tissue location in stem (Longitudinal section)



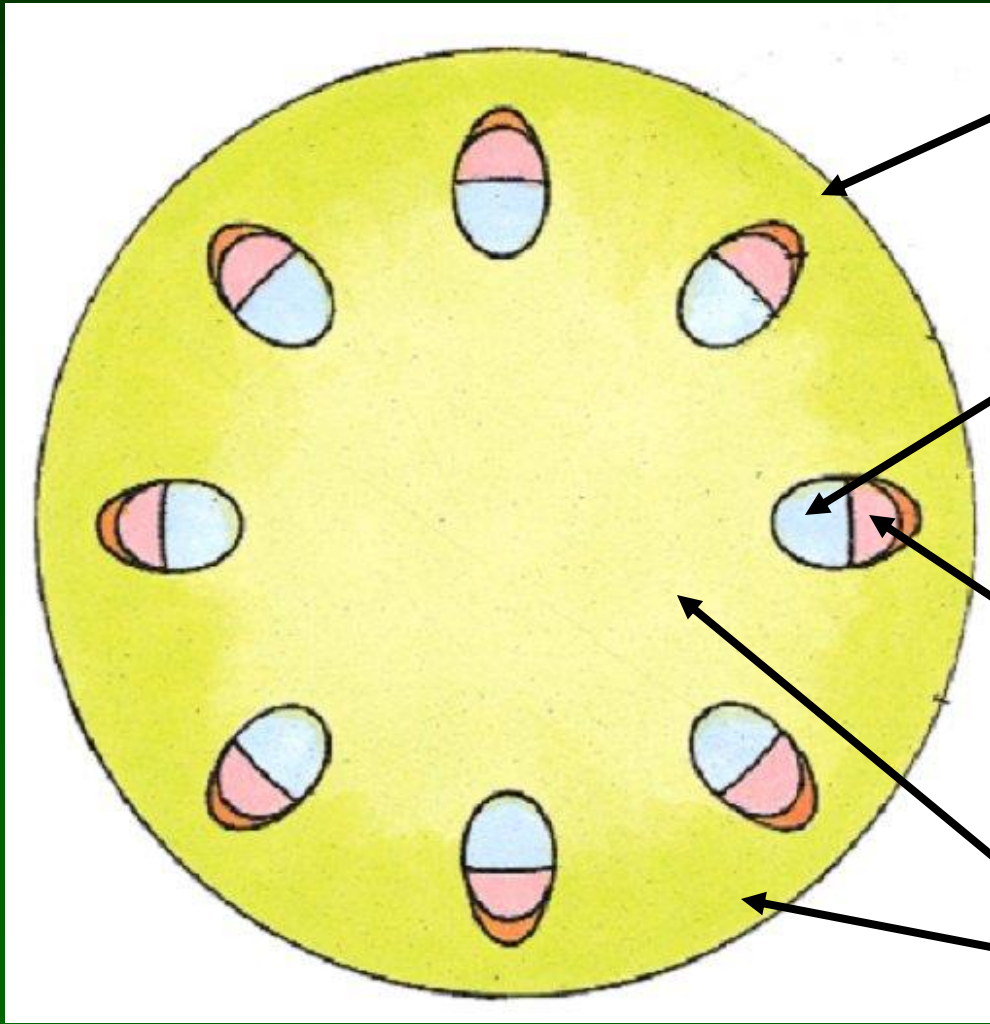
Dermal

Ground

Vascular

Ground

Learning Check 2 Label the diagram



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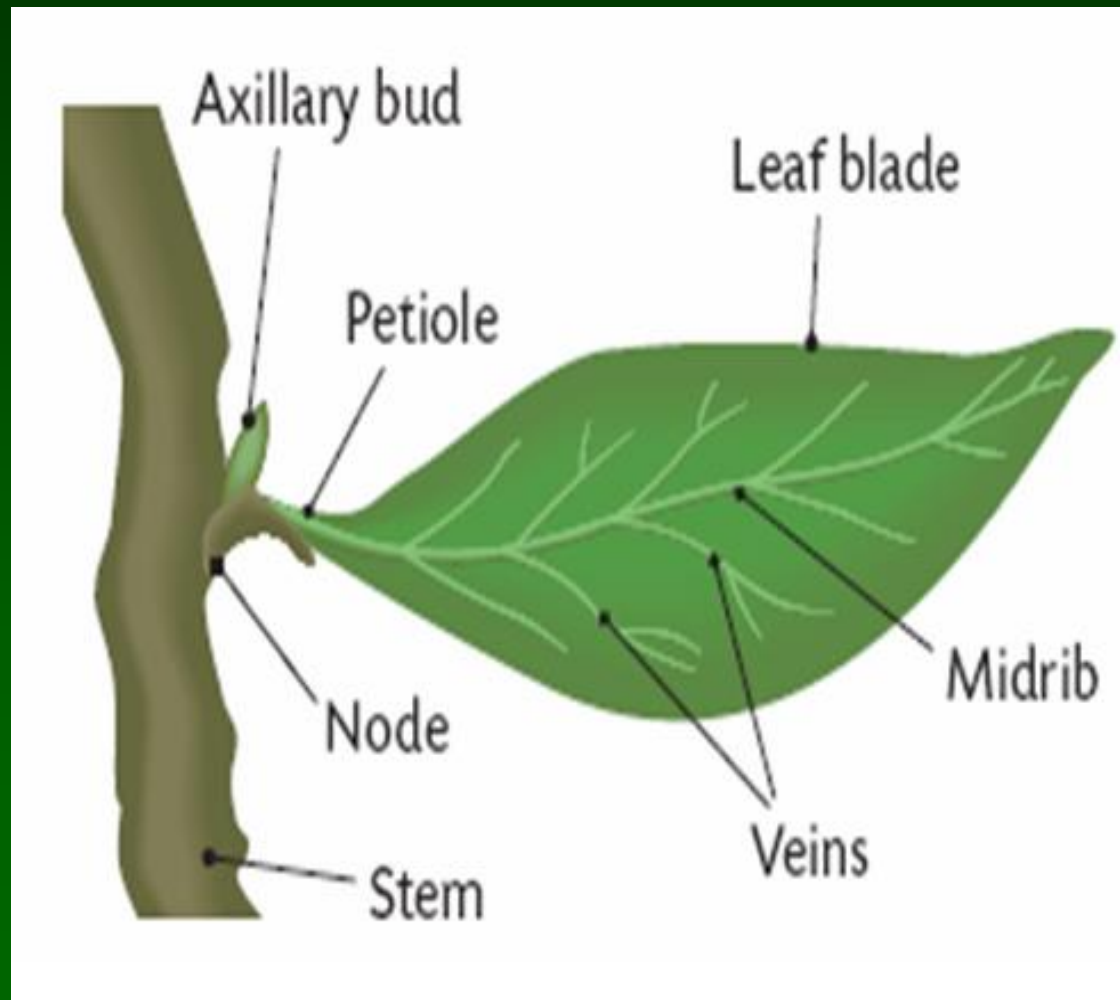
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Leaf parts

- Some leaves do not have a petiole (joins leaf to main stem)
(They are called sessile leaves)
- Veins contain the vascular tissue

