

FLOWERING PLANTS

A biological presentation by Emmanuel Kiganda



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FLOWERING PLANTS

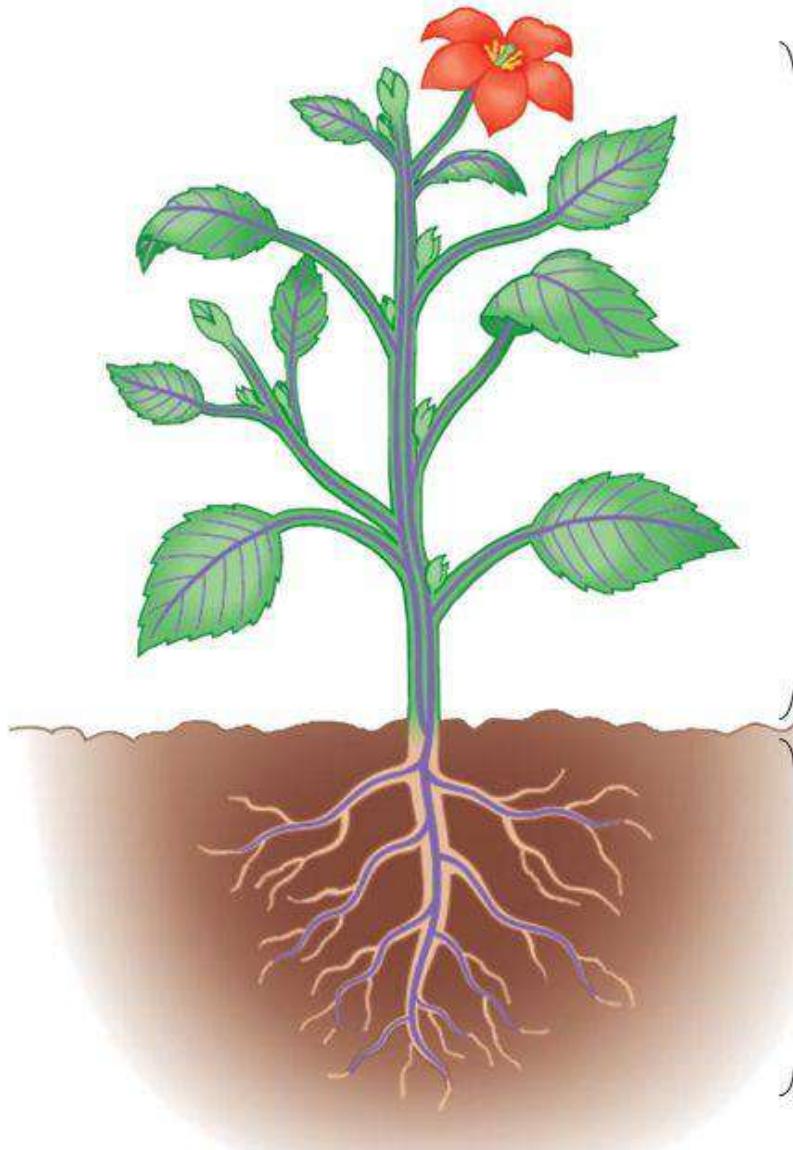
(Plants which bear flowers)

A PICTORIAL EXPLORATION OF SUBCLASS ANGIOSPERMAE



An exploration of flowering plants in St mary's Namagunga compound

THE SHOOT AND ROOT SYSTEM



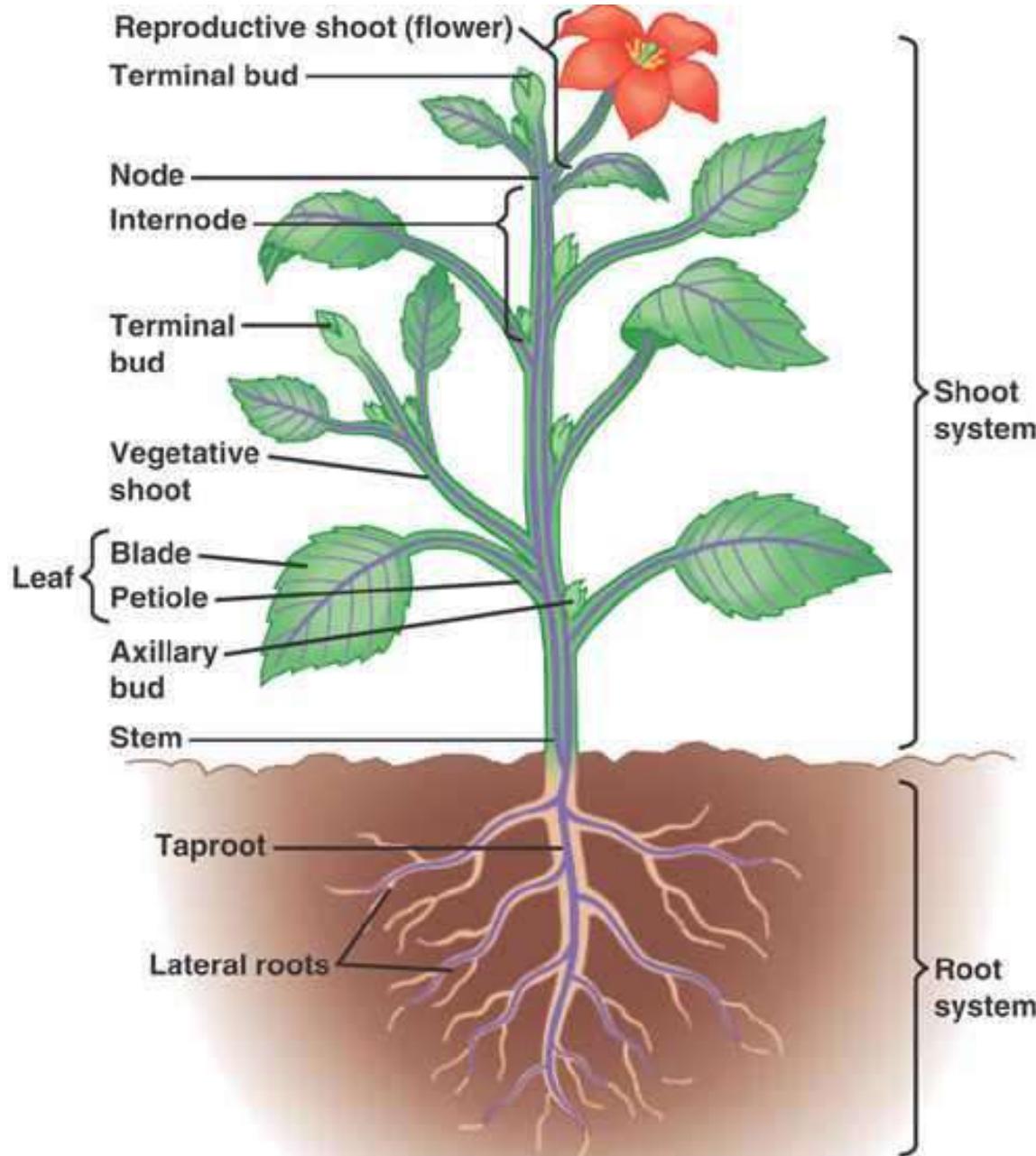
**Shoot
system**

- Above ground
- Stems, leaves

**Root
system**

- Underground (usually)
- Roots

SHOOT AND ROOT SYSTEM CONTINUED....



Differences Between Stems and Roots

TABLE 7-1

General Differences between Herbaceous Eudicot Roots and Stems

ROOTS

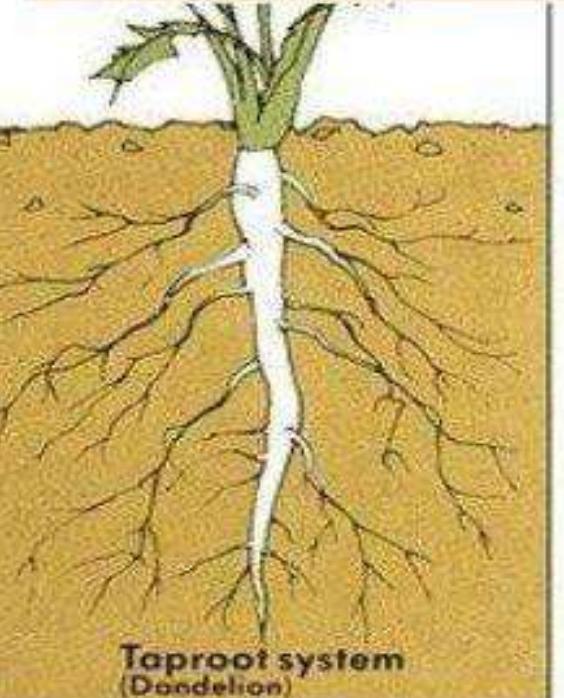
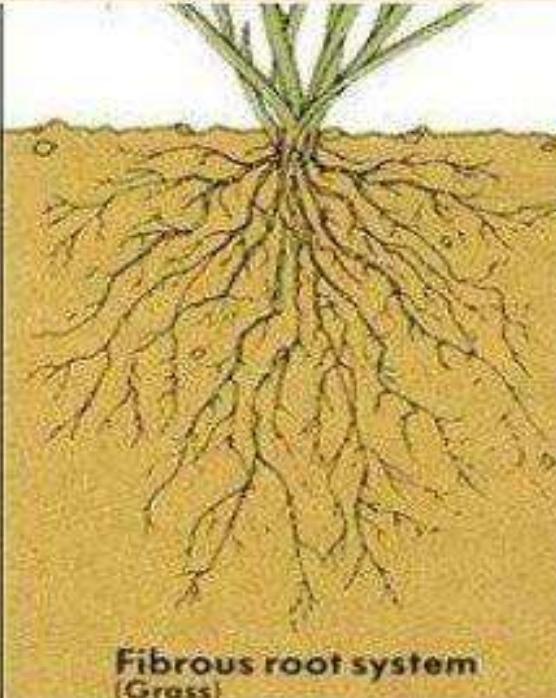
- No nodes or internodes
- No leaves or buds
- Nonphotosynthetic
- No pith

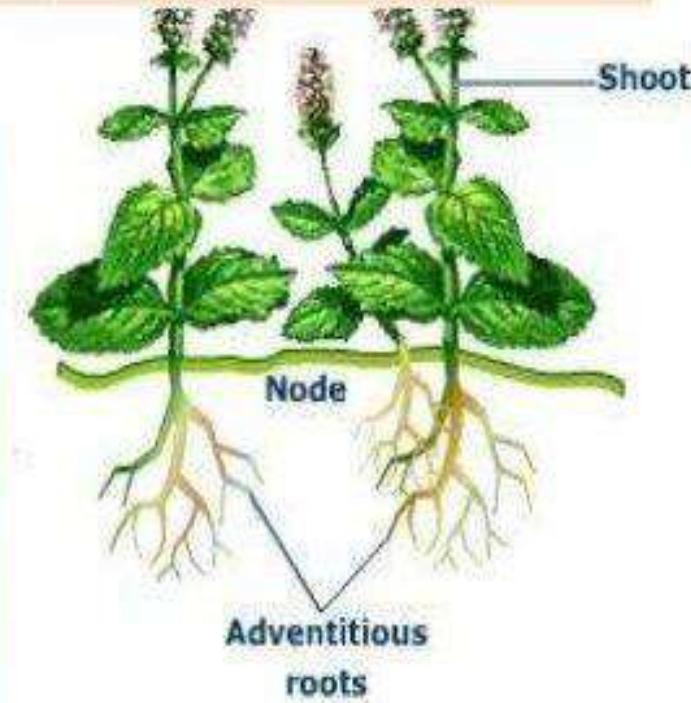
STEMS

- Nodes and internodes
- Leaves and buds
- Photosynthetic
- Pith

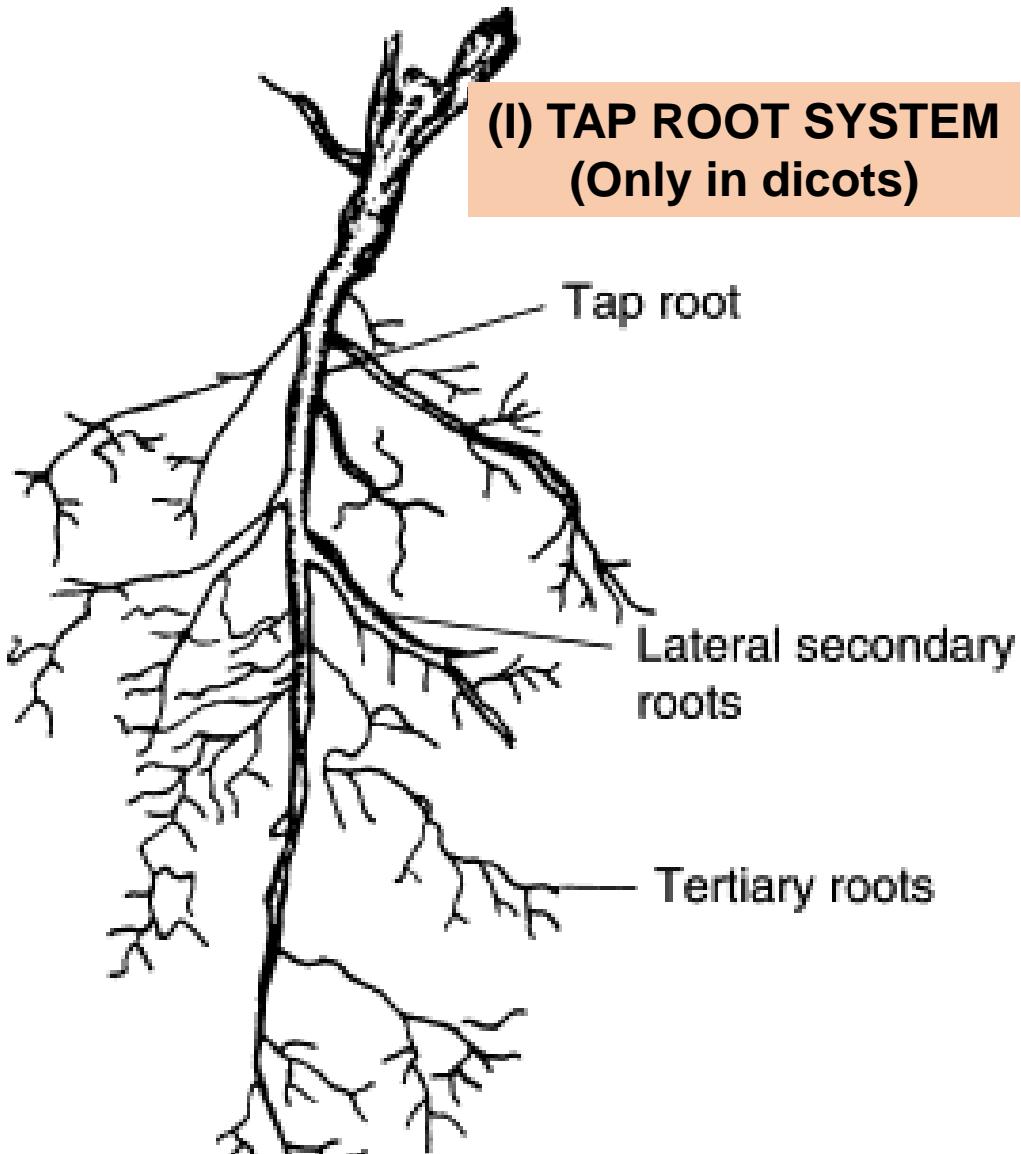
A.THE ROOT SYSTEM

TYPES OF ROOT SYSTEMS

TAP ROOTS	FIBROUS ROOTS	ADVENTIOUS ROOTS
<ul style="list-style-type: none">Prominent in dicotsPrimary roots grow & becomes stout.Secondary & tertiary grow from primary root	<ul style="list-style-type: none">Prominent in monocotsRoots develop from lower nodesThey have same length & diameter	<ul style="list-style-type: none">They develop from organs of shoot system
		
Taproot system (Dandelion)	Fibrous root system (Grass)	

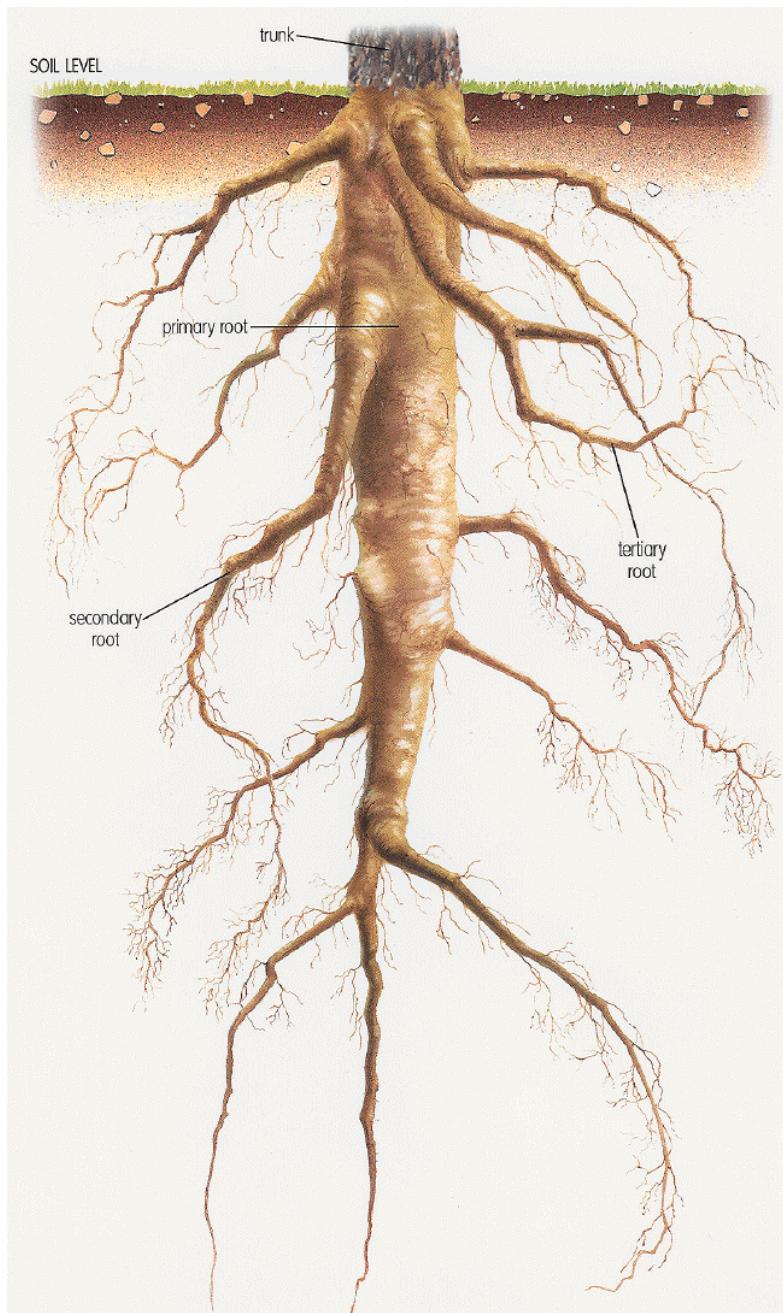


TYPES OF ROOT SYSTEMS CONTINUED.....



**(I) TAP ROOT SYSTEM
(Only in dicots)**

Tap root is also called
Primary root



TYPES OF ROOT SYSTEMS CONTINUED.....

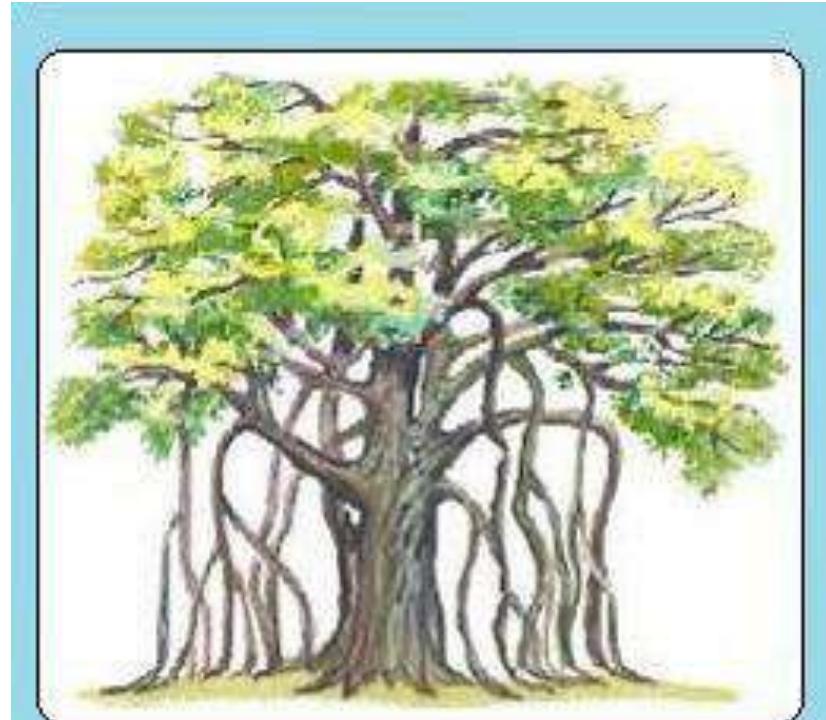
THE FIBROUS ROOT SYSTEM

(Only in monocots)



Roots with similar lengths and size arise from the same point along the base of the stem

THE ADVENTITIOUS ROOTS



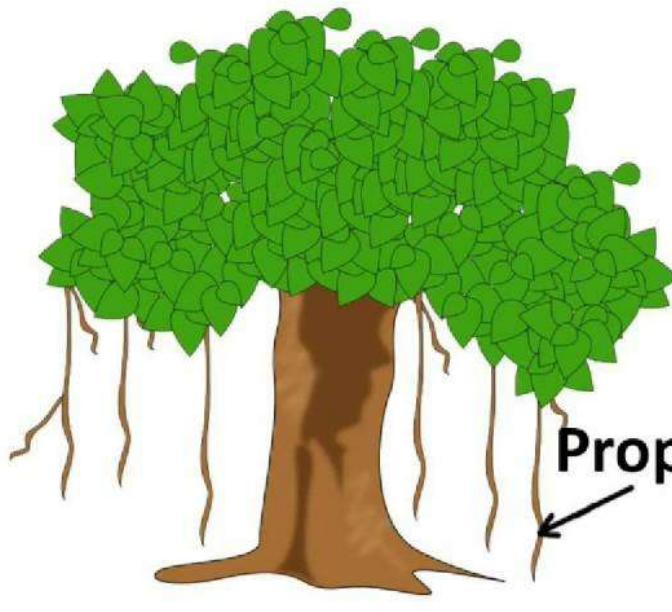
The hanging roots growing from the branches of a banyan tree are a type of adventitious roots.

- They arise from an organ other than the root usually a stem, sometimes a leaf.
- They are especially numerous on underground stems, such as rhizomes, corms, and tubers, and make it possible to vegetatively propagate many plants from stem or leaf cuttings.

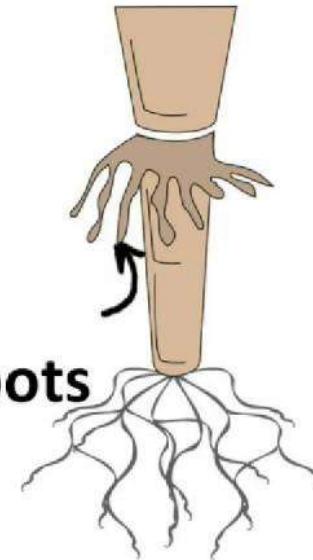
Aerial roots and underground roots



Aerial roots



Banyan tree



Sugarcane



ROOT MODIFICATIONS CONTD.....

1. Storage roots

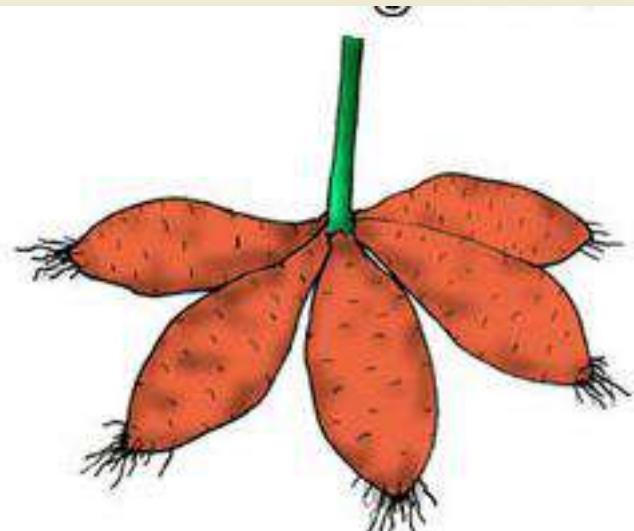
Are these aerial or underground roots?