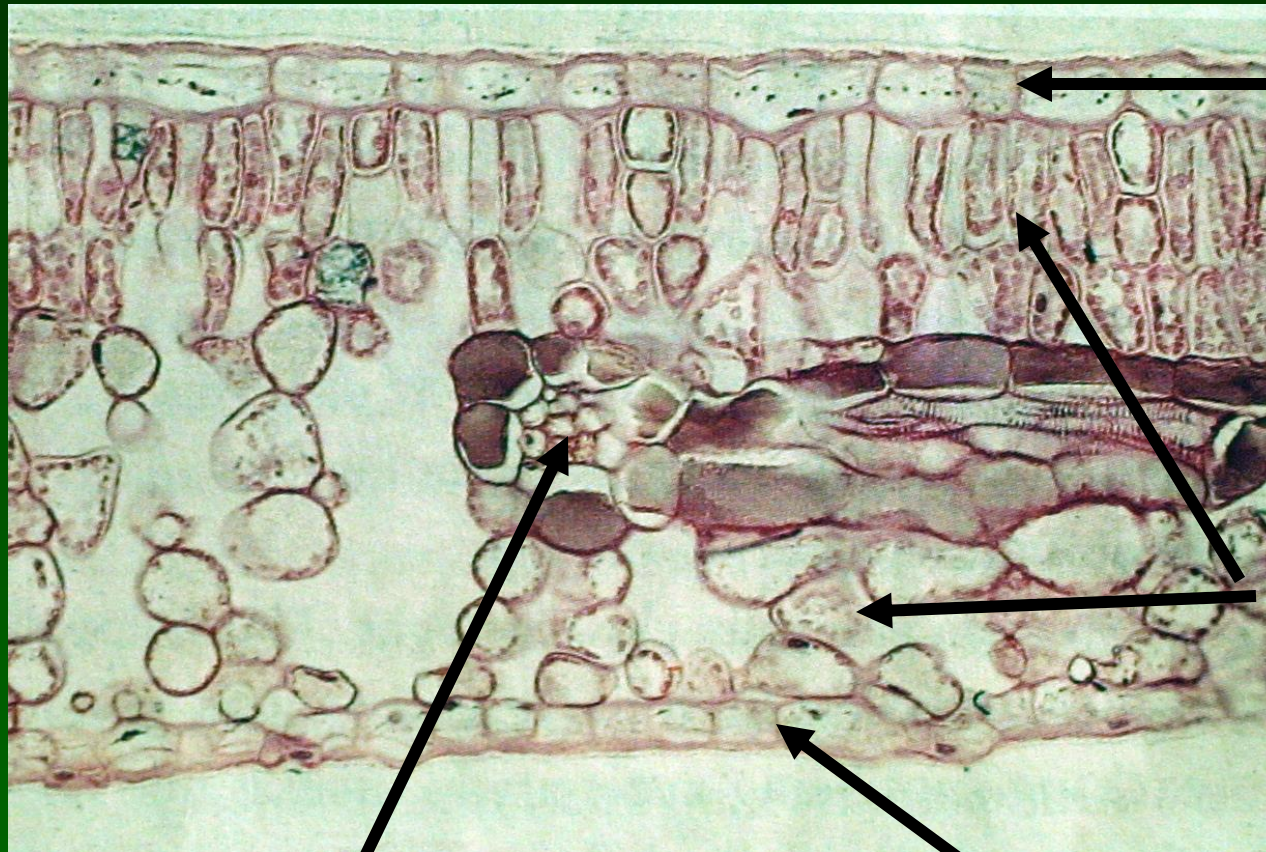


Leaf Functions



1. Photosynthesis
2. Transpiration
3. Gas exchange
4. Sometimes store food

Tissue Location in the Leaf



**Dermal
Tissue**

**Ground
Tissue**

**Vascular
Tissue**

Dermal Tissue

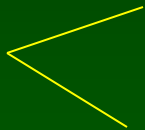
Flower Function



***Sexual
Reproduction***

Vascular Tissue

1. Xylem

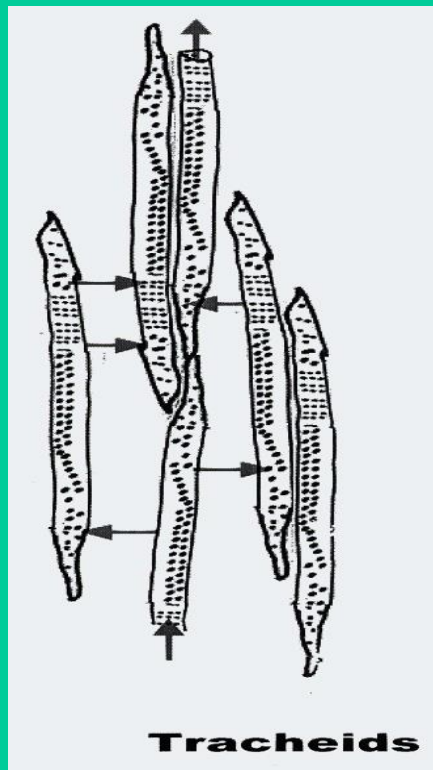
Function  Transport water
Transport minerals

2. Phloem

Function  Transport food

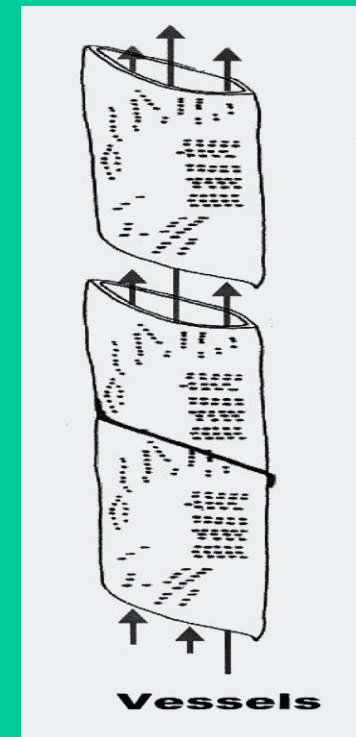
Xylem Structure...Two types of Cell

Xylem Tracheids



Found in conifers

Xylem Vessels



*Found in deciduous-loose
leaves in autumn*

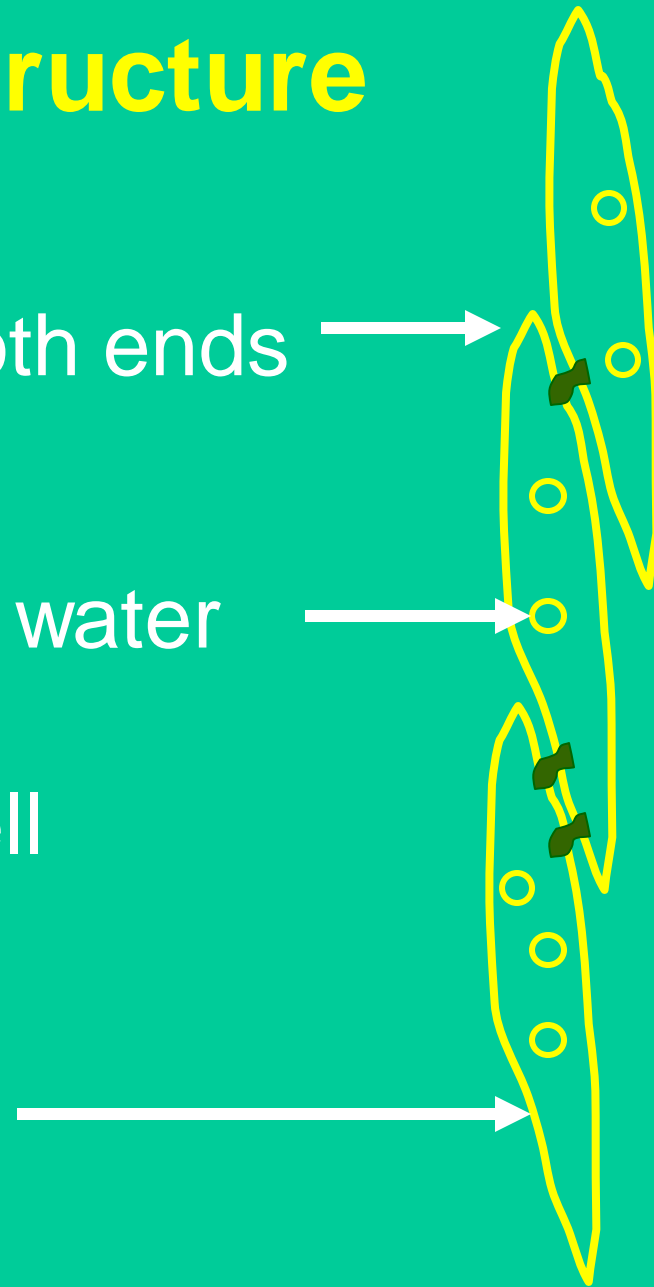
On maturity both
are dead, hollow
and contain no
cytoplasm