Modification: thick or swollen, fleshy and succulent roots

Function: To store food

Example: Carrot, cassava & sweet potato roots

Modified primary root or tap root



2. BREATHING ROOTS or pneumatophores

Modification: spongy roots arising from a horizontal stem in muddy water

Function: gaseous exchange with atmosphere

Example: white mangrove breathing roots



Are these Aerial or underground roots?



3. Stilt roots

Modification: adventitious roots arising from the base the main stem and grow obliquely (acute angles) towards the soil

Function; they support the stem by pushing it off the ground

Examples: red mangrove, pandanus spp etc.

Pandanus spp stilt roots



Red mangrove stilt roots



Are these aerial or underground roots?

4. Prop roots(pillar or aerial roots)

Modification: adventitious roots arise from the nodes above the base of the stem and branches growing vertically downwards into the soil

Function: they pull the stem or branch and anchor it firmly into the soil providing extra support

Example: prop roots of the banyan tree

Prop roots of the Banyan tree



Prop roots of maize



What is the difference between a prop and stilt root?

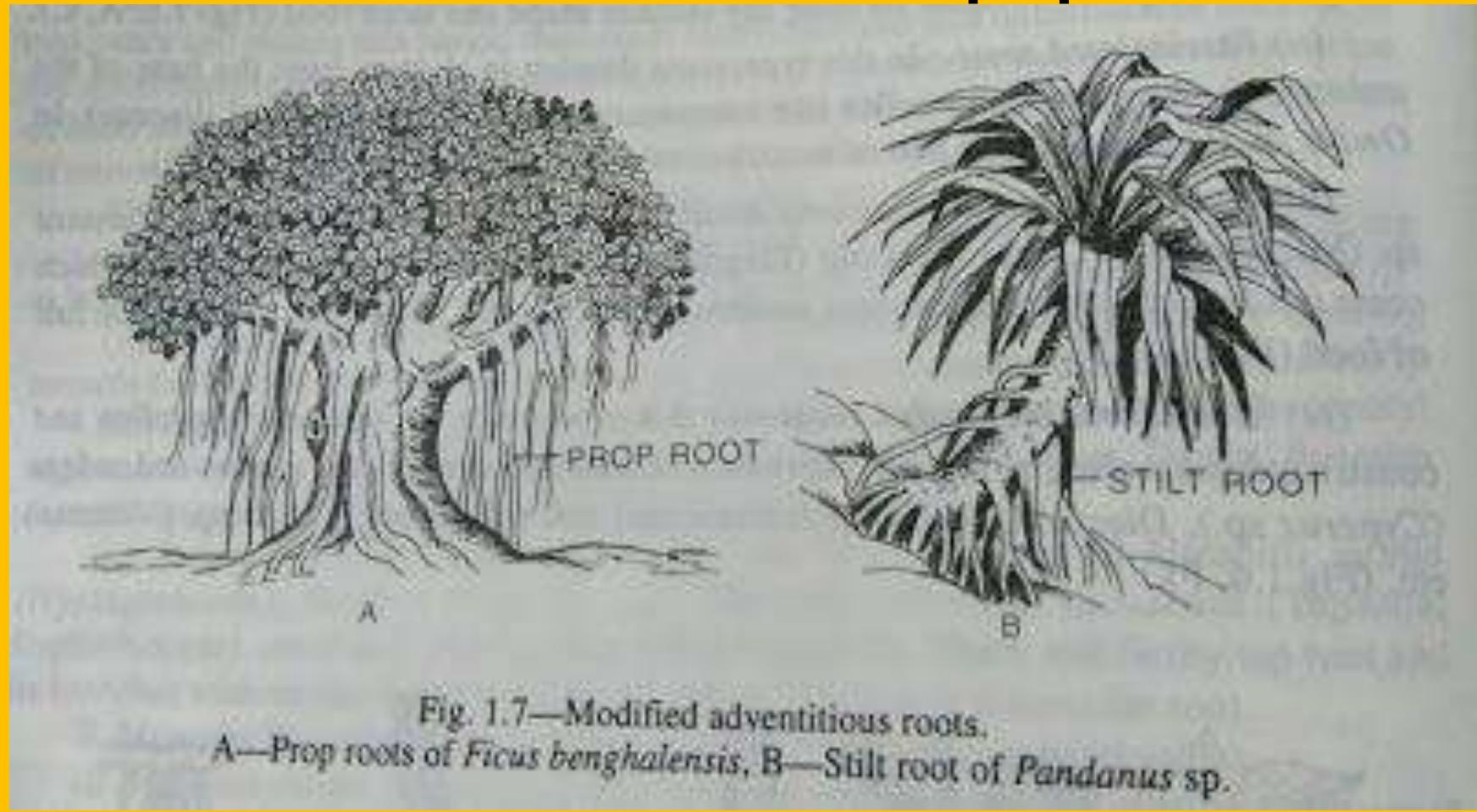


Fig. 1.7—Modified adventitious roots.

A—Prop roots of *Ficus benghalensis*, B—Stilt root of *Pandanus* sp.

Prop roots develop from the **upper part** of the stem(nearer or away from the base), especially the horizontal branches while **stilt roots** develop from the nodes at the **lower part** of the base of the main stem.

(Stilt roots push the stem above the soil while prop roots pull the stem towards the soil)

Think: Are the modified roots of maize stilt or prop roots?, Why is it so?

5. Butress root

Modification: are large, thick roots spreading all sides from the base of a shallow stem.

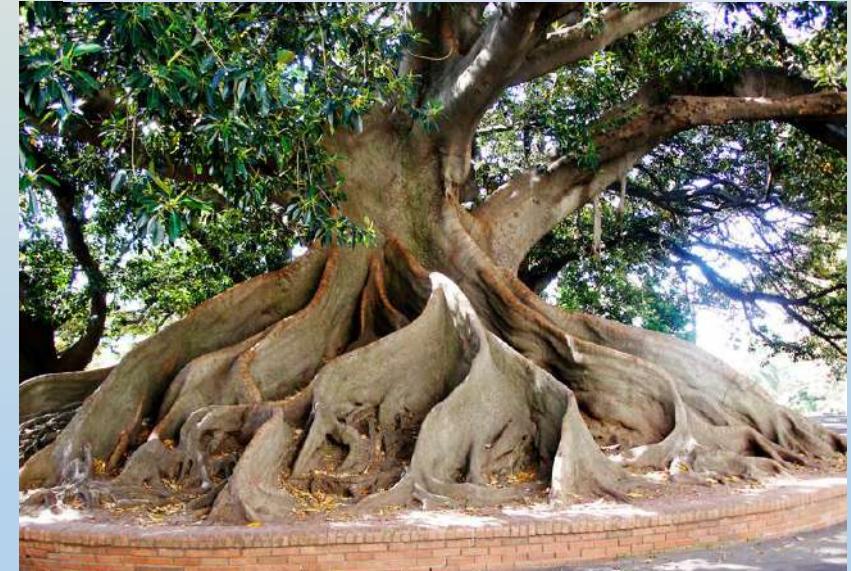
Function: to provide extra support

Example: mvule tree(*milicia excelsa*), silk cotton e.t.c

Butress roots of mvule tree



Butress roots of silk cotton



Are these aerial or underground roots?

6. Clasping roots

Modification: roots growing from the nodes of climbing stems clinging along a solid support. They secret a sticky substance which dries up in air

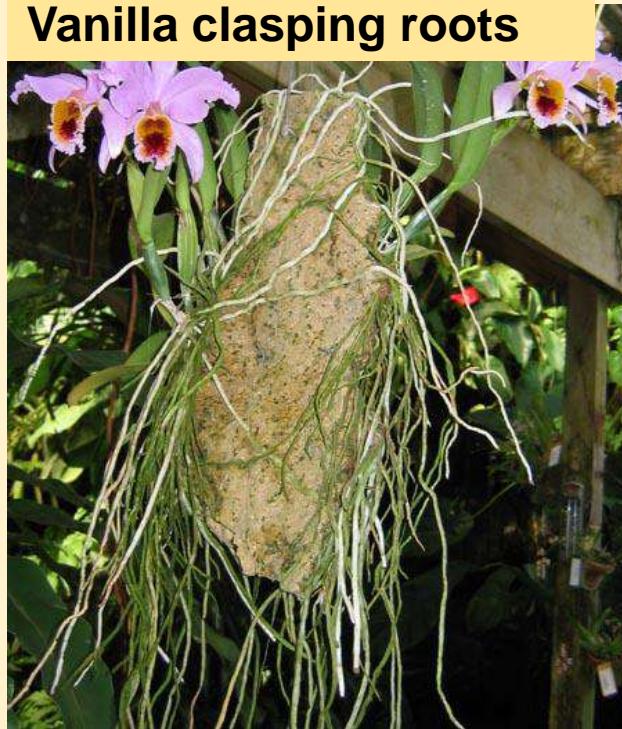
Function: to support climbing stems firmly in air

Examples: orchids, vanilla, figs etc..

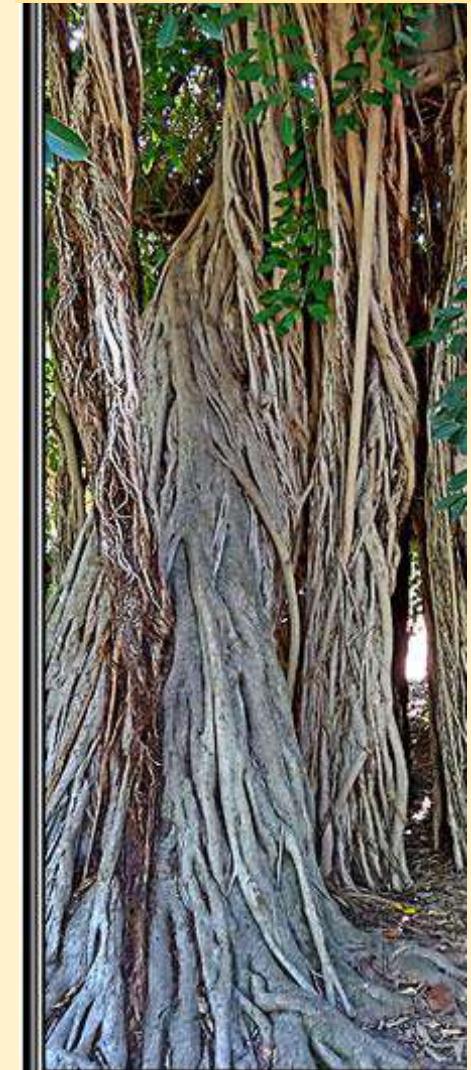
Orchid clasping roots



Vanilla clasping roots



Clasping roots of figs



Are these aerial or underground roots?

7. Epiphytic roots

Modification: Special adventitious roots growing on the outer tissues of other plants and hang freely in the atmosphere

Example: Roots of epiphytic ferns, figs and orchids

Are these Aerial or underground roots?

Epiphytic fern roots



Epiphytic orchid roots



8. SUCKING ROOTS(HAUSTORIA)

Modification: kind of roots which penetrate into the tissue of the host plant

Function: draw nutrients from the host by sucking it

Are these aerial or underground roots?

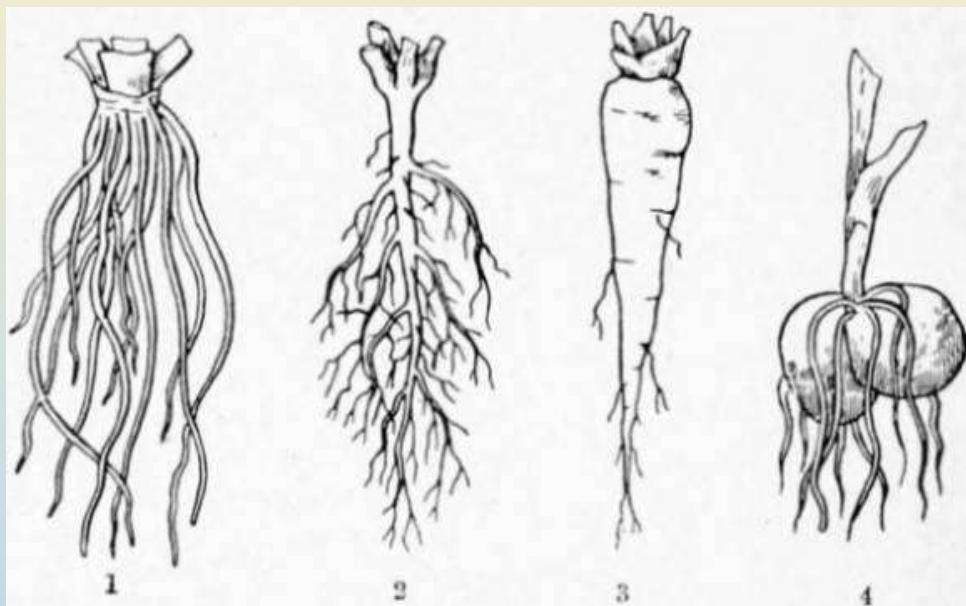
Dodder sucking roots



Cuscuta sucking roots



You are provided with specimens 1,2,3,4 and A, B,C which are plant organs. Describe the nature of the structure of each organ. Identify the organs.

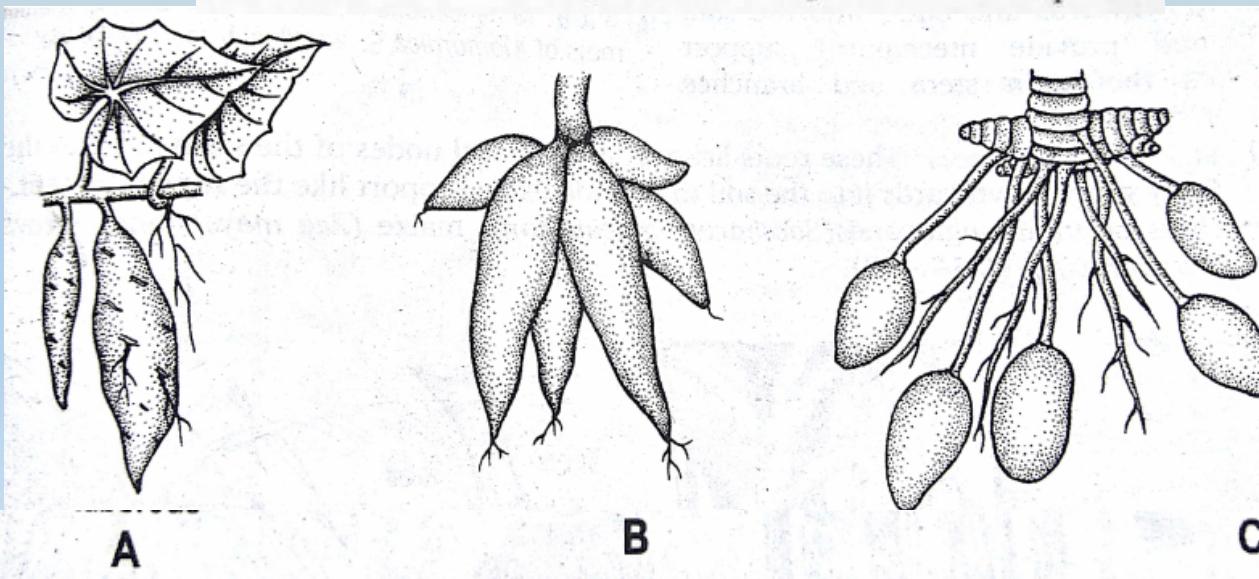


1

2

3

4

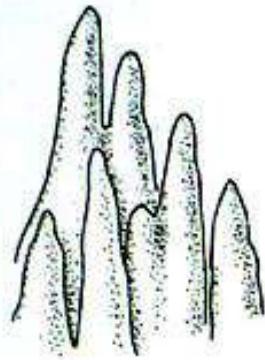


A

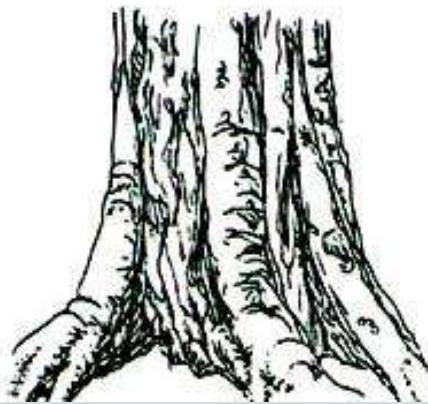
B

C

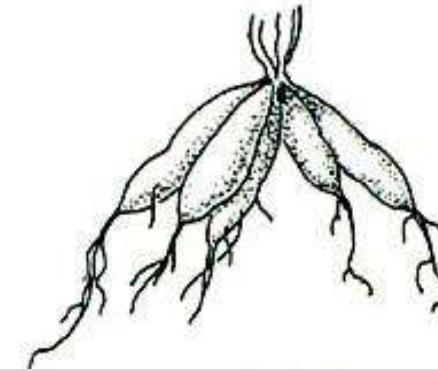
You are provided with specimens A,B,C,D,E,F,G and H which are plant organs. Describe the nature of the structure of each organ. Identify the organs



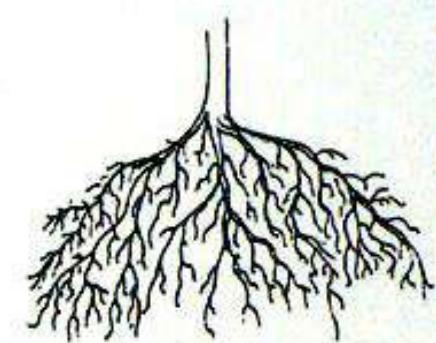
A



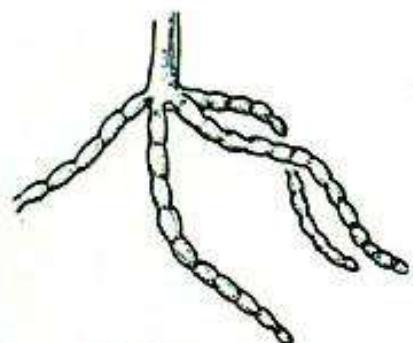
B



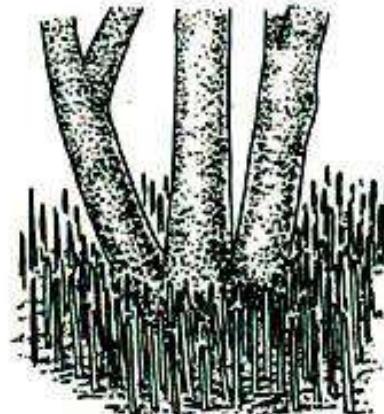
C



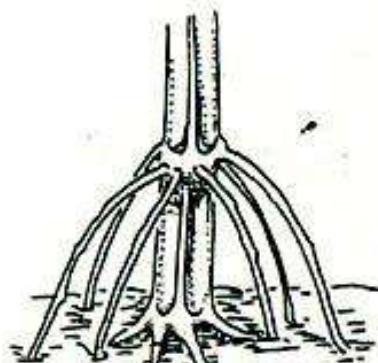
D



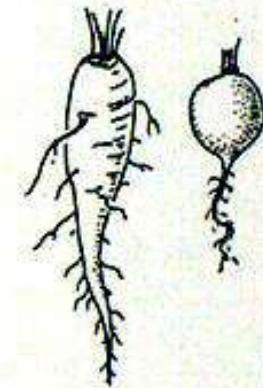
E



F

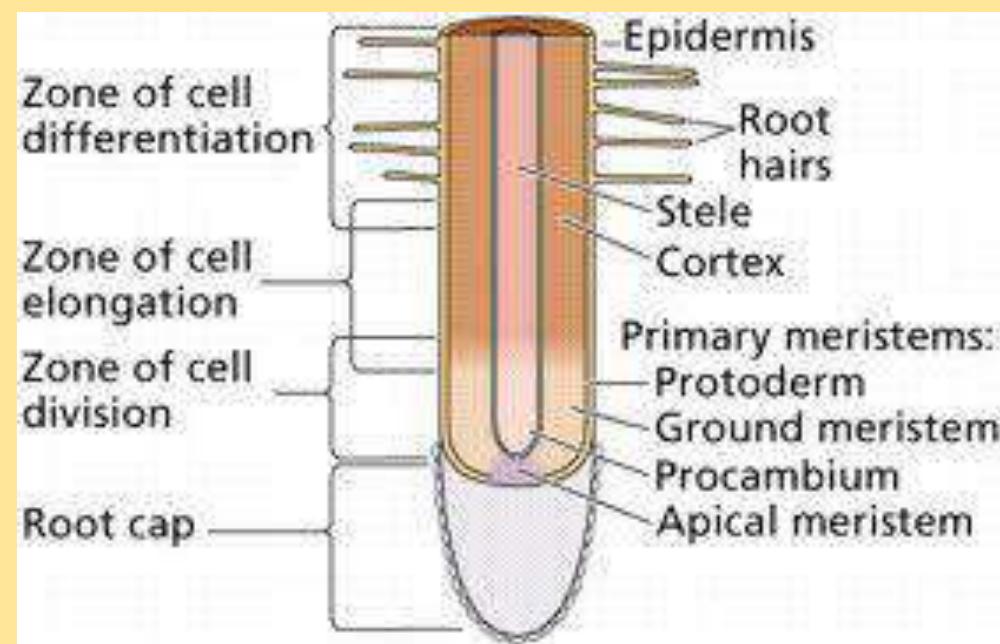
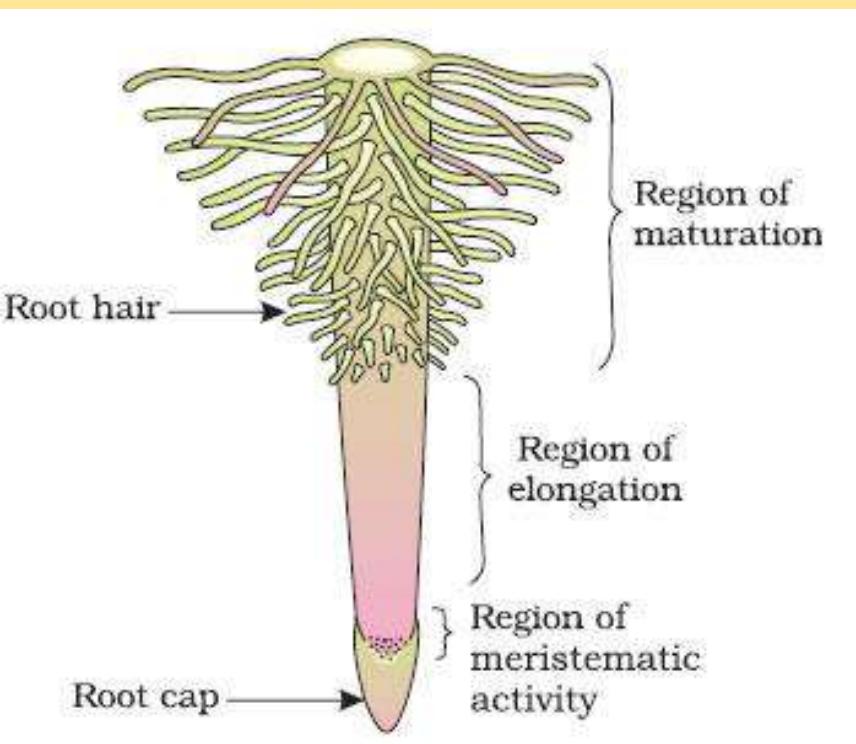