Xylem Tracheid Structure

Long cells tapered at both ends

Pits in the walls – allow water and minerals to move sideways from cell to cell

Walls thickened with **lignin** for support



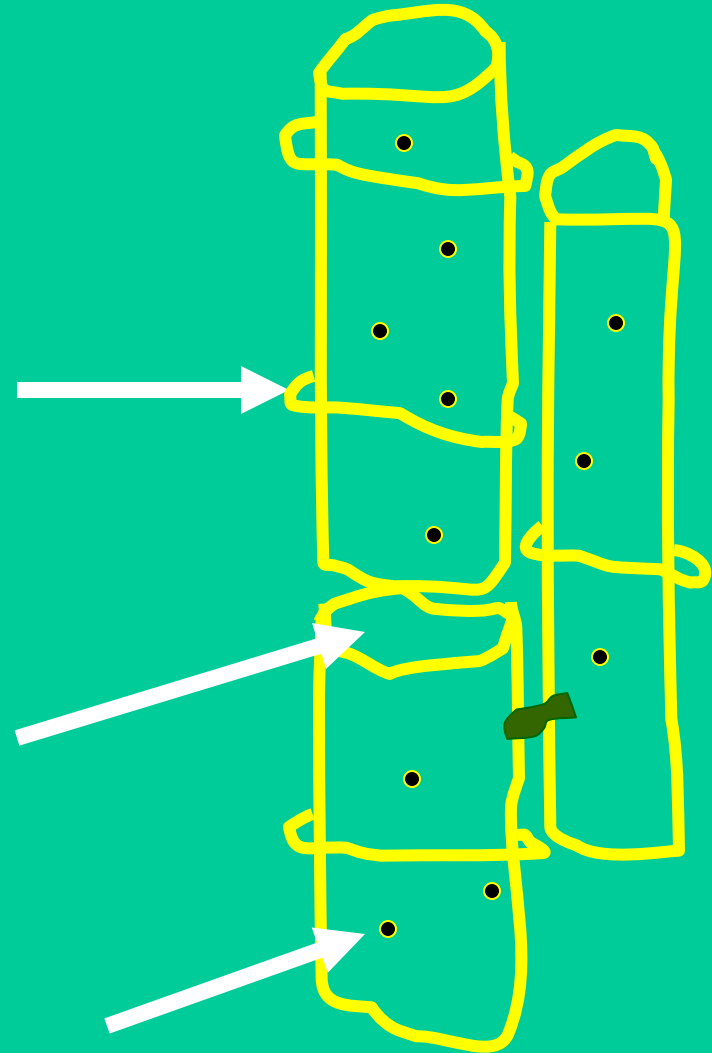
Xylem Vessels Structure

Elongated cells

Spiral lignin for strength

No end walls – form a continuous tube

Pits to allow sideways movement of water



Phloem Structure

1. Sieve tube cells

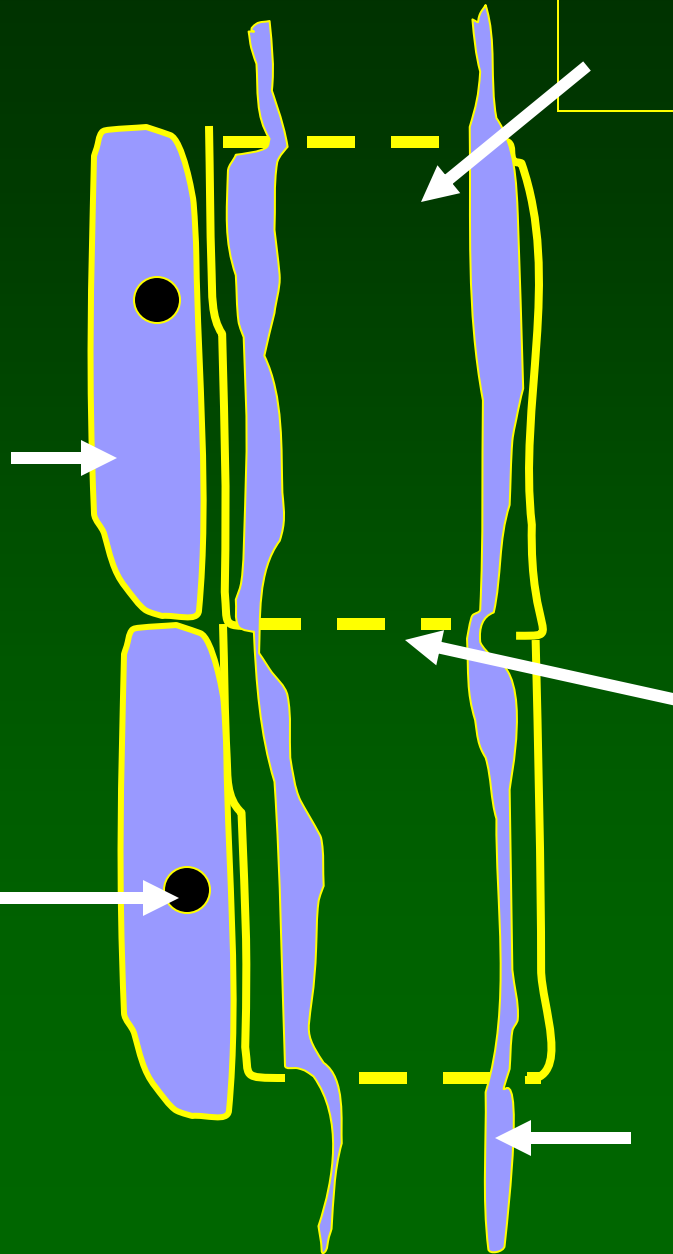
2 Companion Cells

Mature cells have no nucleus

Sieve plates

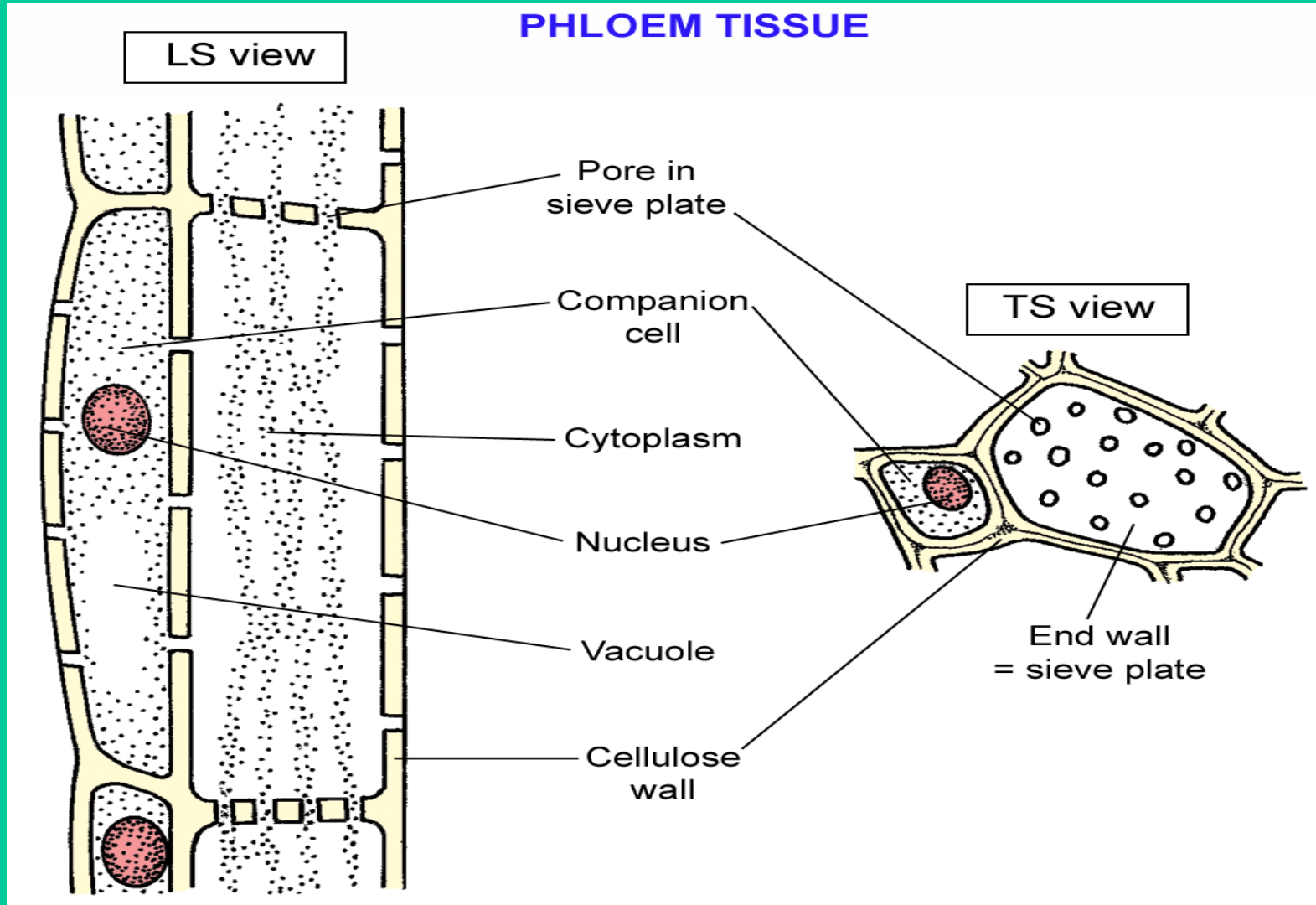
Nucleus controls activities of both companion and sieve tube cell