G

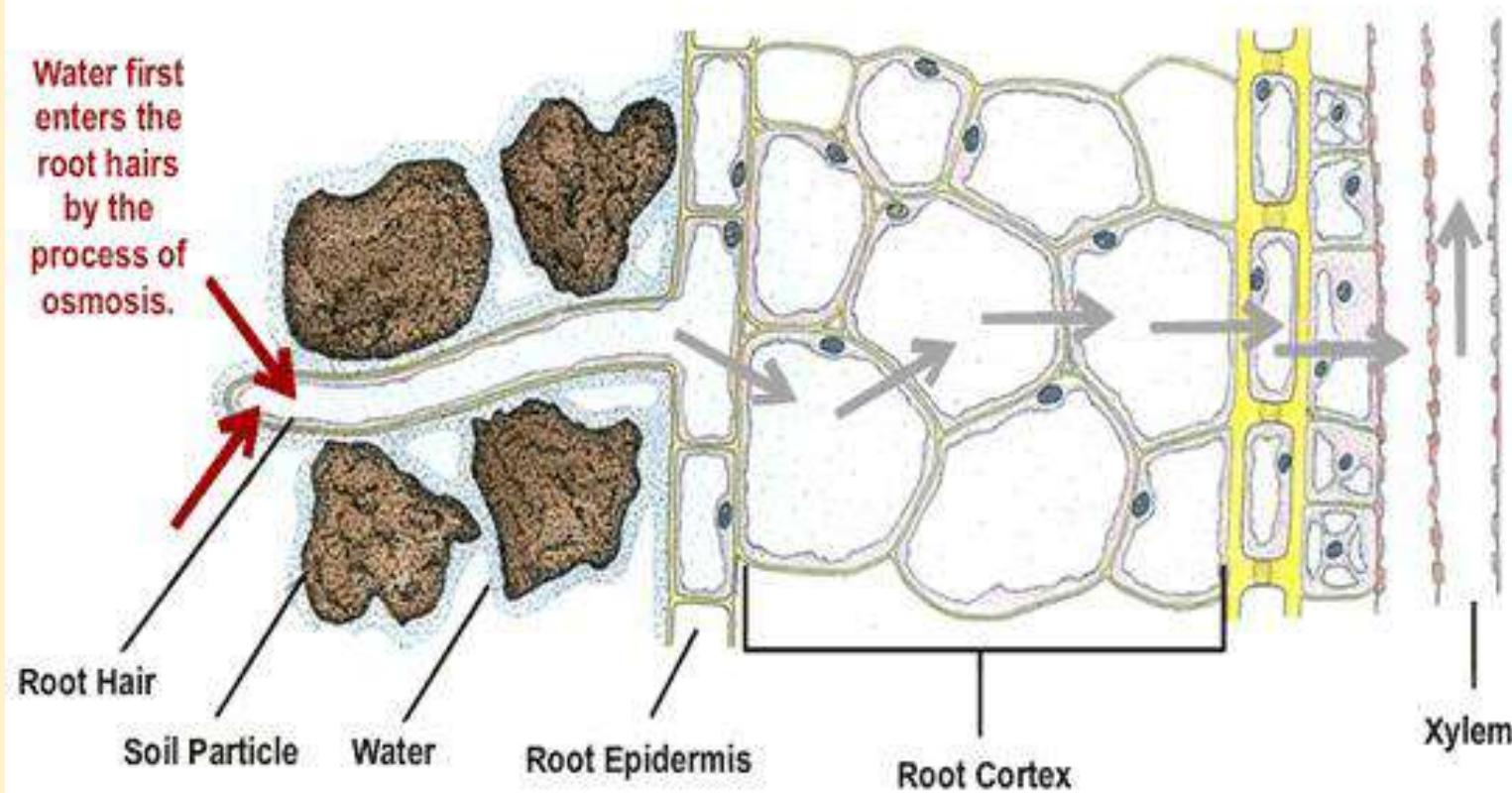


H

LONGITUDINAL SECTION OF AN INTERNAL STRUCTURE OF A ROOT

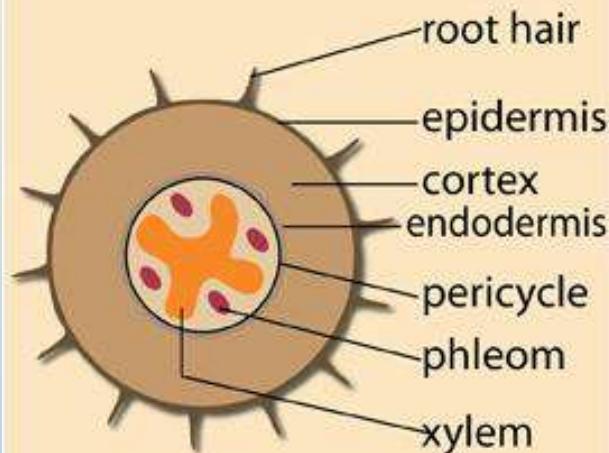


Think: How is water absorbed from soil to the xylem in the root?

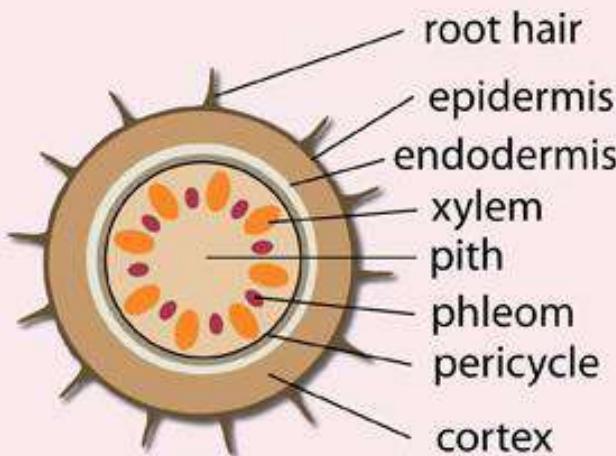


DIFFERENCES BETWEEN A DICOT AND A MONOCOT

Transverse section of a dicotyledon root



Transverse section of a monocotyledon root



Dicot root	Monocot
1. Has no pith.	Has pith.
2. Can form a ring of cambium.	Cannot form a ring of cambium.
3. The xylem is star-shaped occupying the central part.	The xylem and phloem alternates forming a ring.

TYPES OF STEMS

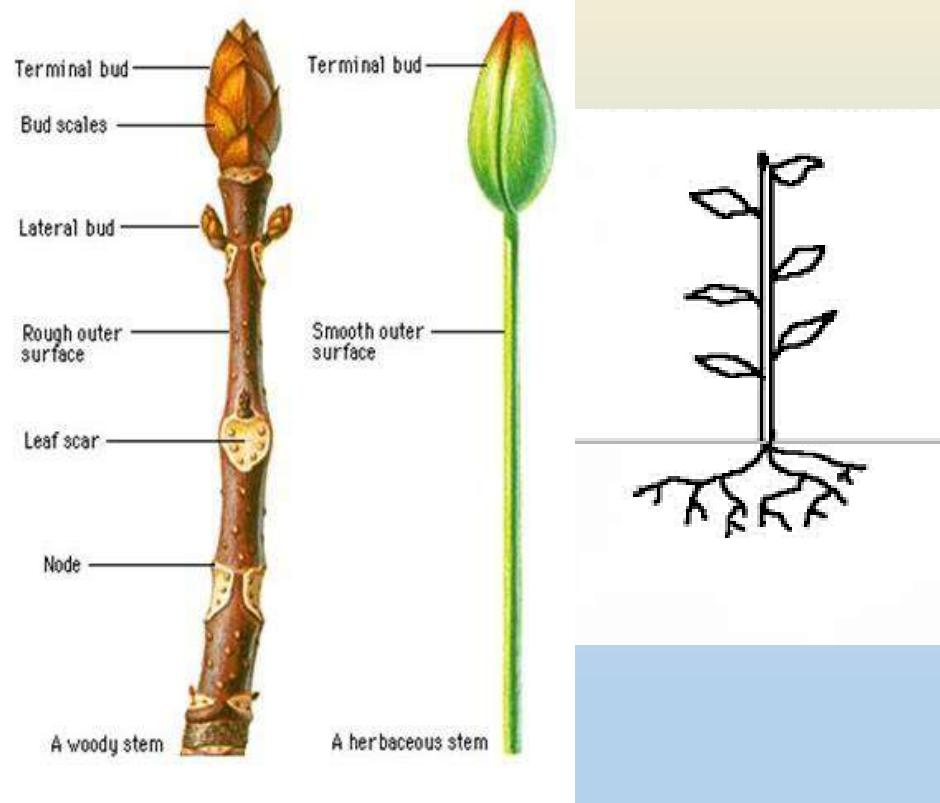
A. ERECT STEMS

1. Woody Stems

- Contain thick, tough tissue (wood)
- Found in plants that live for more than a year
- Trees and shrubs

2. Herbaceous Stems

- Contain soft, green, juicy tissues
- Found in plants that live for one year



TYPES OF STEMS CONTINUED....

B. Weak stems

Climbers



Grapevine



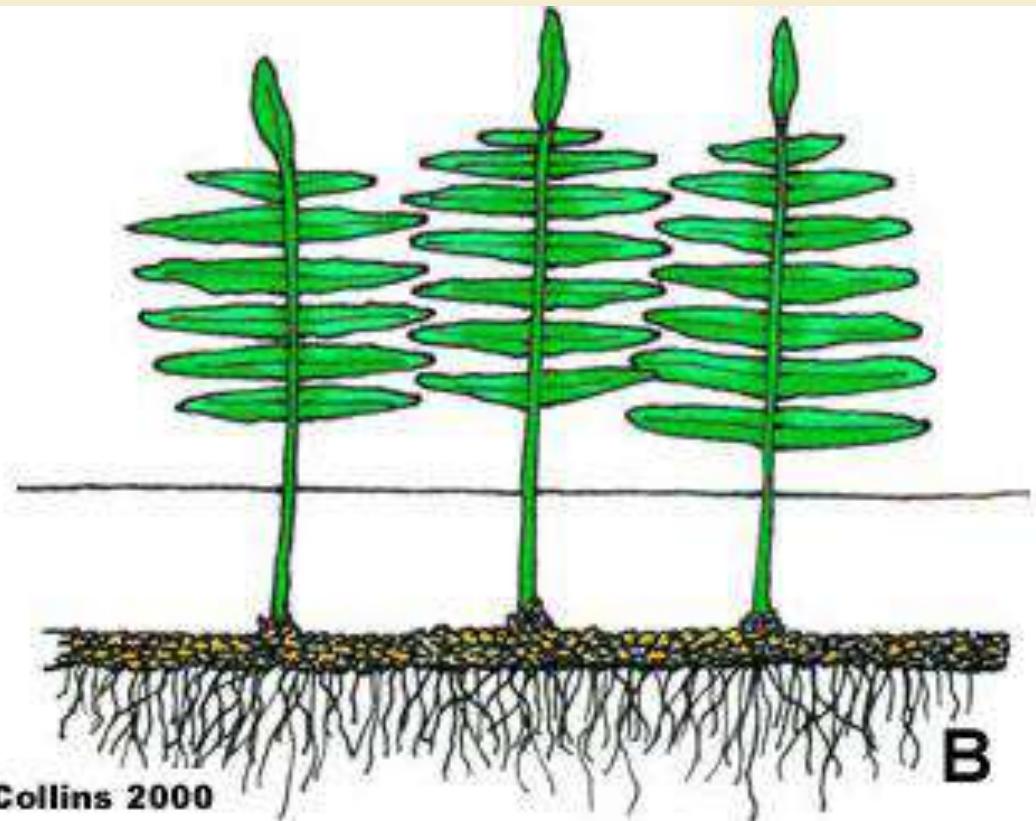
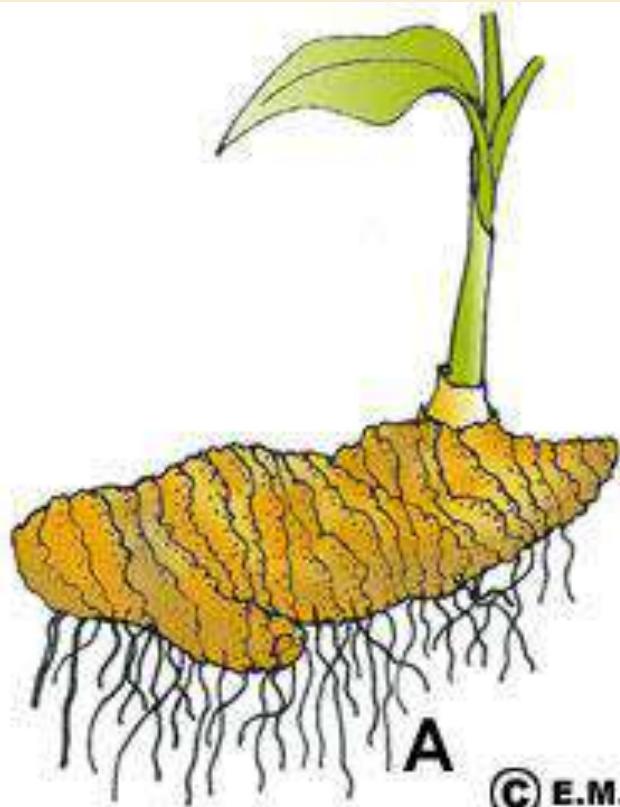
Pea



Money Plant

UNDER GROUND STEMS

(Shall be explained in the next pages)



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STEM MODIFICATIONS

1. Weak stems

A) **twinning stems**(whole stem grows spirally on a solid support)

Dutch man's pipe



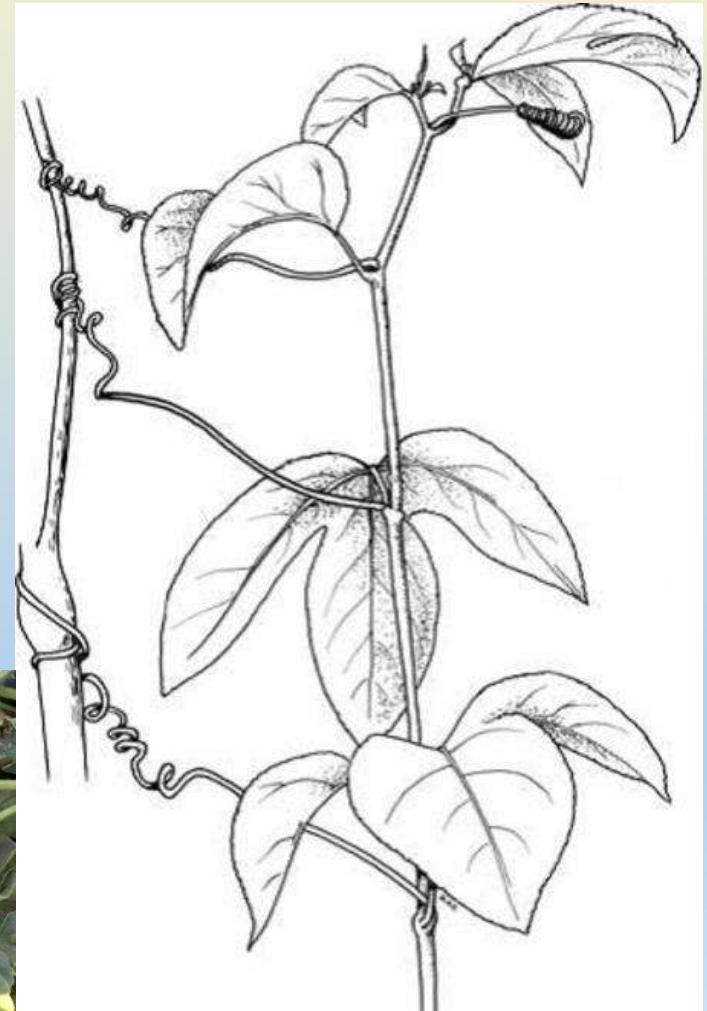
lianas twinning stem



Weak stems cont'd.....

B) **climbing stems**(stem uses tendril to attach on a solid support)

Example: passion fruit, water melon, squash stems e.t.c



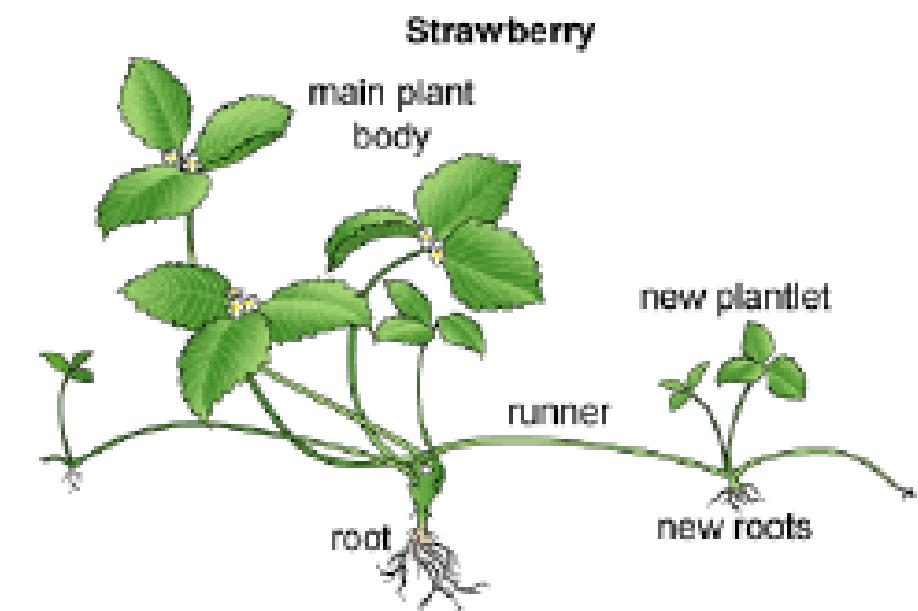
Weak stems cont'd.....

c) Creeping stems

long thin stems which grow horizontally above the ground, giving off roots at certain intervals of the nodes

They include

- a) Runner
- b) Stolon
- c) sucker



CREEPING STEMS CONT'ND.....

Runners and stolons

Runners are above ground horizontal stems arising from nodes at the base of the plant which creep at a distance and give rise to new plants.

A stolon is a part of a runner connecting two adjacent plants

Examples: Stolons of pumpkin, runner of oxalis e.t.c

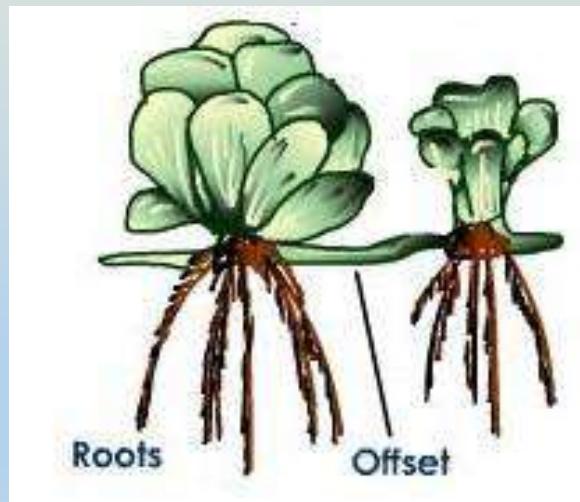


CREEPING STEMS CONT'ND.....

b) Offset stems

Horizontal thickened short stem, originating from the axil of the leaf and grows flat on the ground. It produces many leaves above and a cluster of roots below

Water lettuce stem



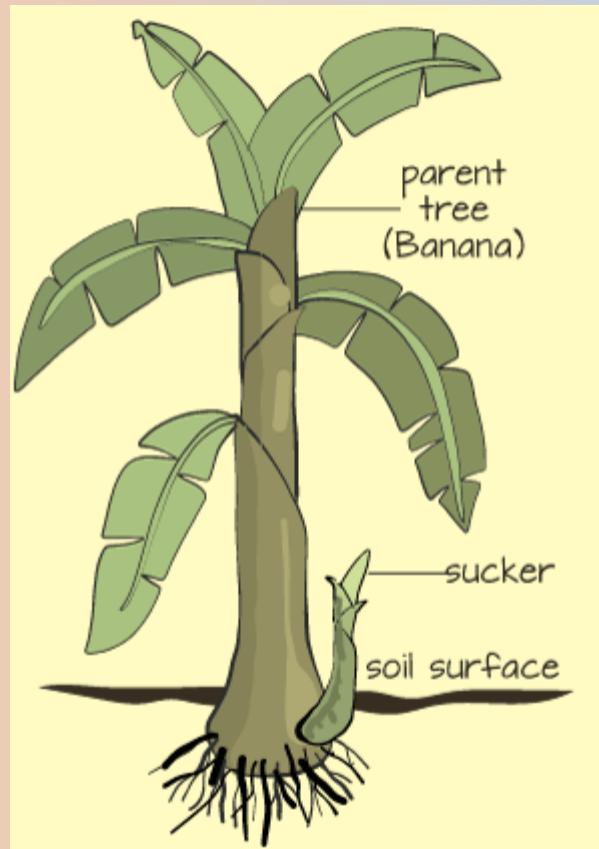
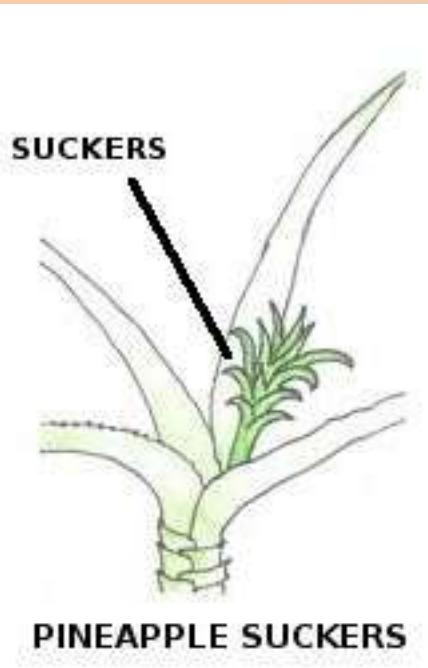
Water hyacinth stem



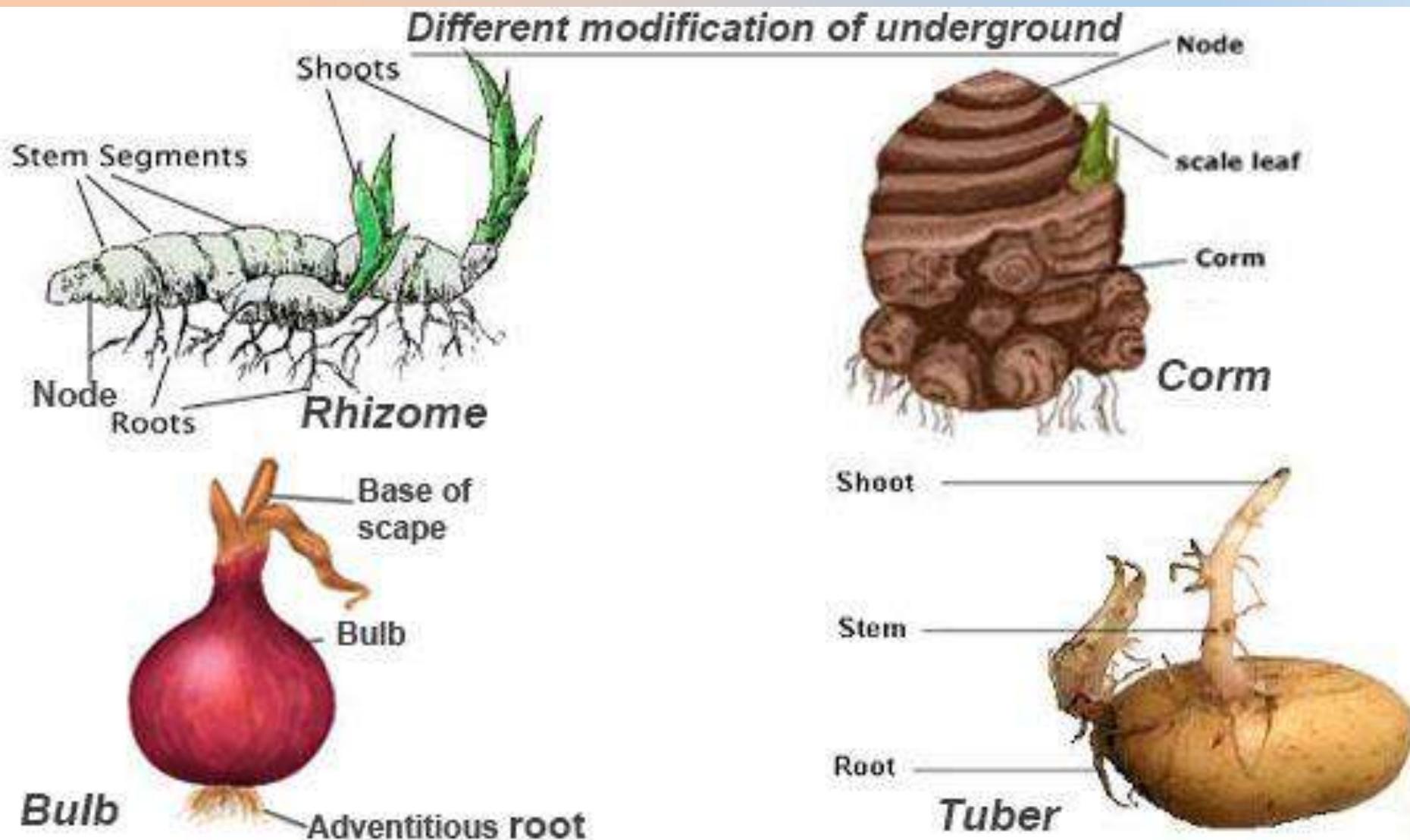
CREEPING STEMS CONT'ND.....

SUCKER

A creeping stem that grows obliquely upwards, directly giving rise to a leafy shoot



3. UNDERGROUND STEMS

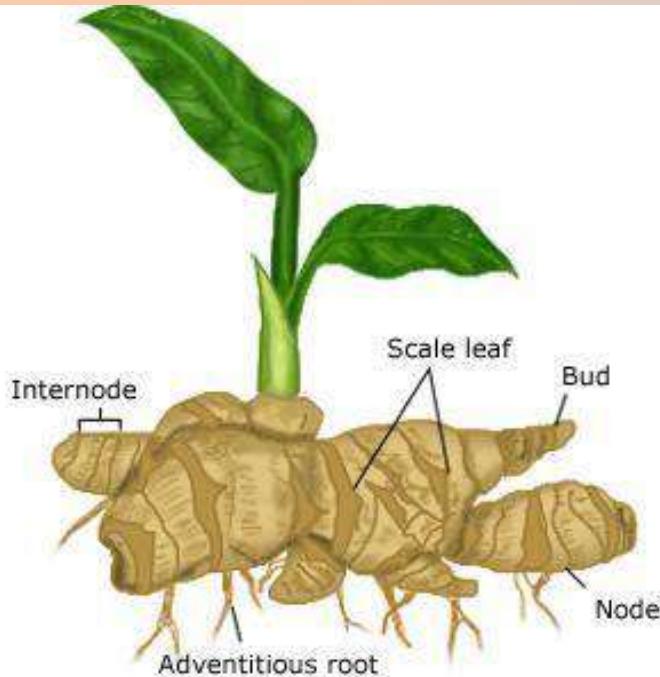


a.RHIZOME

Modification: A horizontal **thick** stem with **adventitious** roots growing from the lower side of the nodes. It has **terminal buds** which develop into aerial shoots. It bears **buds** in axes of the reduced brown leaves called **scale leaves**.

Function: stores food for plant; for vegetative propagation

Ginger rhizome



Couch grass rhizome



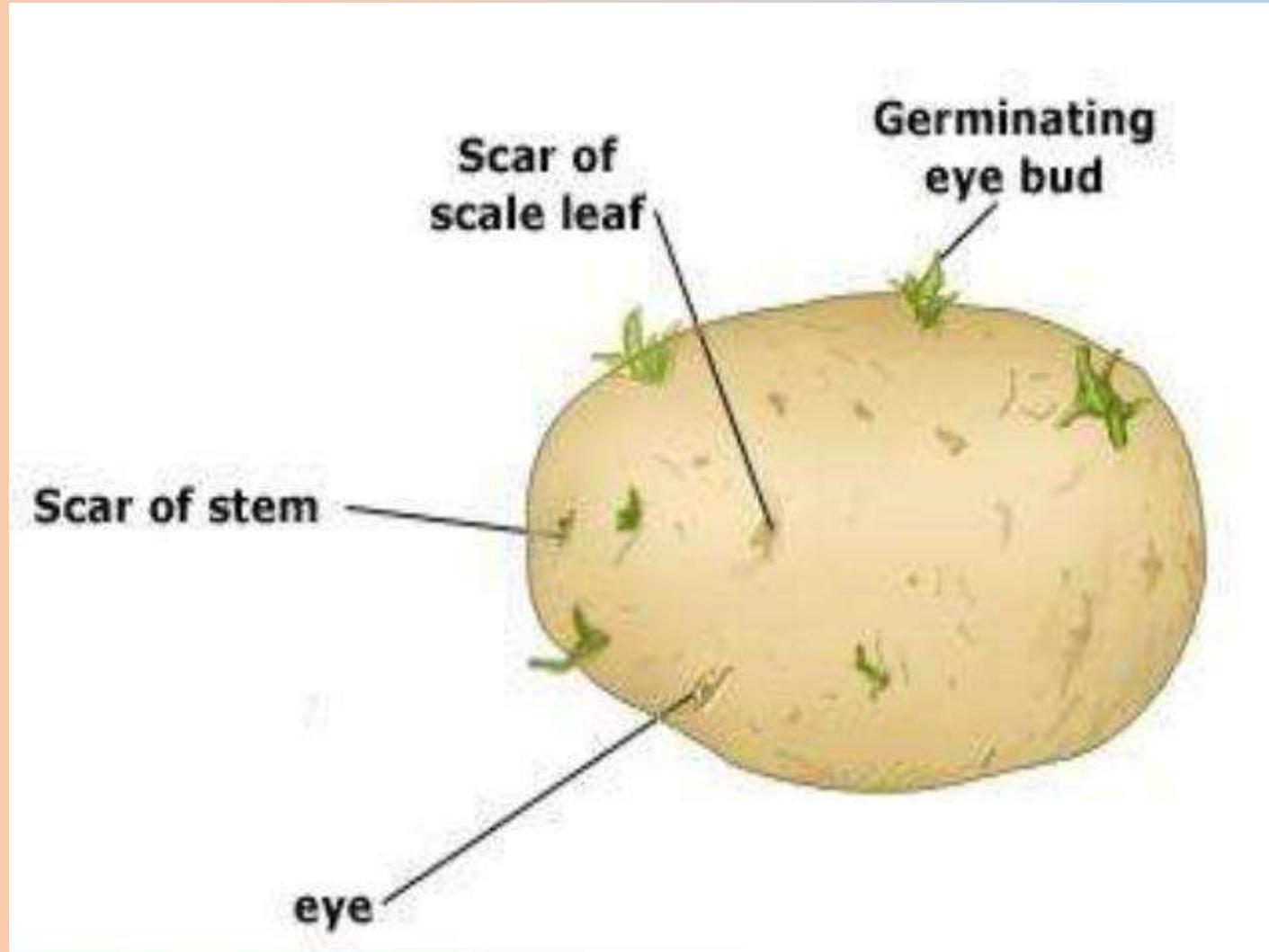
Canalily rhizome



b. Stem tuber

Modification: Short, fleshy and swollen. It has scale leaves and axillary buds which form the “eyes”

Function: Stores large amounts of food

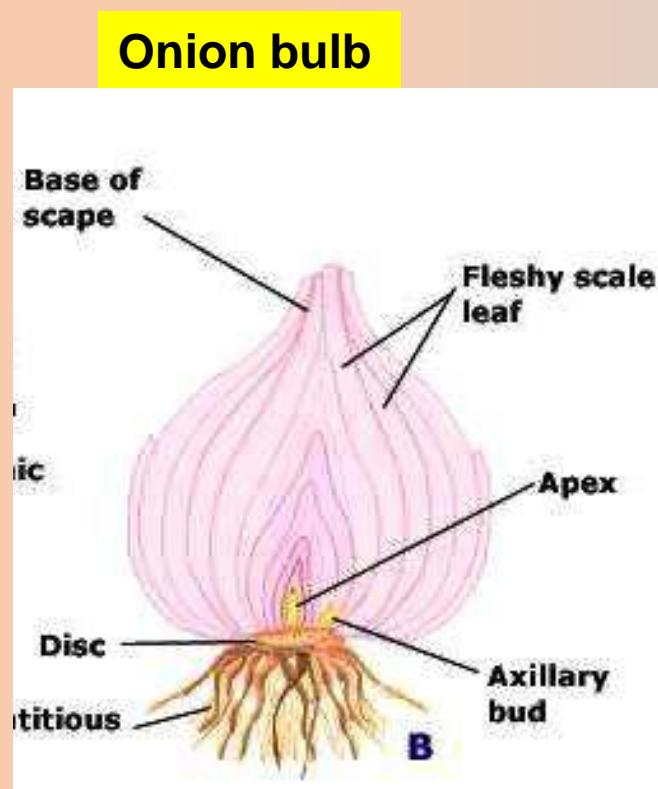


c. BULB

Modification: A short condensed disc-shaped flattened stem with thick fleshy leaves arranged in concentric circles. The thick fleshy leaves are protected by outer dry brown leaves called scale leaves.

A terminal bud lies at the top of the stem and give rise to the aerial shoot. Axillary buds are situated between the leaf bases.

Function: Stores food

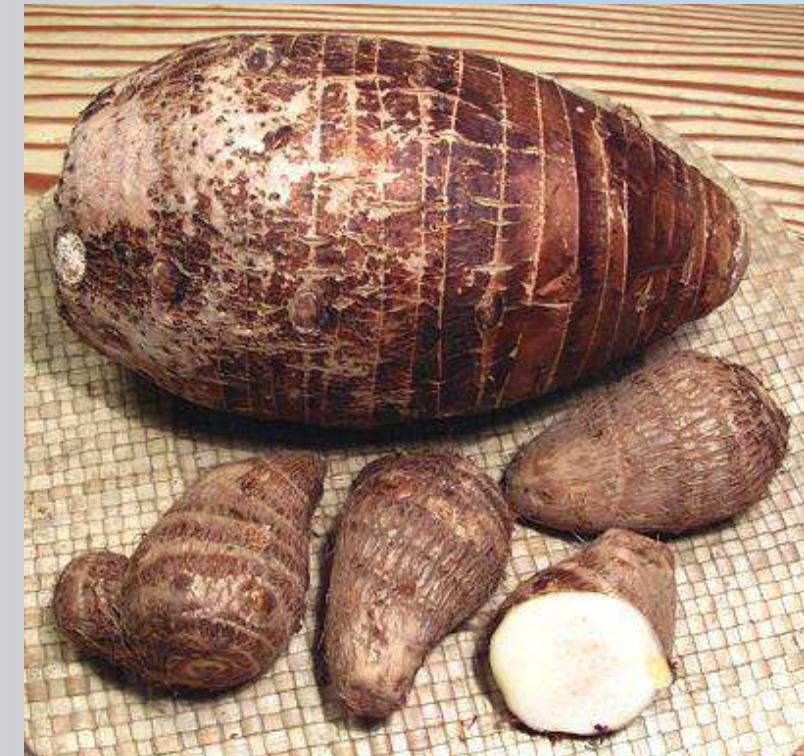
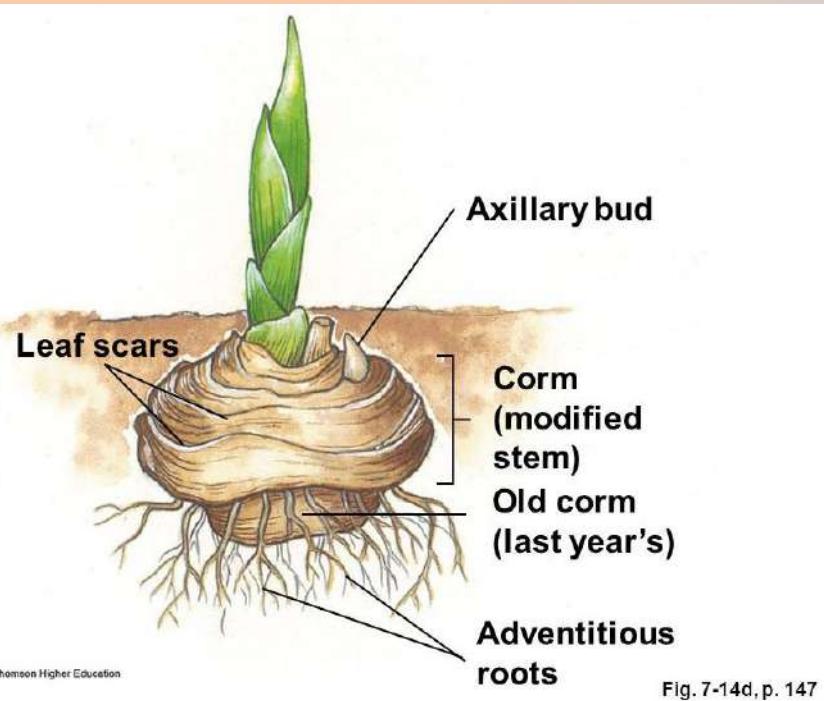


d. CORM

Modification: A short, round-shaped vertical, swollen stem with a terminal bud, scaly leaves rising from the nodes and randomly distributed adventitious roots.

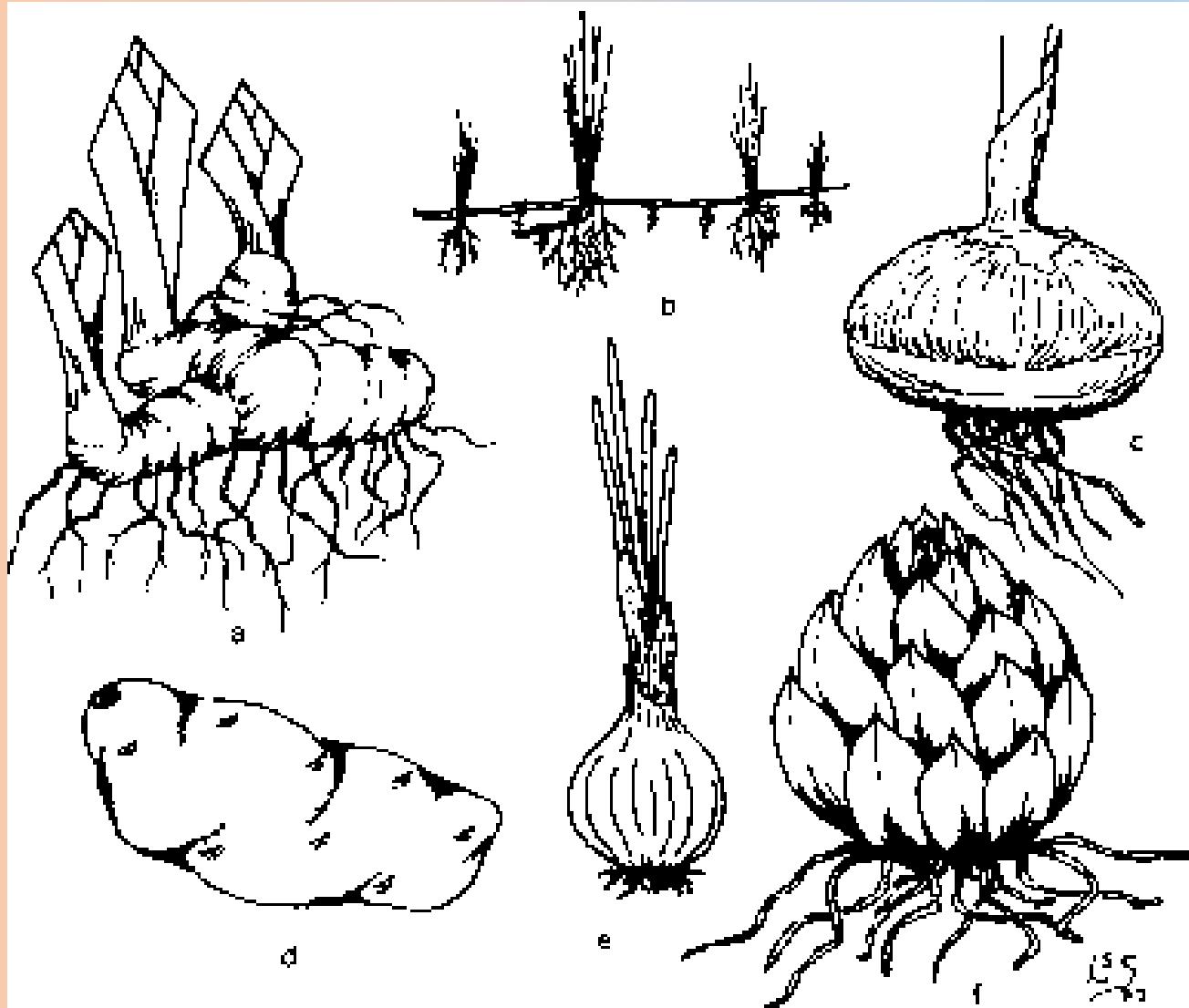
Function: Stores large amounts of food

Examples: cocoyam, yams

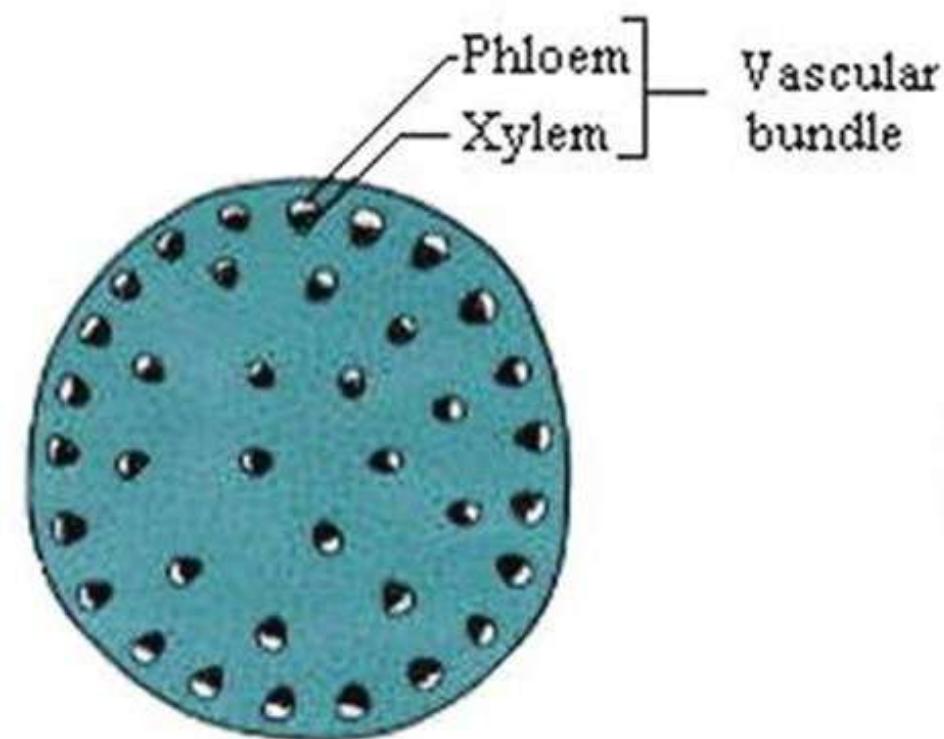


Specimens a,b,c,d,e and f are plant organs.

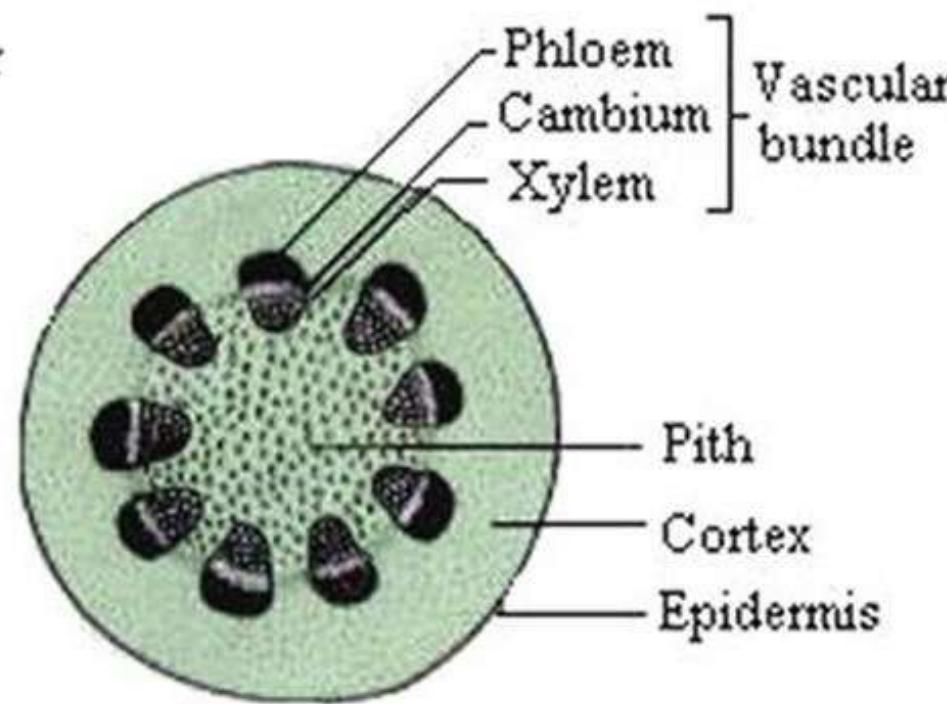
- a) Identify the organs giving a reason for your answer.
- b) Describe the nature and structure of each organ.



STEMS – MONOCOT & DICOT



Monocot stem

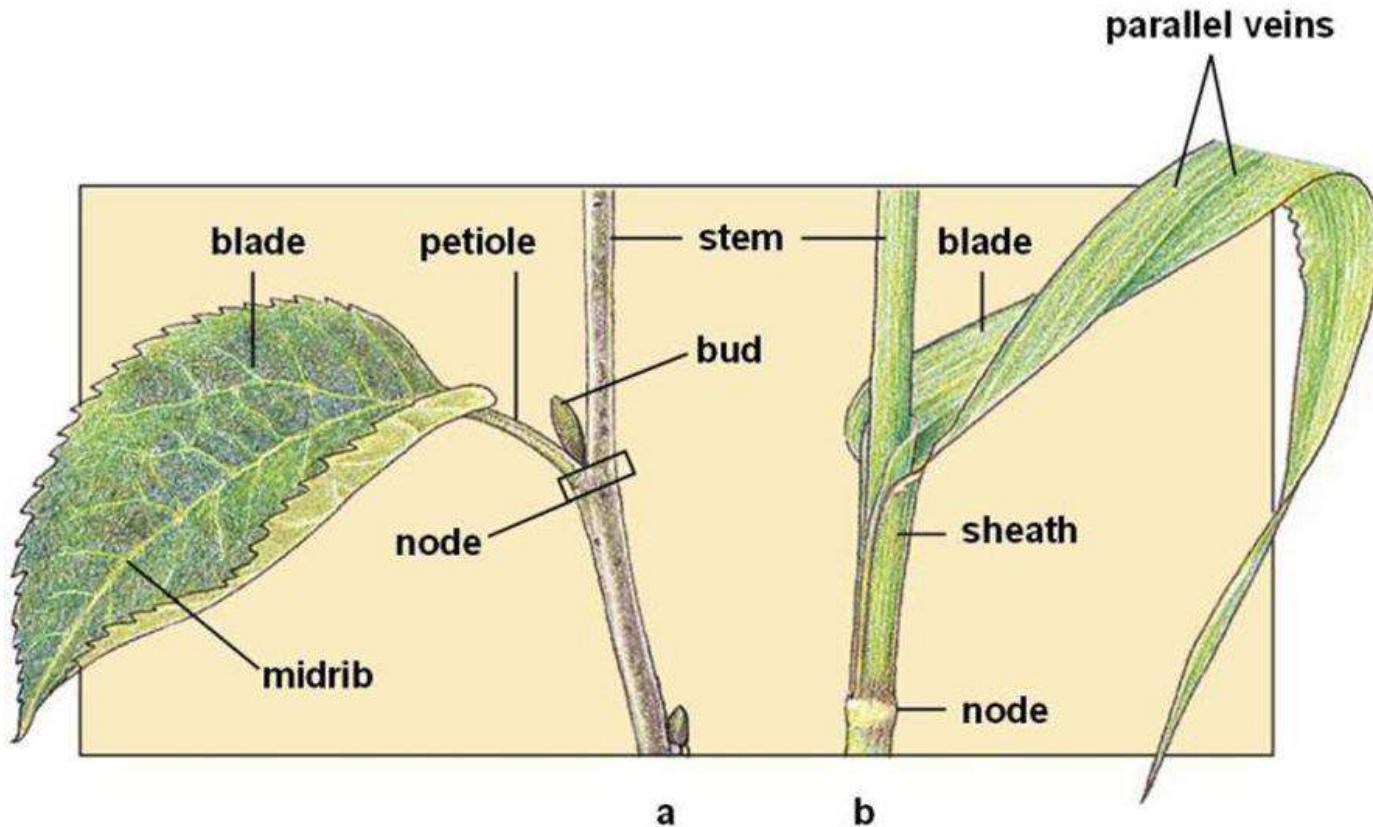


Dicot stem

THE LEAF

A leaf is a **thin flattened** structure which **grows from the nodes of a stem** or its branches and has a bud in its axil.
The leaf is made up of 3 main parts.

Typical dicot (a) and monocot (b) leaves compared.