Cytoplasm extends from cell to cell through the sieve plate



Phloem (DRAW)

Longitudinal and Transverse sections



Example of Monocot and Dicot

Monocot



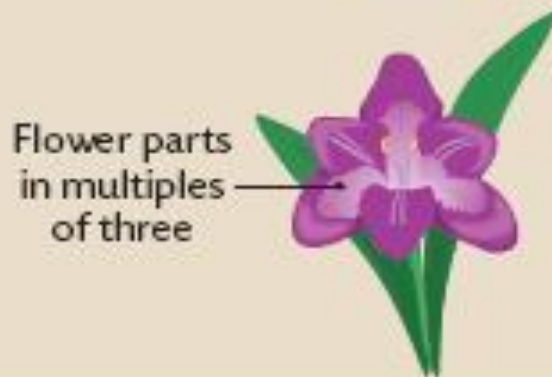
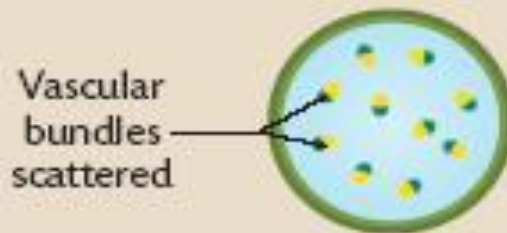
Grass