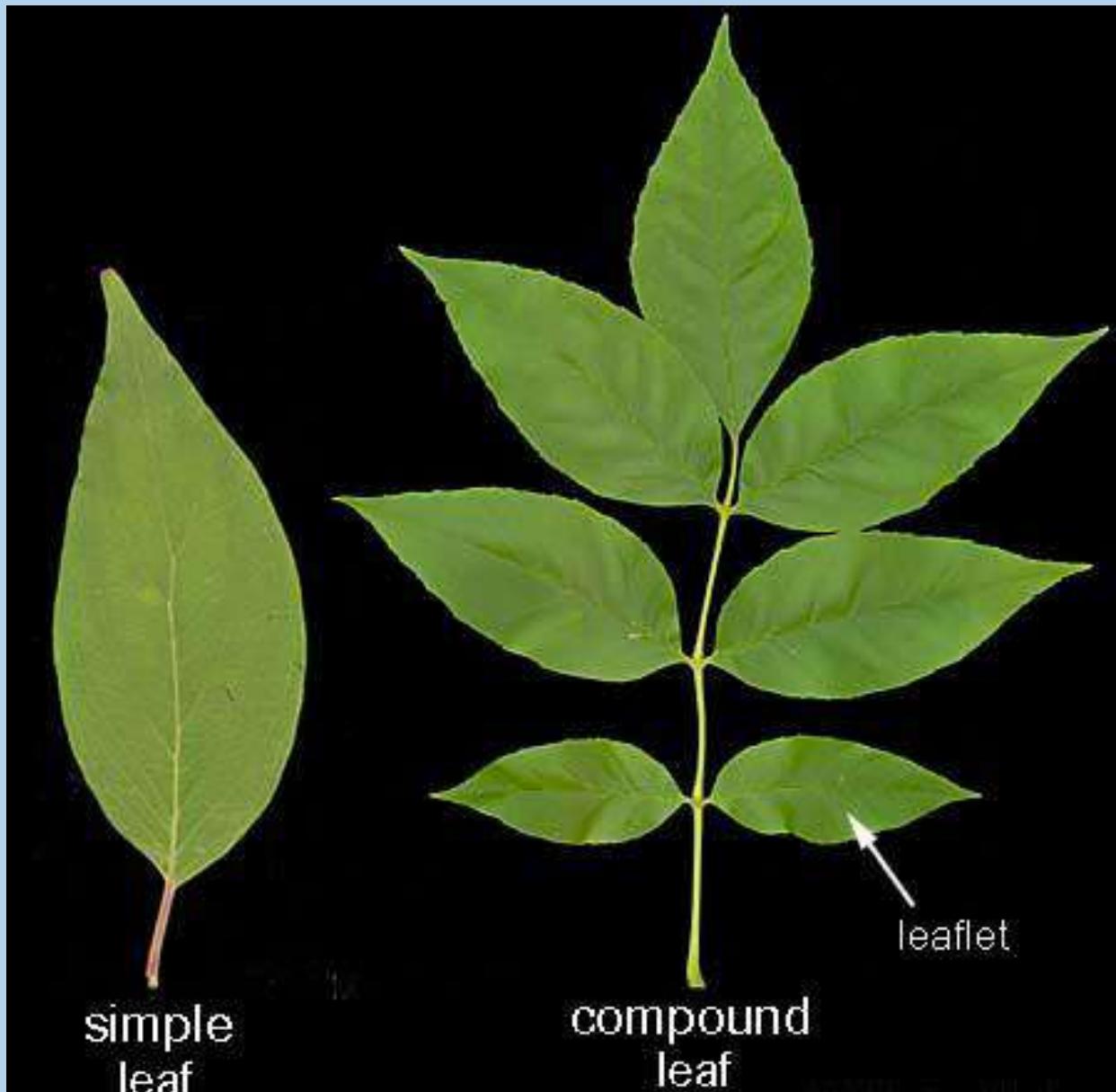
Dicot leaves usually have netted venation and a midrib; monocot leaves usually have parallel veins.

Can you describe the nature and structure of the leaf below?

Parallel palmate venation



TYPES OF LEAVES



SIMPLE LEAVES

(Lamina undivided or incompletely divided)



Simple
digitates of
[cassava](#)
and
[pawpaw](#)



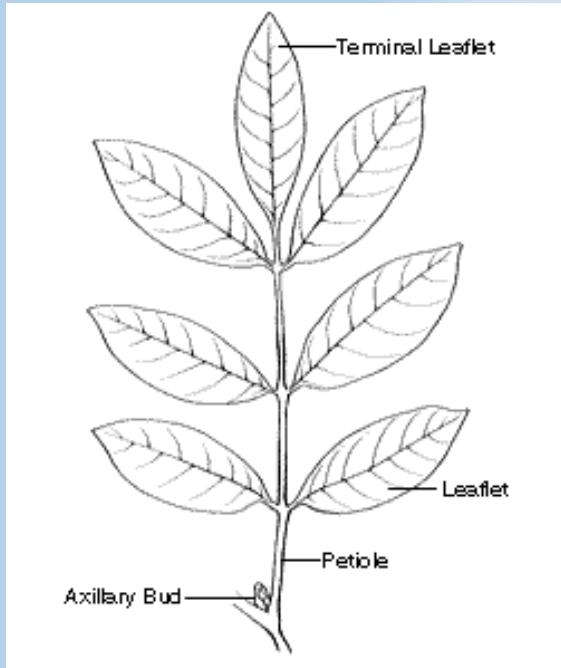
COMPOUND LEAVES

1. COMPOUND PINNATE

A compound leaf divided into **leaflets** arranged oppositely or alternatively along a main vein called **rachis**

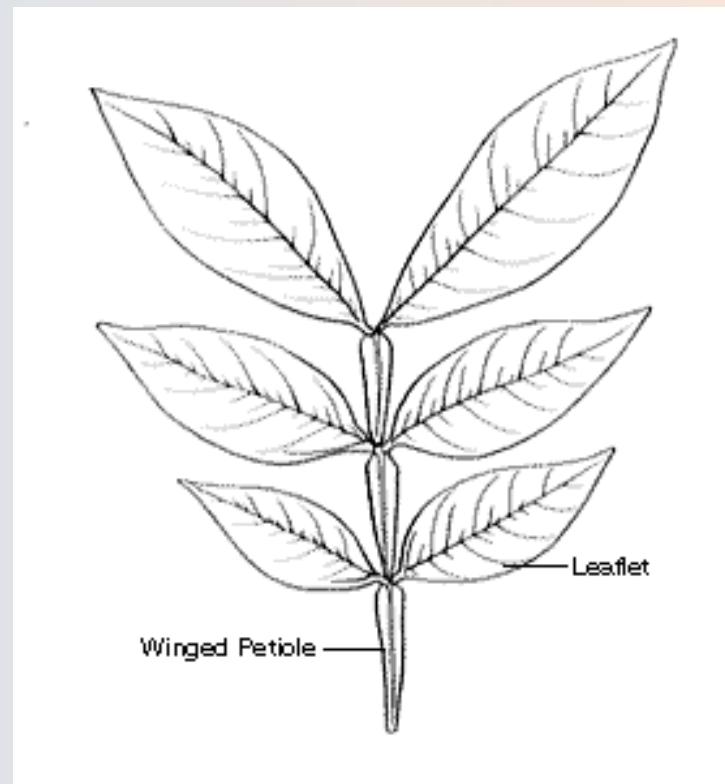
Imparipinnate

(Has terminal leaflet)



Paripinnate

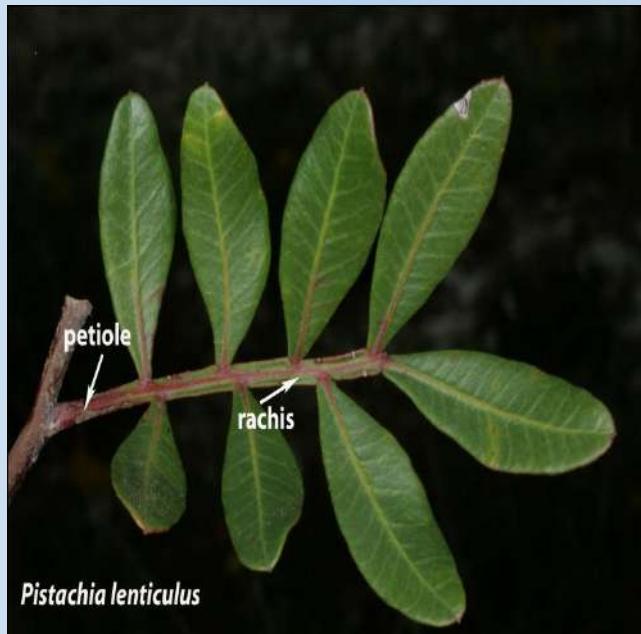
(Has no terminal leaflet)



COMPOUND LEAVES

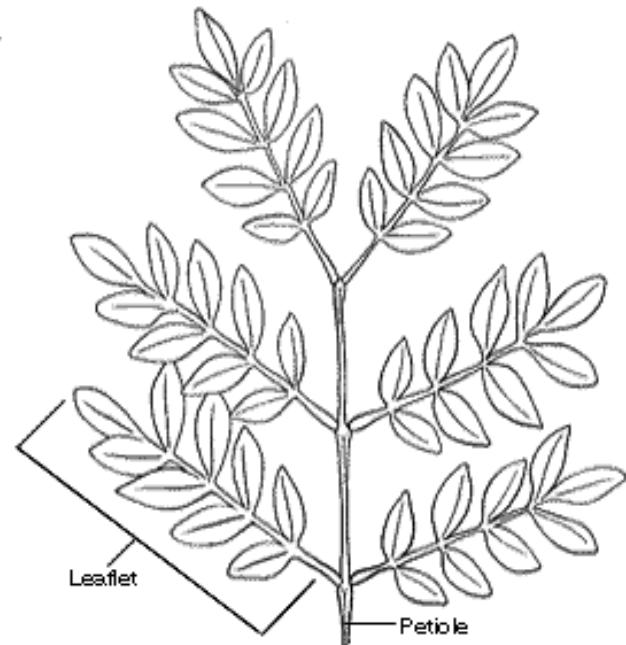
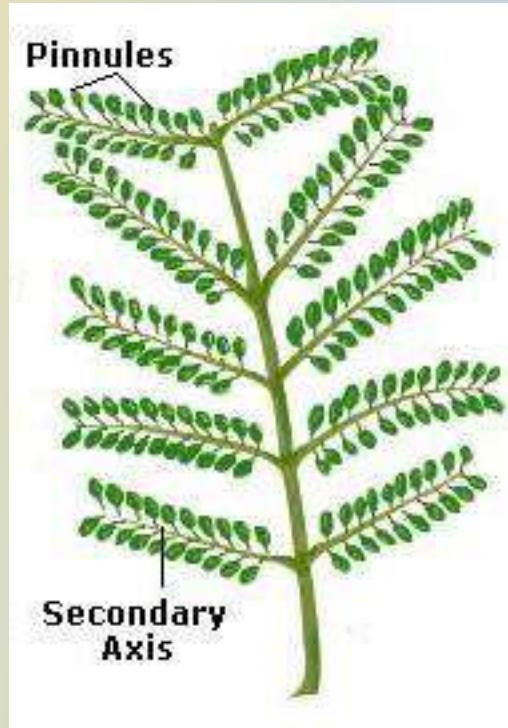
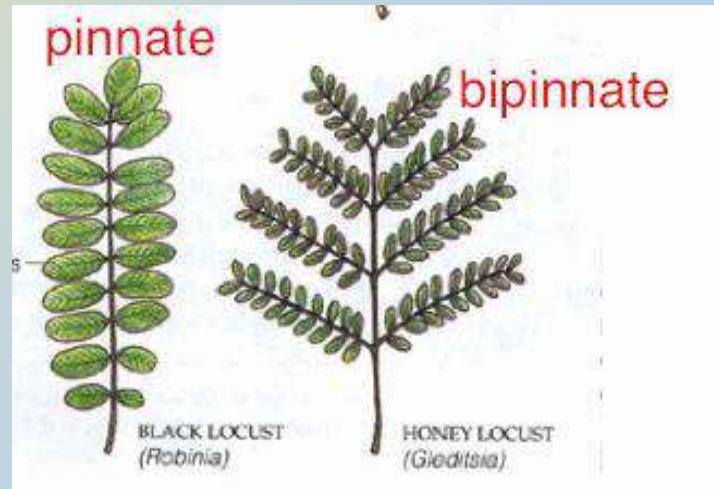
COMPOUND PINNATE con'td

A leaf divided into leaflets such that each leaflet is a **simple leaf**



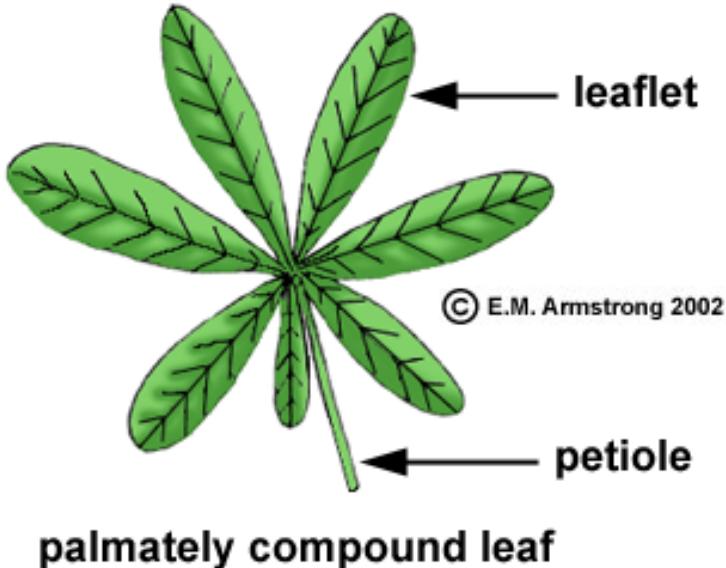
2. COMPOUND BIPINNATE

A leaf with **leaflets** further divided into **pinnules** such that each leaflet is also **compound**



COMPOUND DIGITATE(palmate)

A leaf with completely divided leaflets radiating from the same point as digits from a palm



COMPOUND TRIFOLIATE

Compound leaves with **only three leaflets** arising from the same point

Oxalis latifolia



Food for thought

1. You are provided with specimen A,B, C and D which are plant organs
With a reason, identify the specimens (Observe mainly the nature of the margins and lamina).



A



B

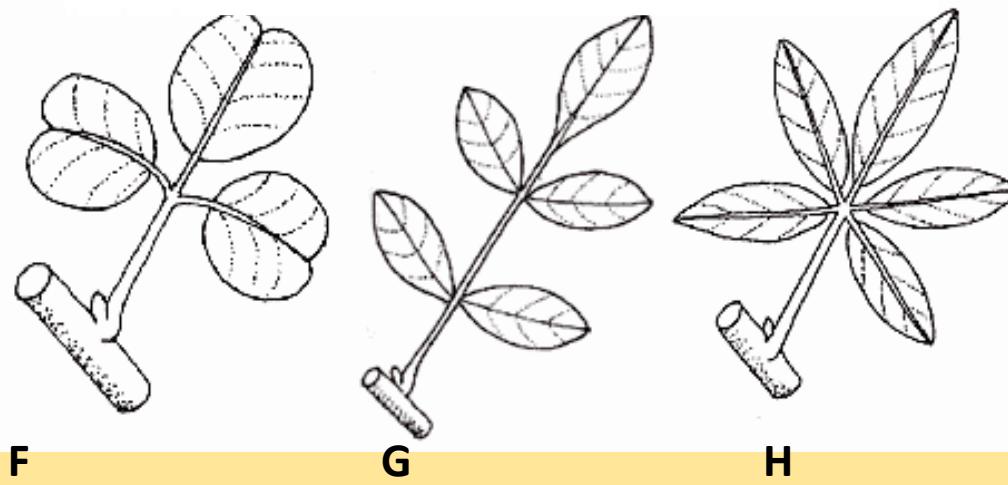
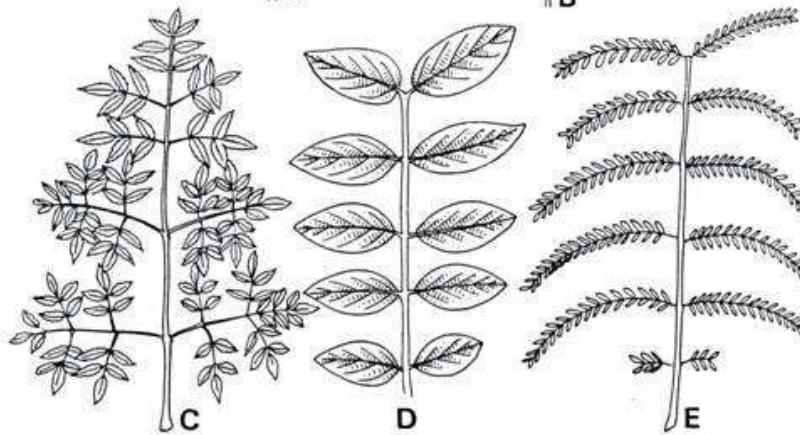
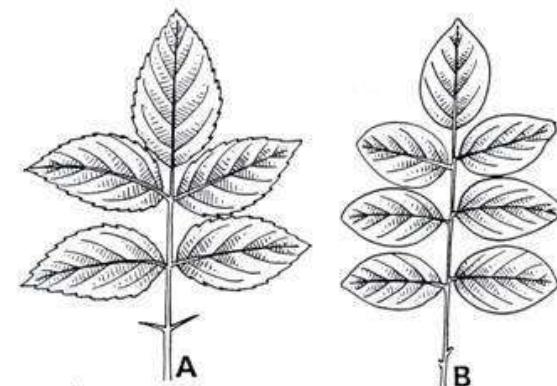


C



D

2. You are provided with specimens A, B,C,D,E,F,G and H which are plant organs.
Describe the nature and structure of each organ hence identify the organ.



ARRANGEMENT OF LEAVES ON A STEM



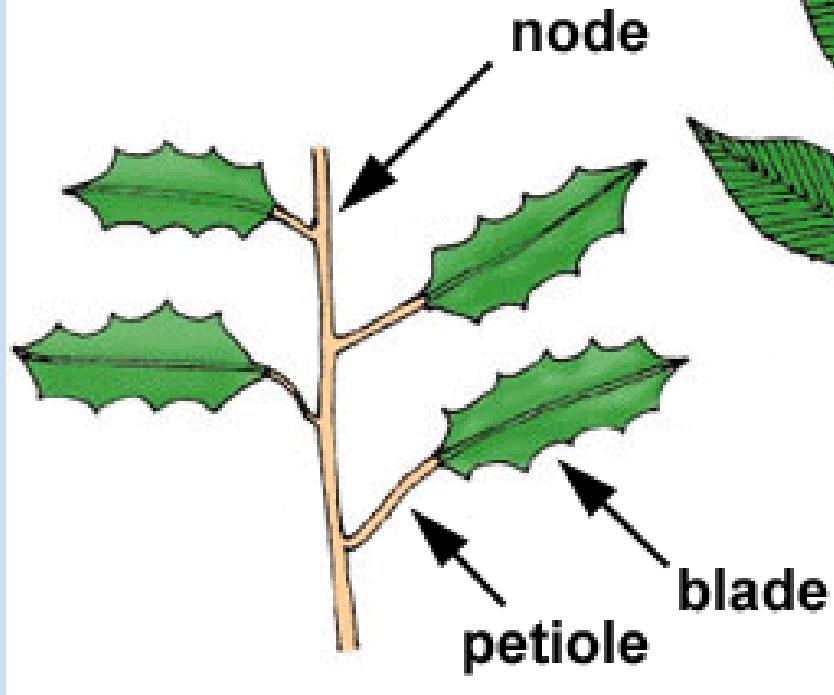
A

B

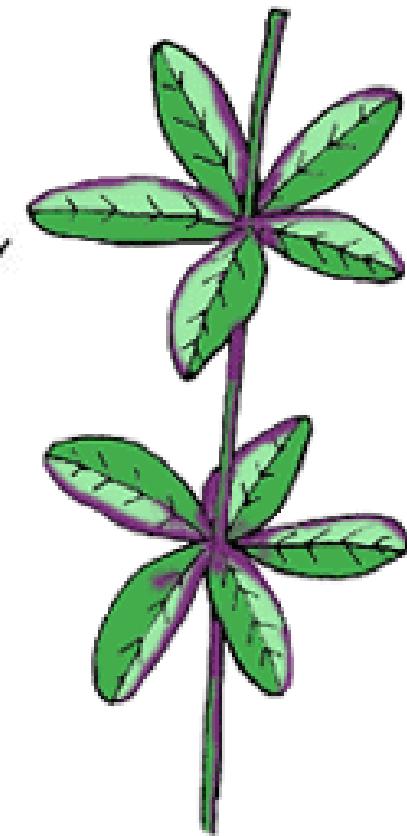
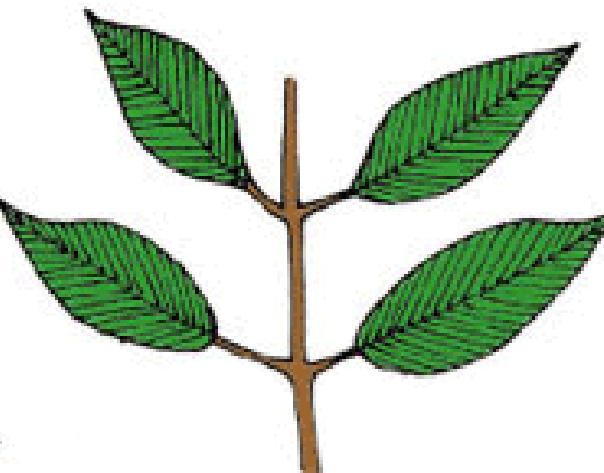
C

ARRANGEMENT OF LEAVES ON A STEM CONTINUED.....

© E.M. Armstrong 2002



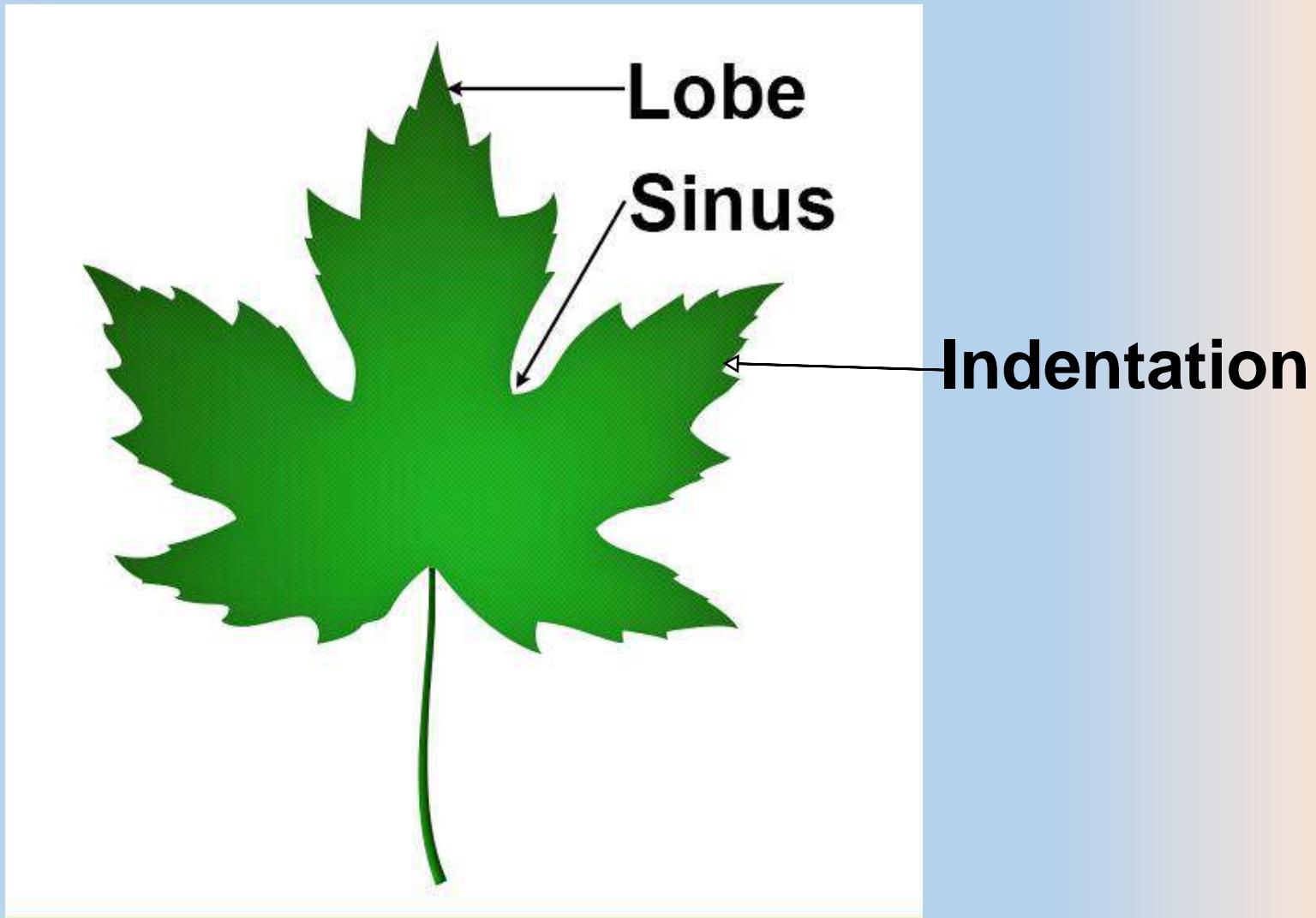
Leaf Arrangement



Which of the following is a

- series of leaves arising from different points from either side of the stem?
- series of two leaves arising from the same point each from either side of the stem?
- series of leaves arising from the same point all around the stem?