Dicot

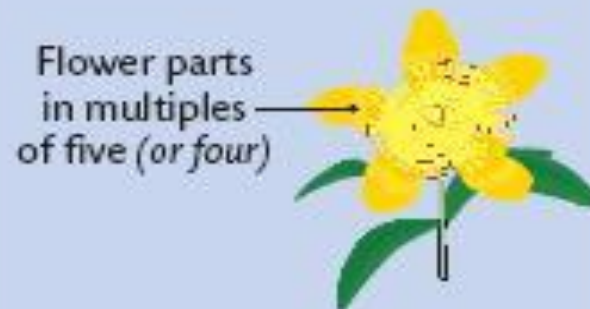
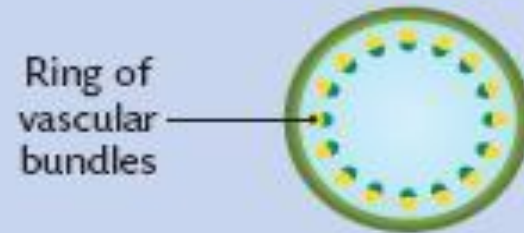
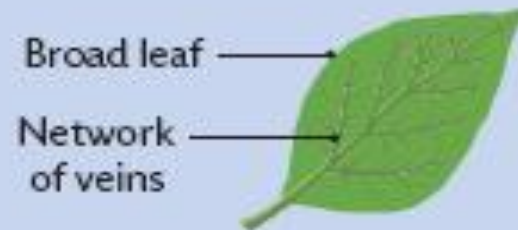
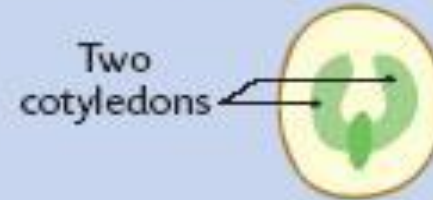


Buttercup

MONOCOTS

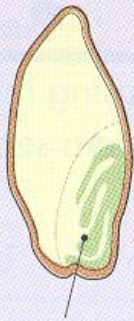


DICOTS

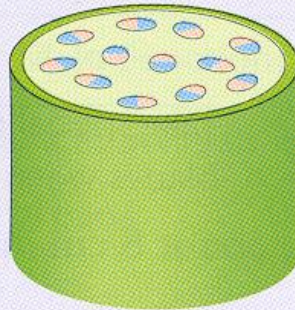


Identification of Monocots & Dicots

MONOCOT



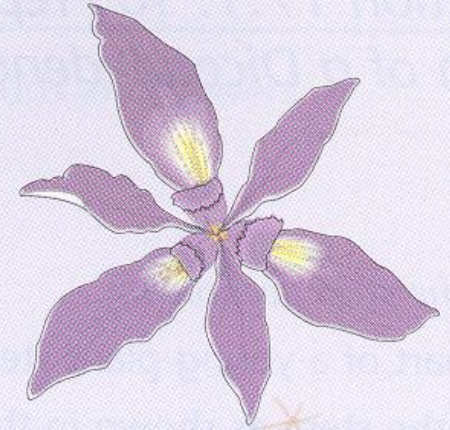
One cotyledon



Vascular bundles scattered in stem

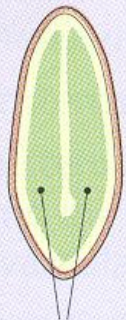


Leaf veins parallel

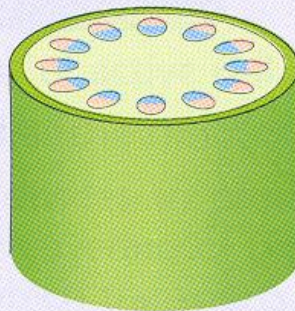


Flower parts in multiples of 3

DICOT



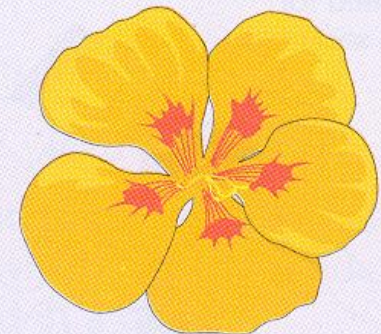
Two cotyledons



Vascular bundles in a distinct ring



Leaf veins form a netted pattern



Flower parts in multiples of 4 or 5

Differences between Monocots & Dicots

	Monocotyledons	Dicotyledons
Number of cotyledons	<i>One</i>	<i>Two</i>
Arrangement of vascular bundles in the stem	<i>Scattered in the stem</i>	<i>In a ring pattern</i>
Leaf venation	Parallel	Netted
Number of flower parts	In threes	In fours and fives
Woody or herbaceous	Almost all are herbaceous	May be woody or herbaceous