LEAF MARGINS DESCRIPTIONS



LEAF MARGINS



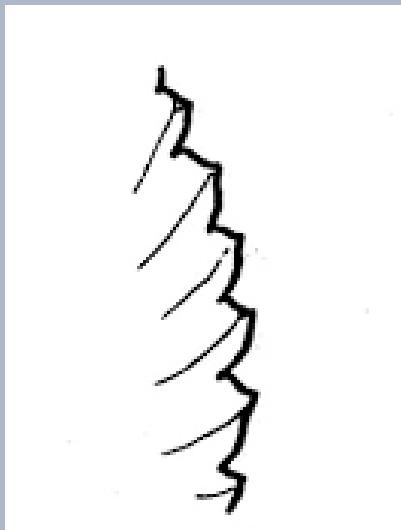
Serrated



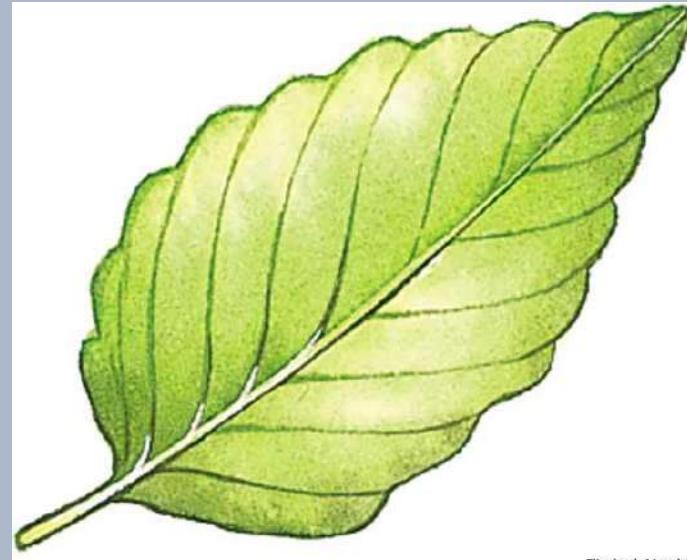
Entire



Lobed



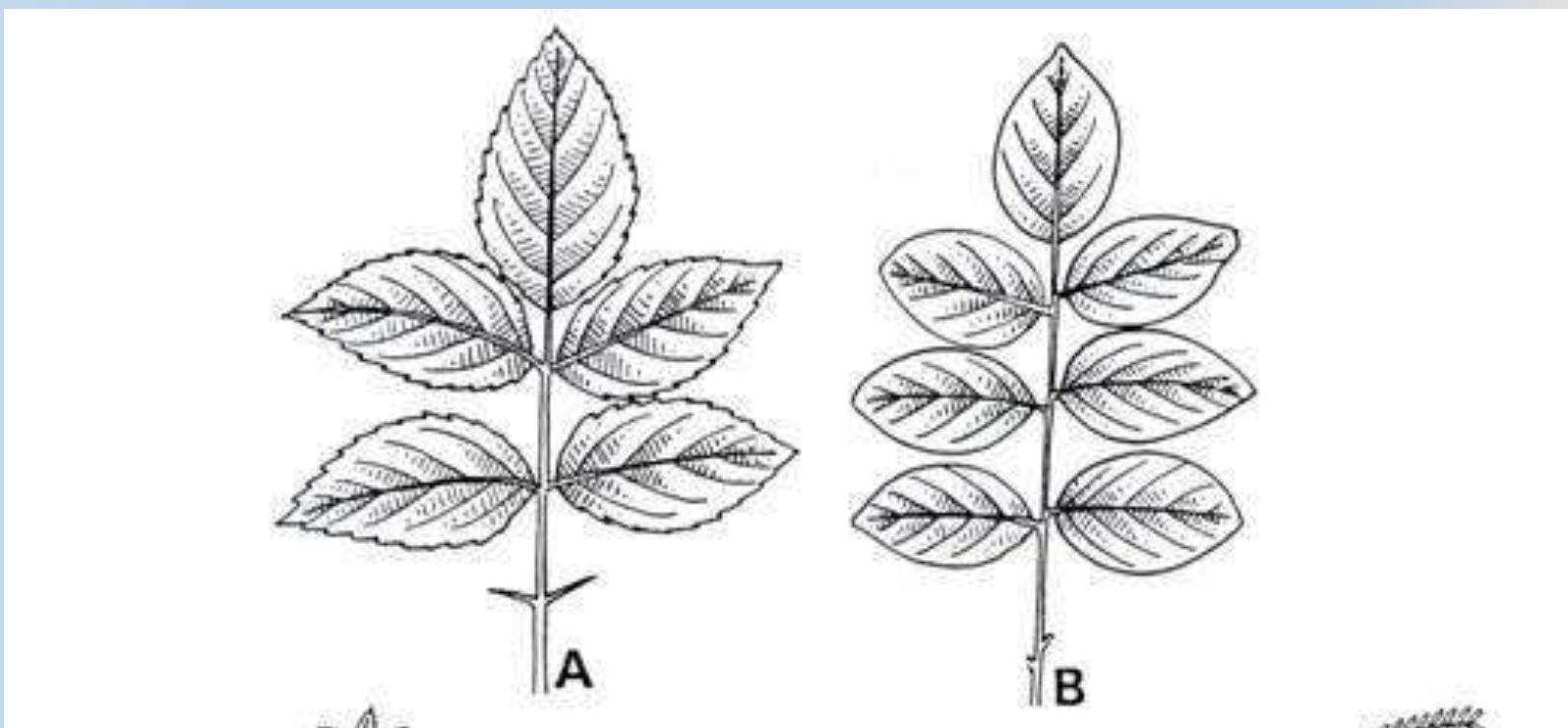
Dentate



Crenate

Elizabeth Morales

You are provided with specimens A, B and C which are plant organs. Describe the nature of margins, leaf arrangement and lamina. Hence identify each specimen



VENATION

SHAPES

ARRANGEMENT

MARGINS

ARRANGEMENT
ON THE STEM

pinnate

parallel

palmate



linear



obovate



ovate



pinnately lobed



palmately lobed



lanceolate



sagittate



simple



palmately compound



pinnately compound



bipinnately compound



entire



crenate



dentate



opposite



whorled



lobed

MODIFICATION OF LEAVES

1.LEAF TENDRILS

Modification: leaves are modified into slender wire like coil structure called tendrils.

Function: The climbing organs in climbers are for support



Leaf tendril



Squash tendrils

MODIFICATION OF LEAVES CON'TD

2.LEAF SPINES

Modification: Are modified into sharp pointed structures

Aloevera leaf

Function: For defense

Egg plant leaf



Pine pinus



Cactus leaf



MODIFICATION OF LEAVES CON'TD

3.LEAF SCALES

Modification: Are modified into thin, dry membranous structures usually brown in colour

Function: To protect the axillary bud from mechanical injury and drying out



MODIFICATION OF LEAVES CON'TD

4. INSECTIVOROUS LEAVES

Modification: Have a deep cavity filed with enzymatic fluids. The leaf closes once it detects a foreign object

Function: To capture and digest insects

Pitcher plant



Venus fly trap



Sundew



nepenthes (pitcher)



Bladder wort



Butter wort



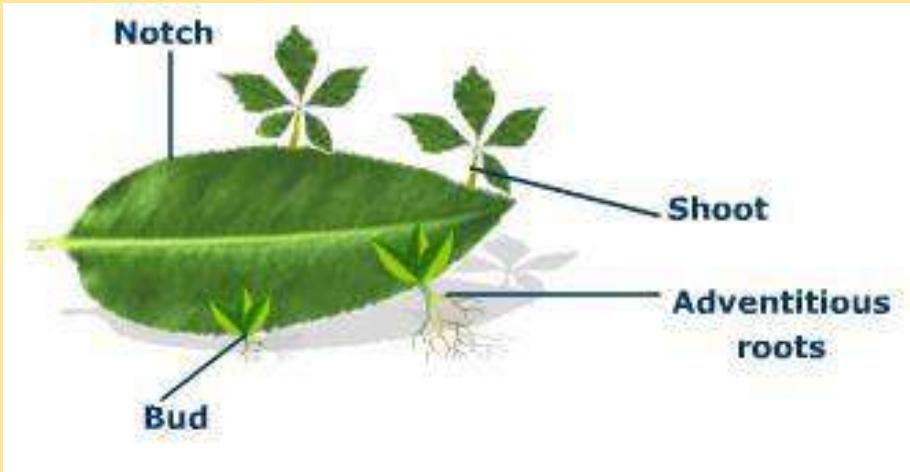
MODIFICATION OF LEAVES CON'TD

4. VEGETATIVE LEAVES

Modification: Leaves have series of buds at the end of vein

Function: To give rise to new plants

Example: Bryophyllum leaf



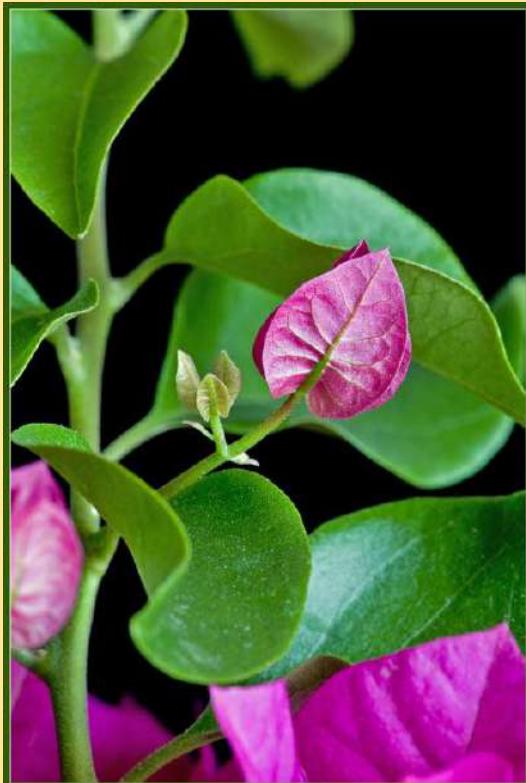
MODIFICATION OF LEAVES CON'TD

5. BRACTS

Modification: Here leaves are modified into small, dull or brightly colored leaf like structures often positioned beneath a flower or inflorescence(a group of flowers on the same stalk)

Function: To attract pollinators

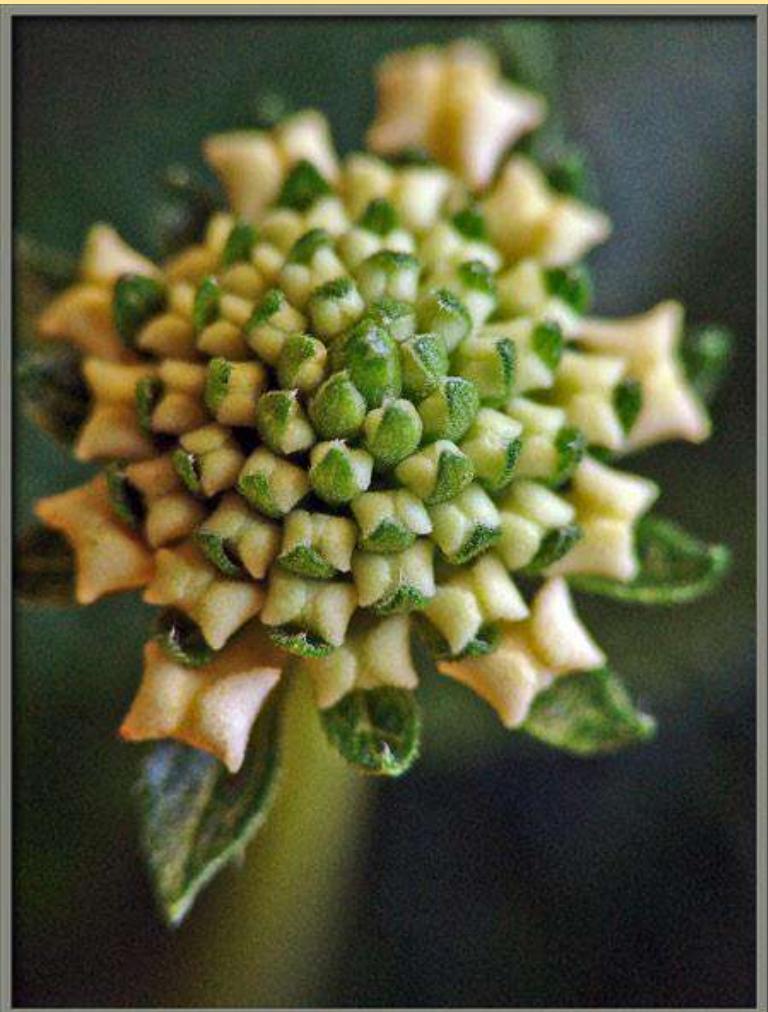
Example: Bougainvillea bract(brightly coloured bracts)



BRACTS CONTINUED.....

Example 2: *Lantana camara* bracts

Modification: Dull coloured bracts for **protection** of flowers



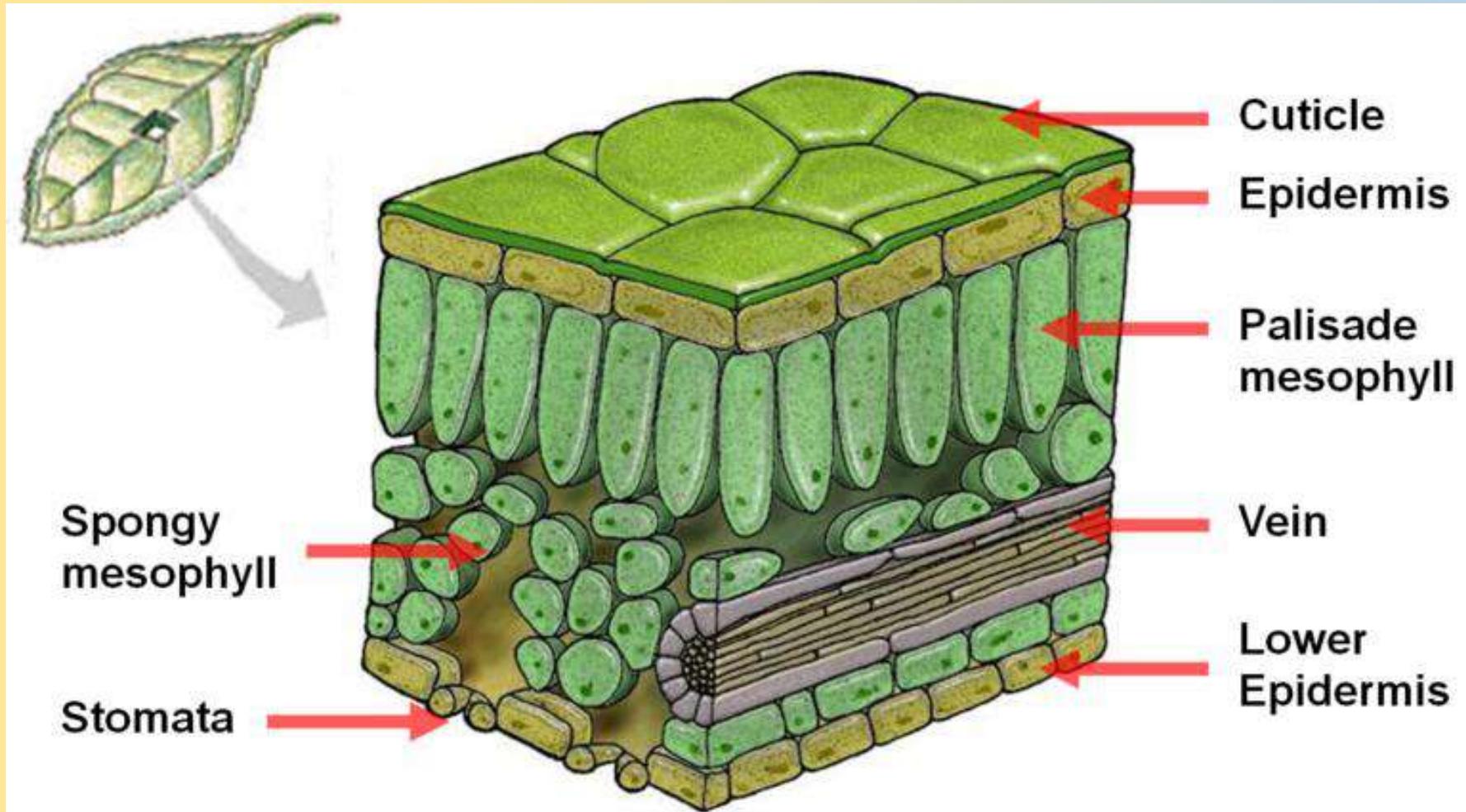
BRACTS CONTINUED.....

Example 3: ***Bidens pilosa*** inner and outer bracts

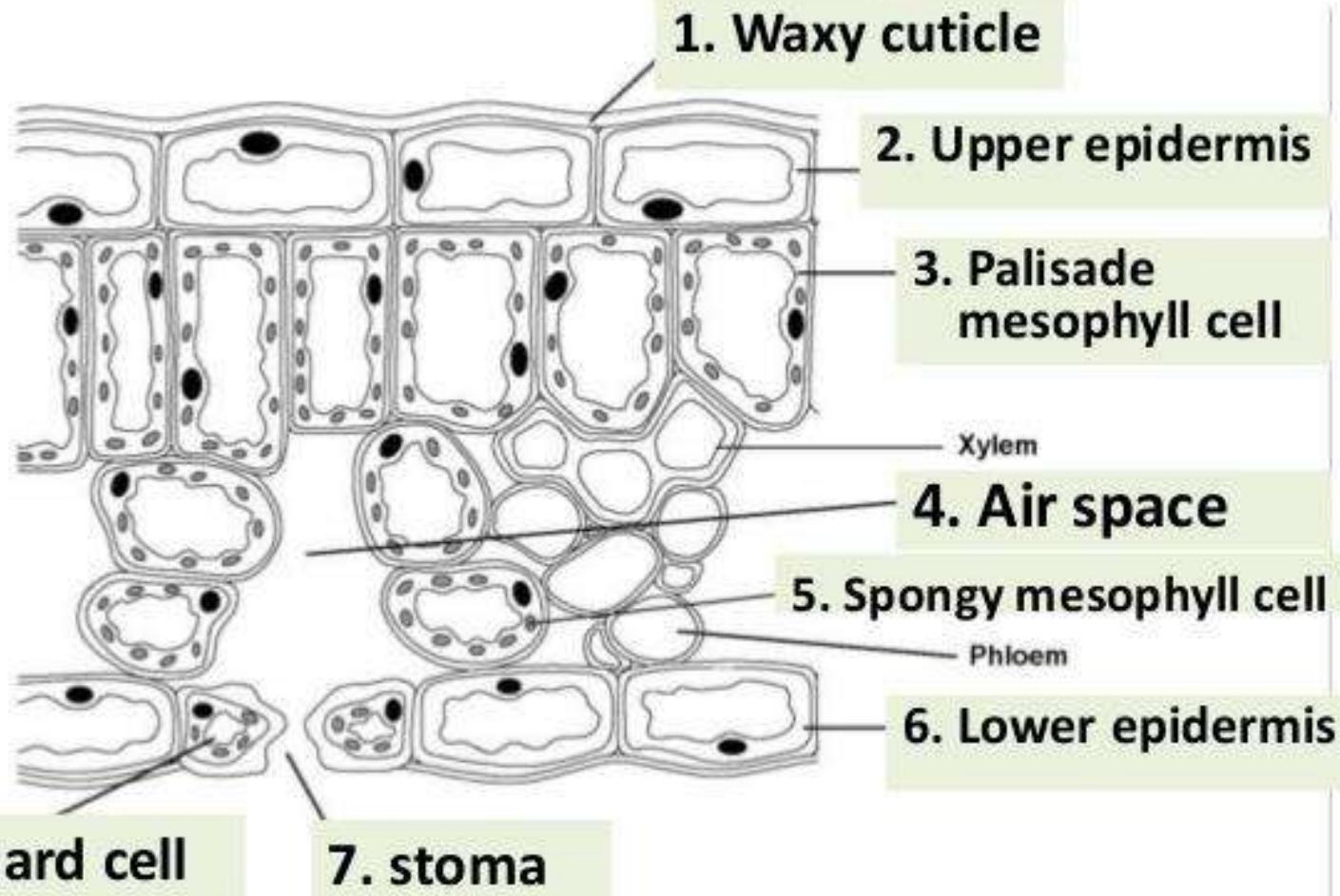
Modification: Dull coloured small and larger leaflike structures for protection of flowers



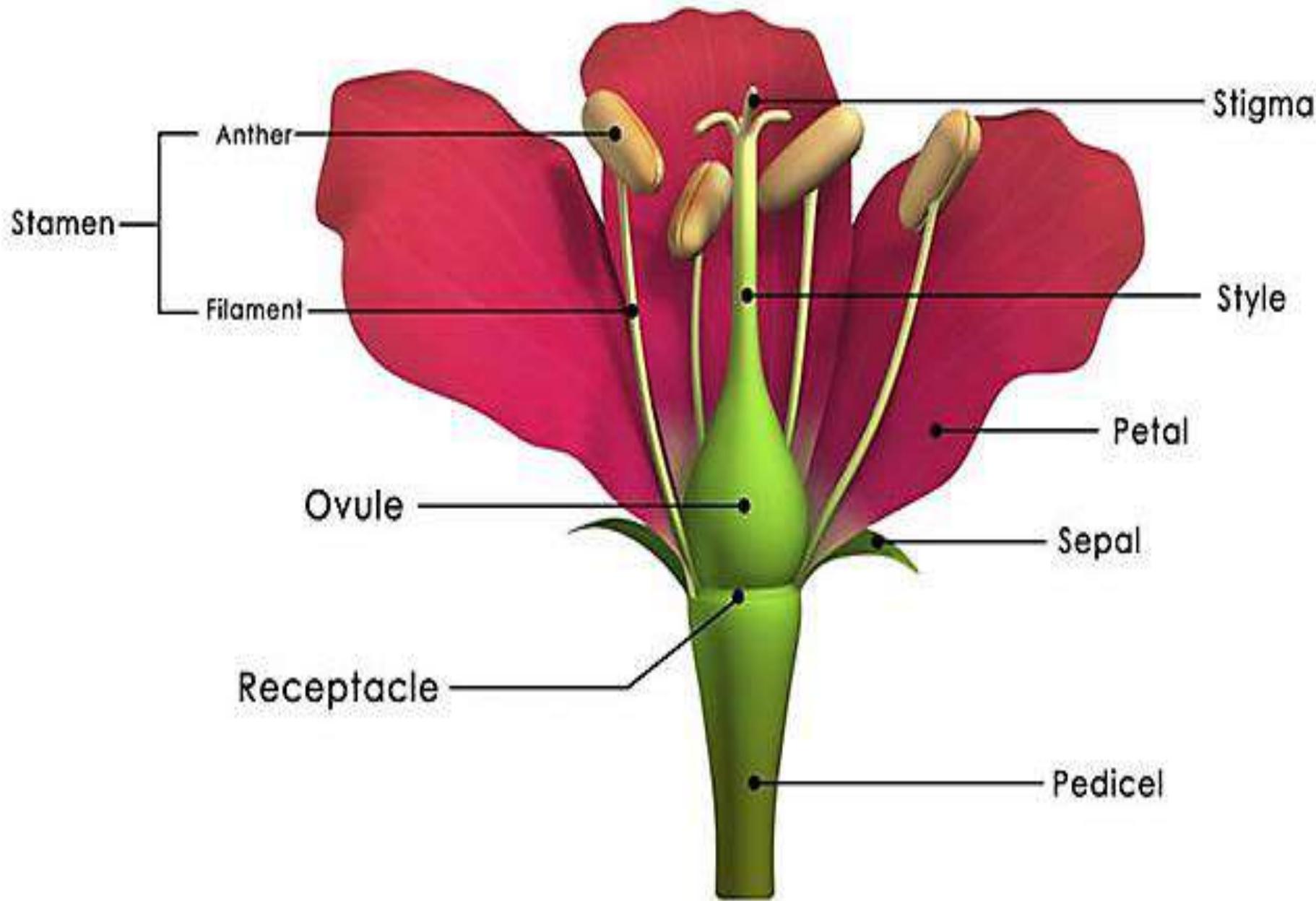
THE INTERNAL STRUCTURE OF A LEAF



Vertical section through a leaf



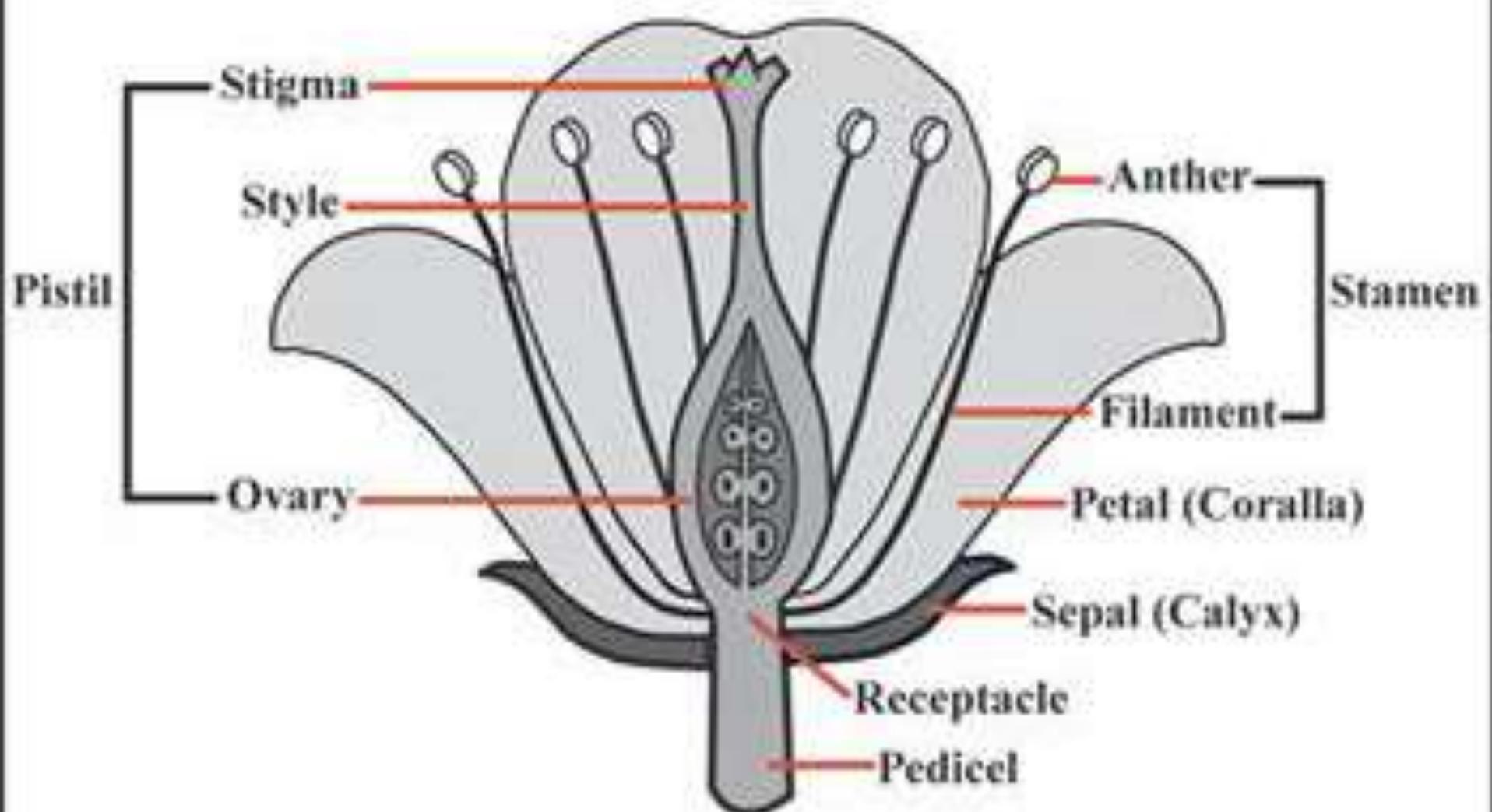
THE FLOWER



FLOWERS OF INTEREST

1. Morning glory
2. Bouganivillae
3. Banana INFLORESCENECE
4. Maize inflorescence
5. Lantana camara
6. Crotolaria

FLOWER DIAGRAM



THE CROTALARIA FLOWER



It is **complete** and **irregular**



THE CROTALARIA FLOWER CONTINUED.....

The calyx



Describe the nature of the calyx

- Has five green sepals joined together at the base; but free at the apex
- The sepals are veined

THE CROTALARIA FLOWER CONTINUED.....

The corolla

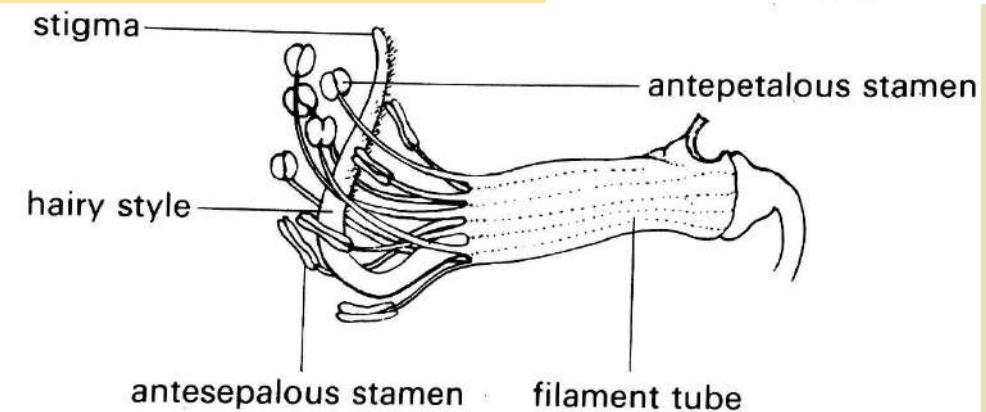
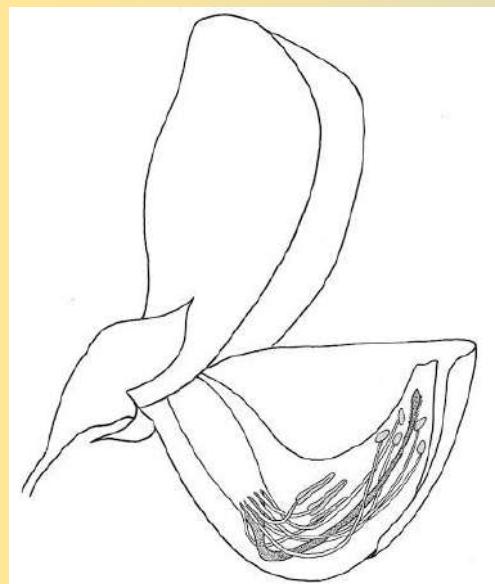


Describe the nature of the corolla

- The petals are brightly colored
 - The corolla is made up of **3** free and **2** fused petals.
 - The outer one (**standard**) petal is large and round.
 - It is curving sharply backwards.
 - Has **dark lines** called **pollen guides**.
- The two middle side petals called **wings**.
- The two lower ones are fused to form a boat-shaped structure called **keel**.
 - The upper part of a keel coils round to form a tube

THE CROTALARIA FLOWER CONTINUED.....

The androecium

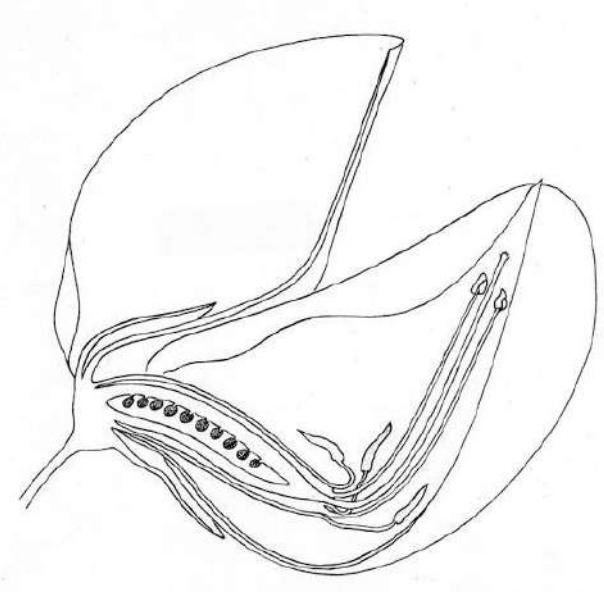


Describe the nature of the androecium

- The stamens are found inside the **keel**.
- The androecium is made up of **10** stamens.
- The lower halves of filaments join to form a **filament tube** with a narrow slit between the two upper stamens.
- Has 5 short and 5 long **bilobed** stamens.
- The longer stamens have **rounded** anther heads.
- The shorter stamens have **elongated** anther heads.

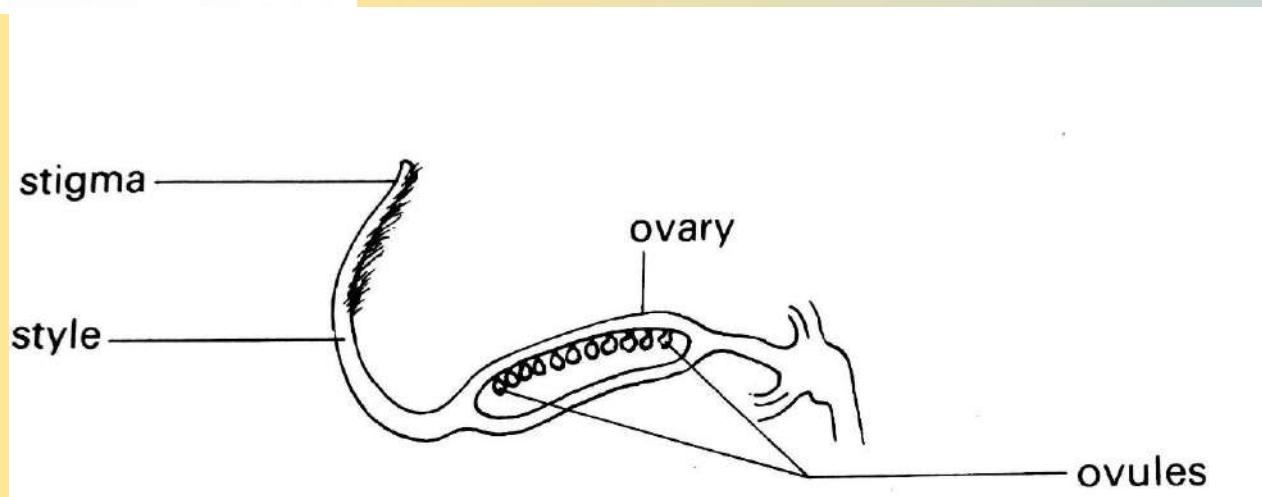
THE CROTALARIA FLOWER CONTINUED.....

The gymnoecium



Describe the nature of the gymnoecium

- The gymnoecium is made up of one carpel(**monocarpous**)
- The seeds are arranged along the margin(**Marginal placentation**)
- The style bends upwards at right angles to the ovary.
- The style is hairy just below the stigma.



THE CROTALARIA FLOWER CONTINUED.....

Mode of pollination



Describe the mode of pollination of crotalaria

Insect pollination

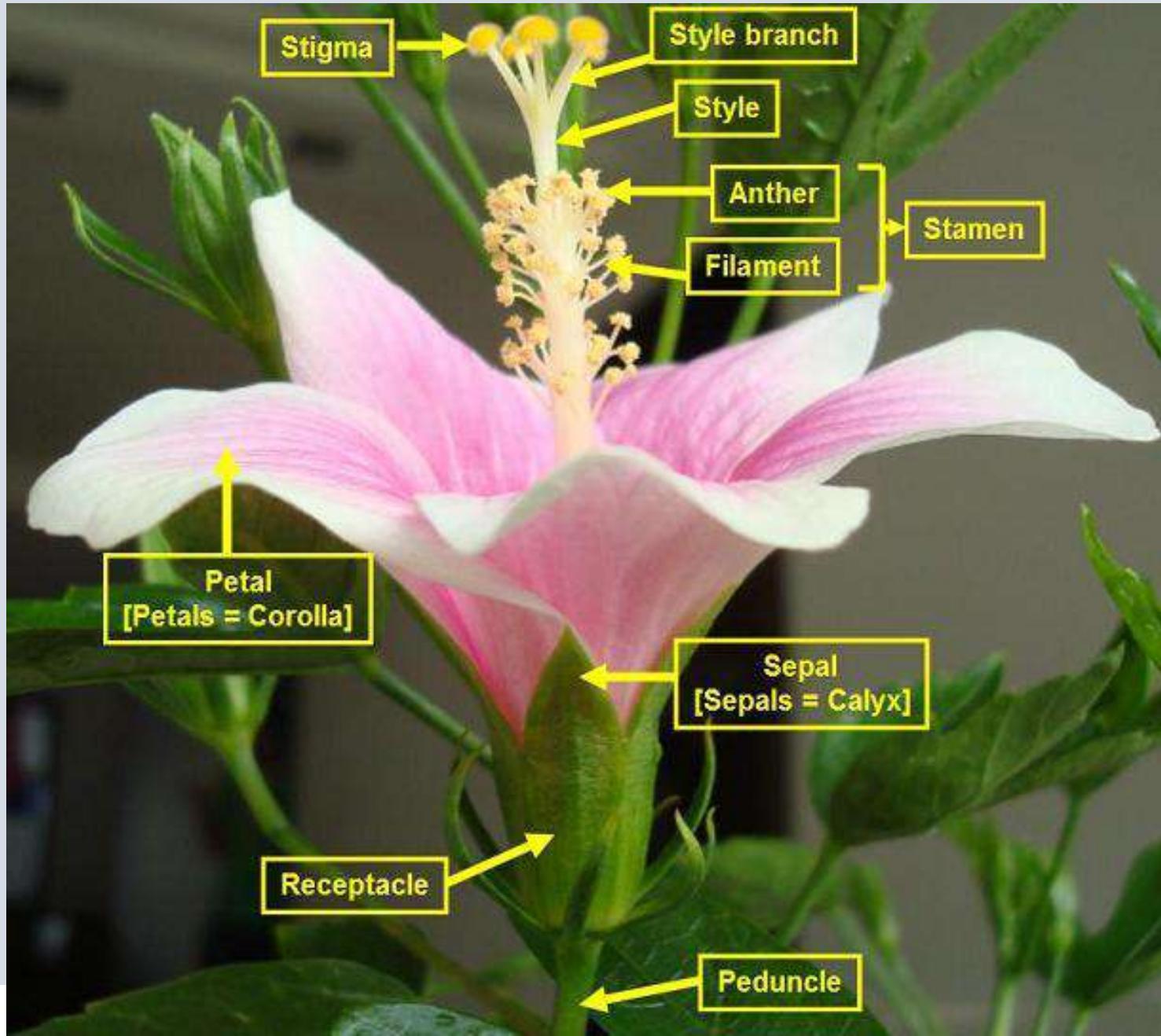
Reasons for the mode of pollination

- Has brightly colored petals.
- Has wings heavy enough to be depressed by the bee thereby lowering the keel.
- This makes the keel open and a ribbon of pollen is pressed against the bee's under surface.
- Has nectaries at the base of the stamen tube
- Has pollen guides which appear as dark lines on the standard.
- Has a hairy stigma to brush off pollen from the bee as it moves towards the stigma

THE HIBISCUS FLOWER



EXTERNAL STRUCTURE OF HIBISCUS FLOWER labeled



The calyx



Describe the nature of the calyx

- Has five fused sepals
- Sepals are hairy
- Sepals point towards the apex.
- Sepals are green in colour
- Sepals are veined.



The corolla



Describe the nature of the corolla

- Has brightly colored petals
- Has 5 free petals.
- The petals are smooth
- The petals are veined.
- They are broad anteriorly.

The androecium



Describe the nature of the androecium

- Has numerous filaments fused to form a staminate tube covering the pistilate tube.
- The anther heads are cylindrical; small, brightly colored and bilobed.

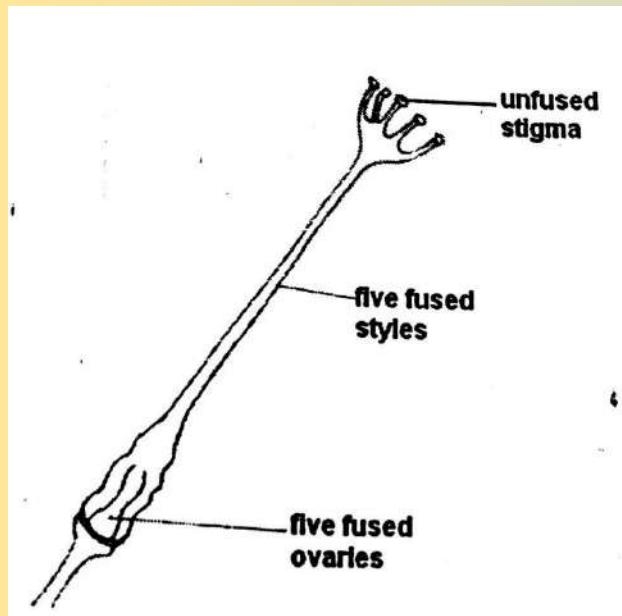
The gymnoecium



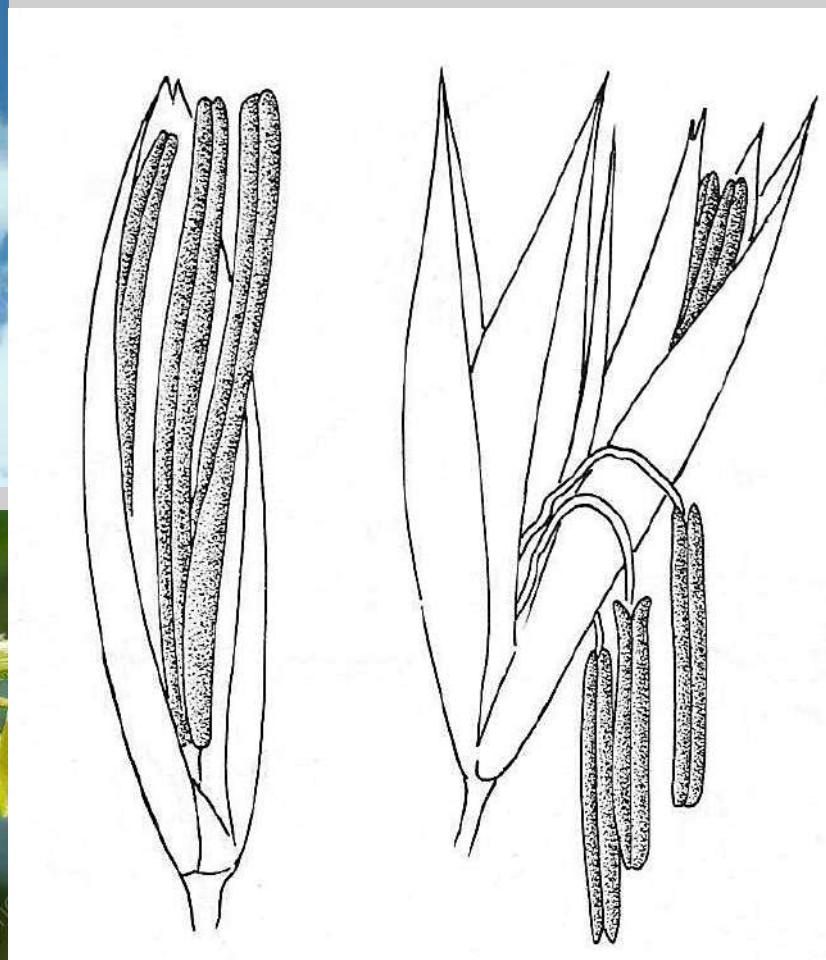
file.com

Describe the nature of the gymnoecium

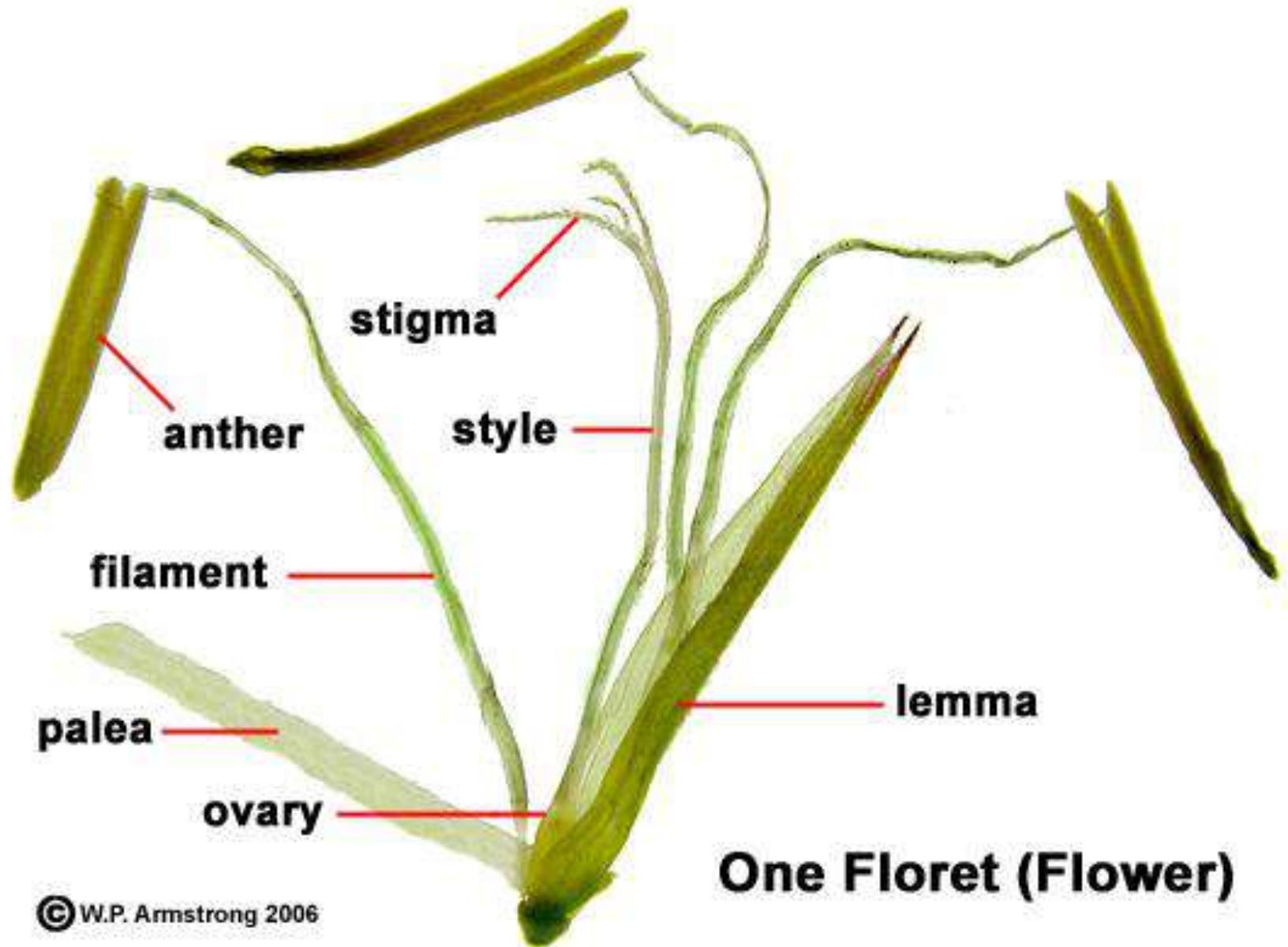
- The ovary is superior and conical shaped.
- Has 5 styles fused to form a pistillate tube.
- The styles are free at the end terminating into five free stigmas.
- The stigmas are hairy.



SPIKELET OF THE MAIZE FLOWER



MAIZE SPIKELET FLOWER LABELED



SINGLE GRASS FLOWER

Guinea grass



Grass spikelet



PARTS OF A FLOWER

The four floral whorls

a.Calyx

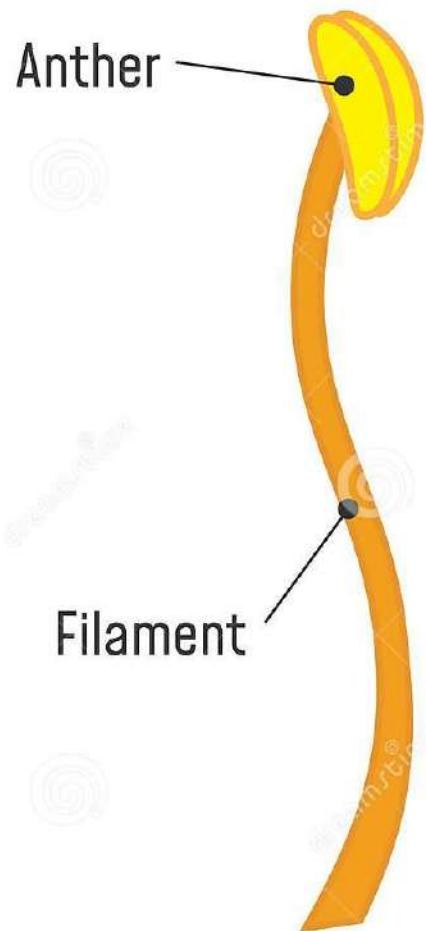
b.Corolla

c.Androecium

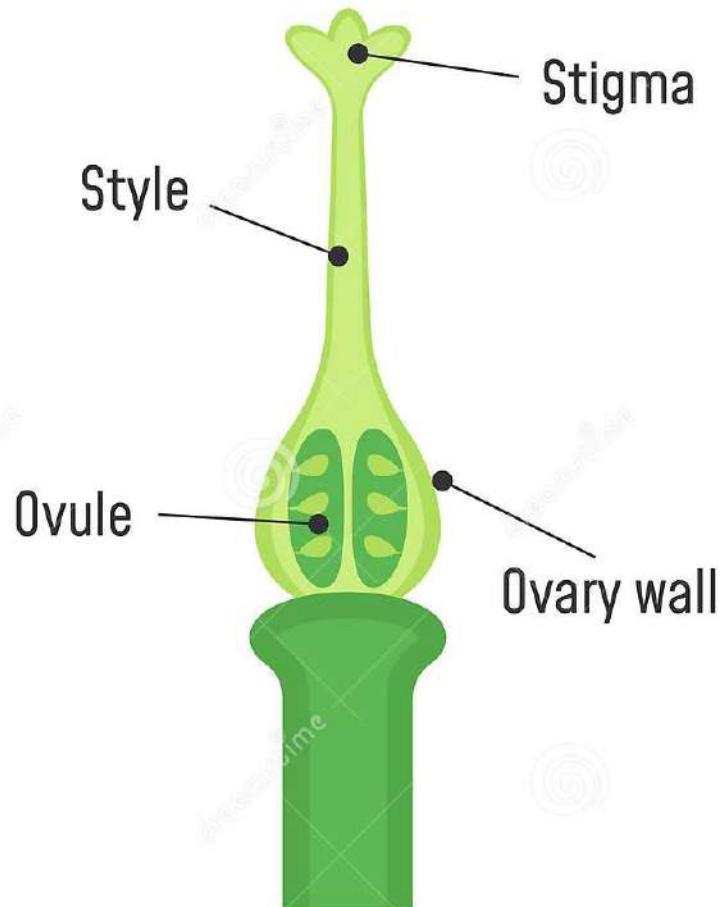
d.Gymnoecium

THE ANDROECIUM AND GYMNOECIUM

Structure of stamen



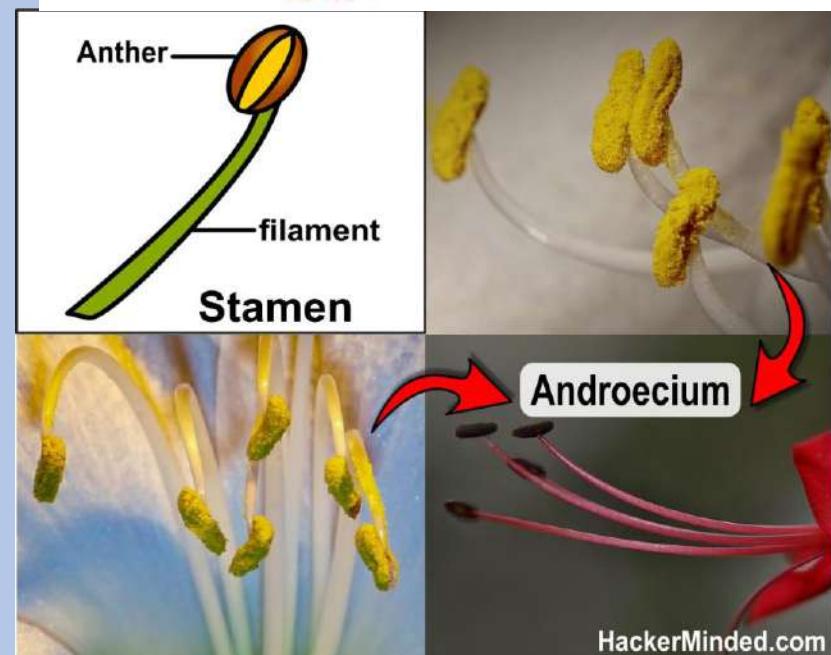
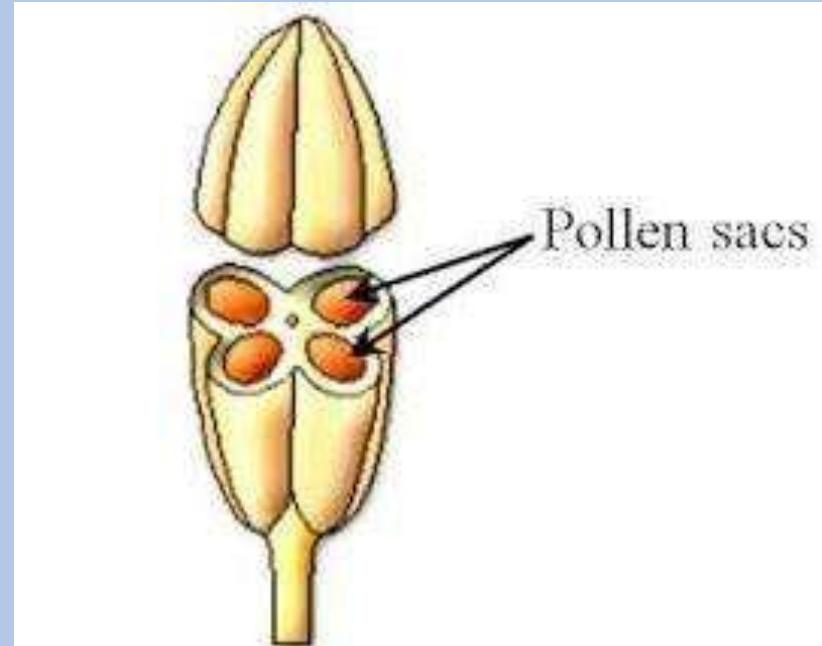
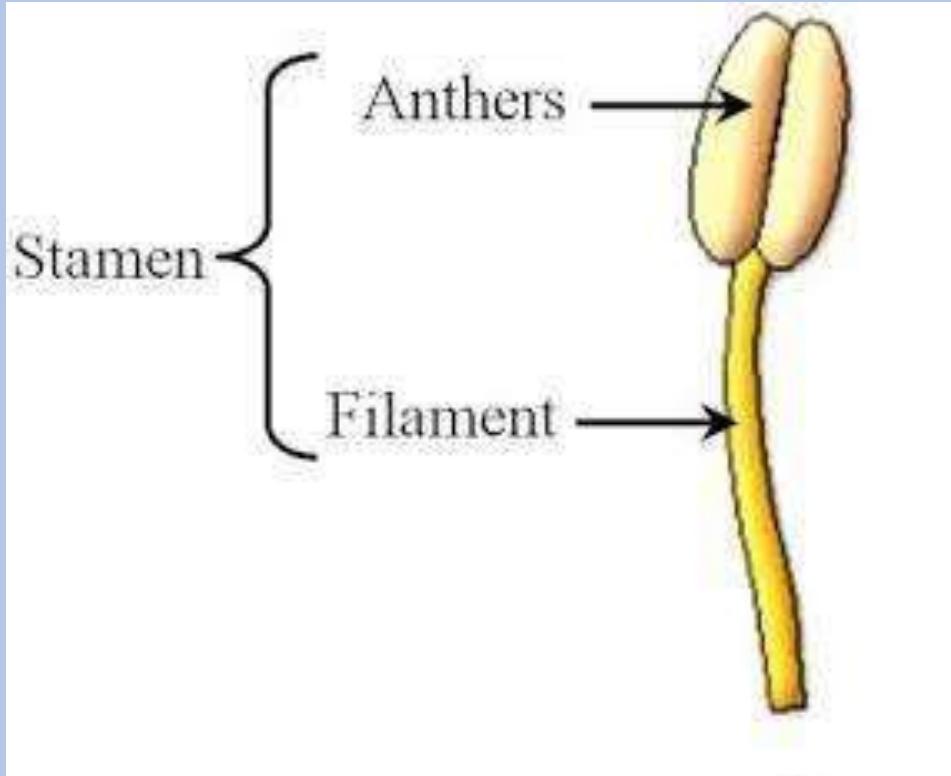
Structure of carpel



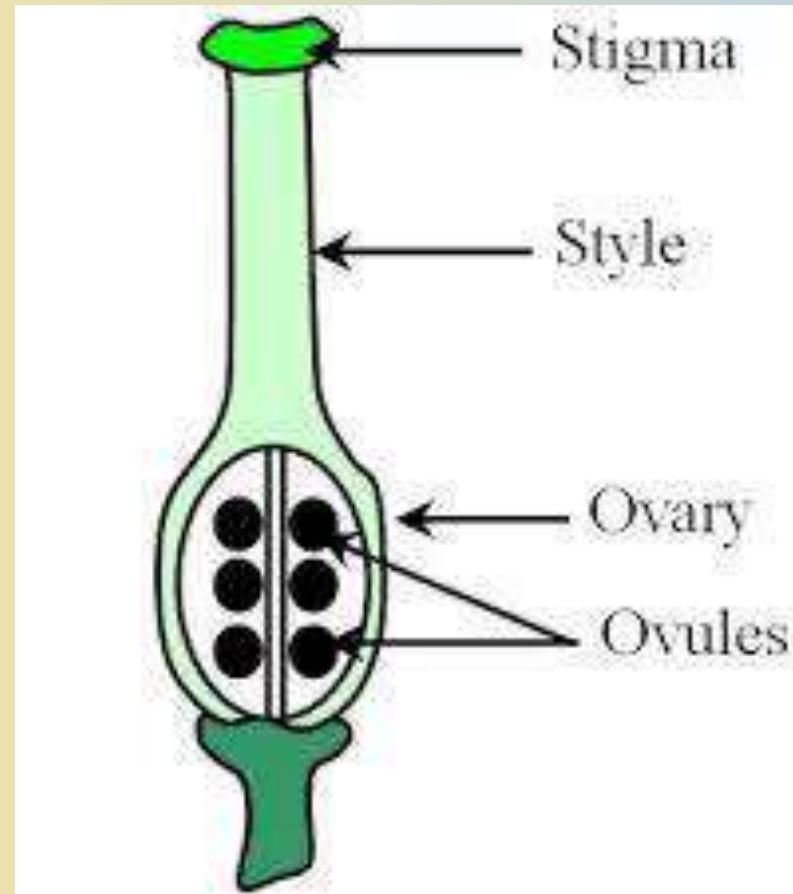
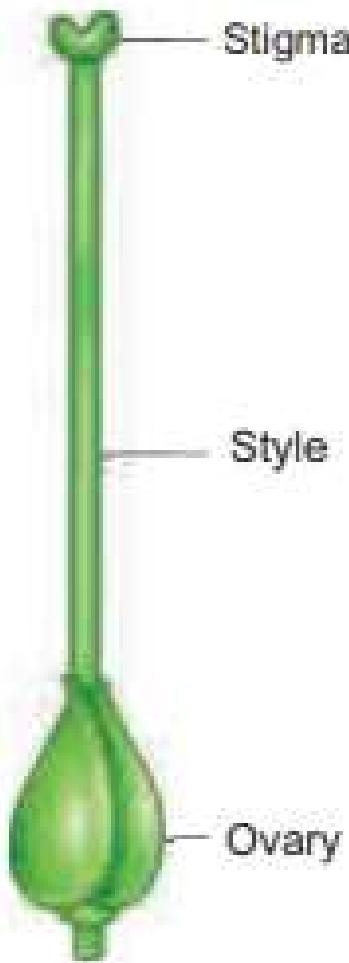
THE CALYX AND COROLLA



THE ANDROECIUM



THE GYMNOECIUM

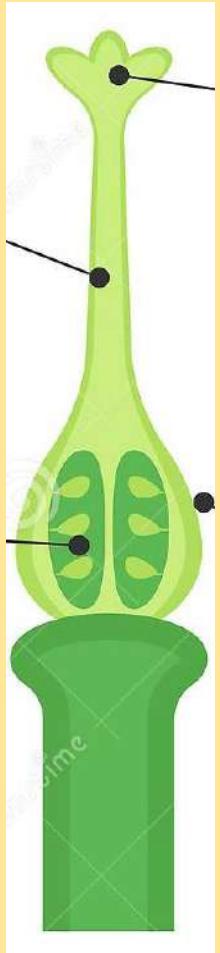


Structure of carpel

TYPES OF PISTILS

MONOCARPOUS FLOWER

Morning glory flower



Cow pea flower



(Single carpel shown)

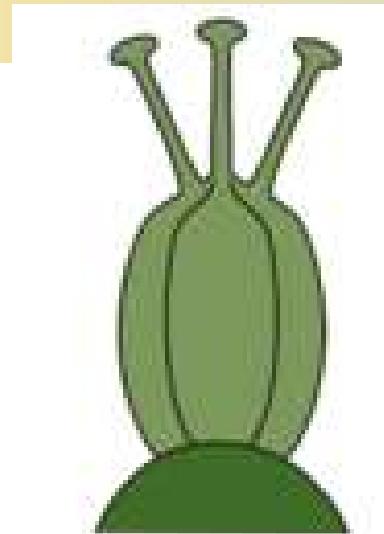
SYNCARPOUS FLOWER

More than one but fused carpels



Fused carpels

Syncarpous gynoecium



3 carpels, connate
1 compound pistil

Hibiscus flower



Solanum flower



APOCARPUS FLOWER



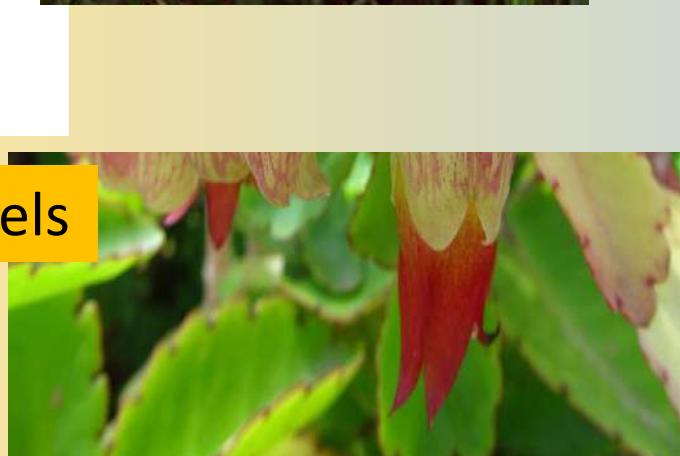
3 carpels, distinct
3 simple pistils



Butter cap flower

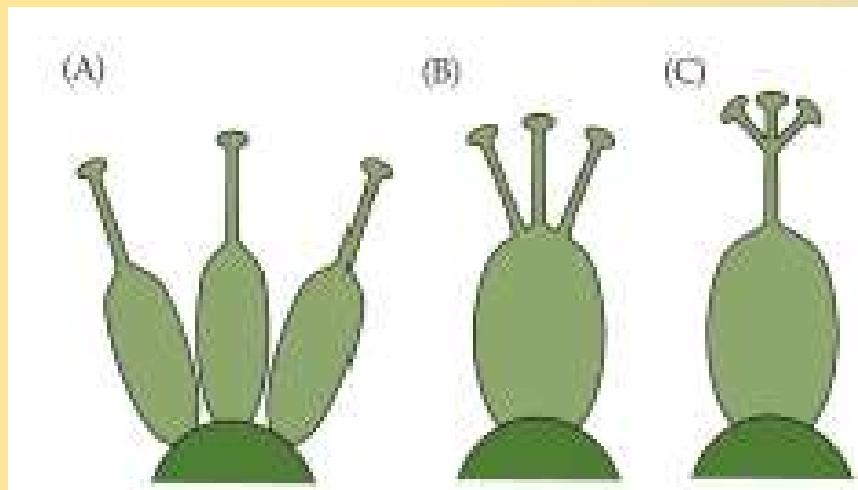
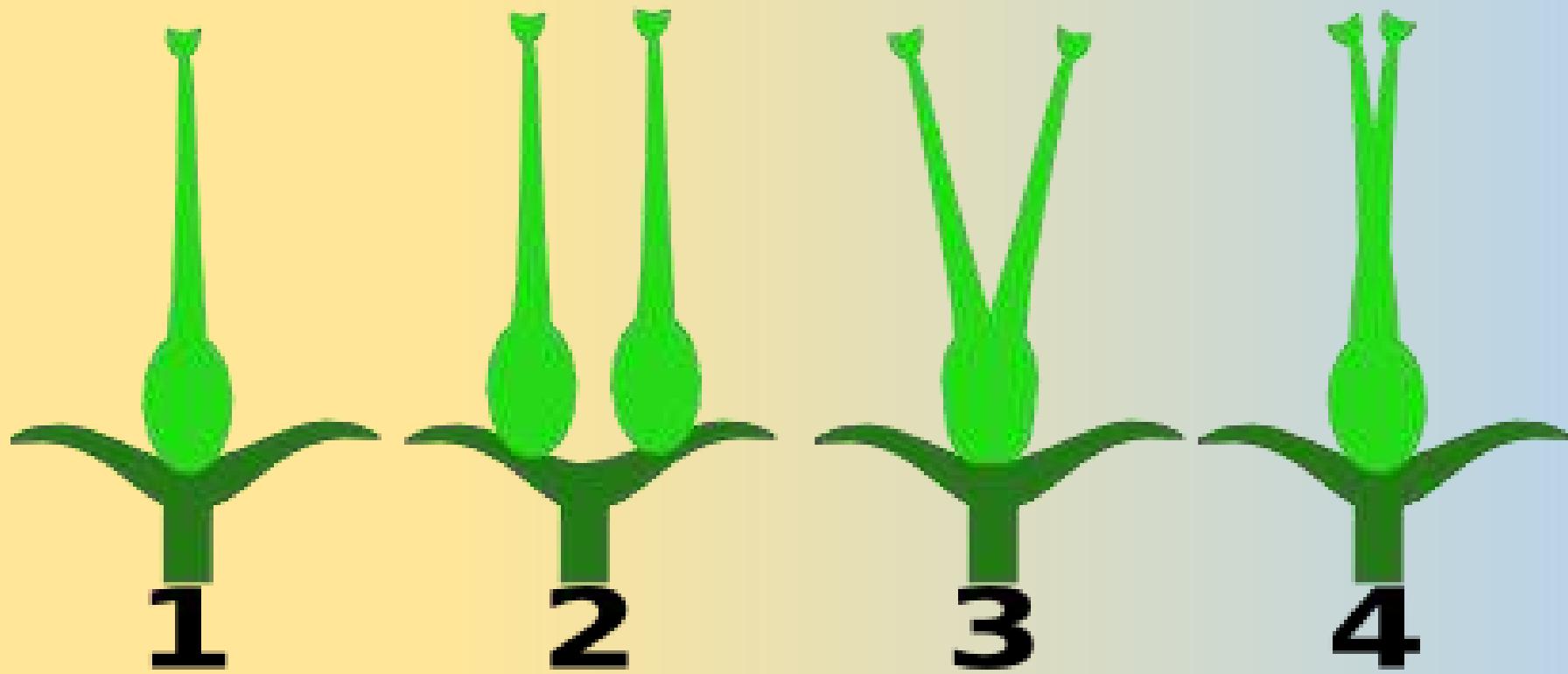


Bryophyllum flower



More than one but free carpels

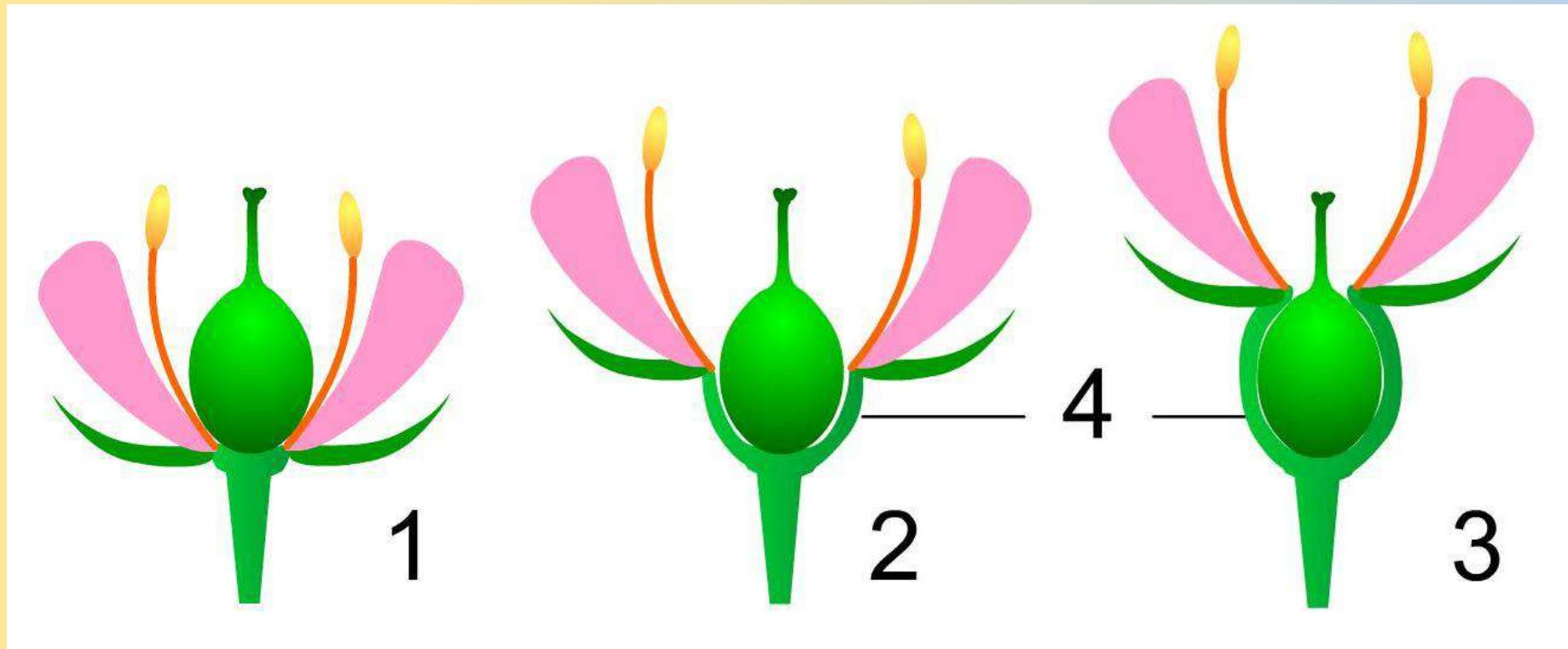
Describe the type of pistils shown in specimens 1, 2, 3 and 4



TYPES OF OVARIES

Ovary position relative to other floral parts

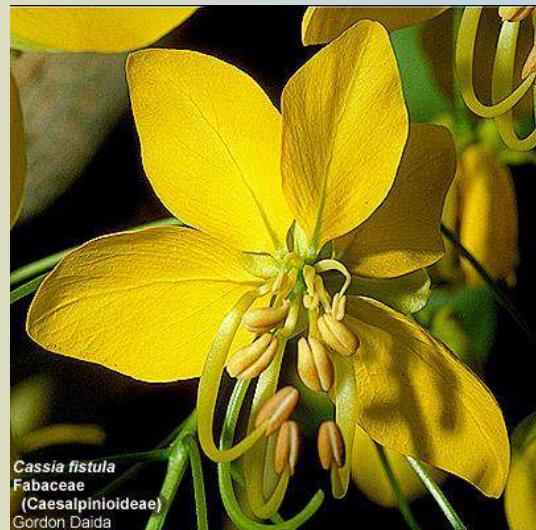
Superior ovary or inferior ovary?



EXAMPLES OF FLOWERS WITH SUPERIOR OVARIES



Cassia fistula



Commelina benghalensis (Wandering Jew)



EXAMPLES OF FLOWERS WITH INFERIOR OVARIES

Genus Impomea(Morning glory family)

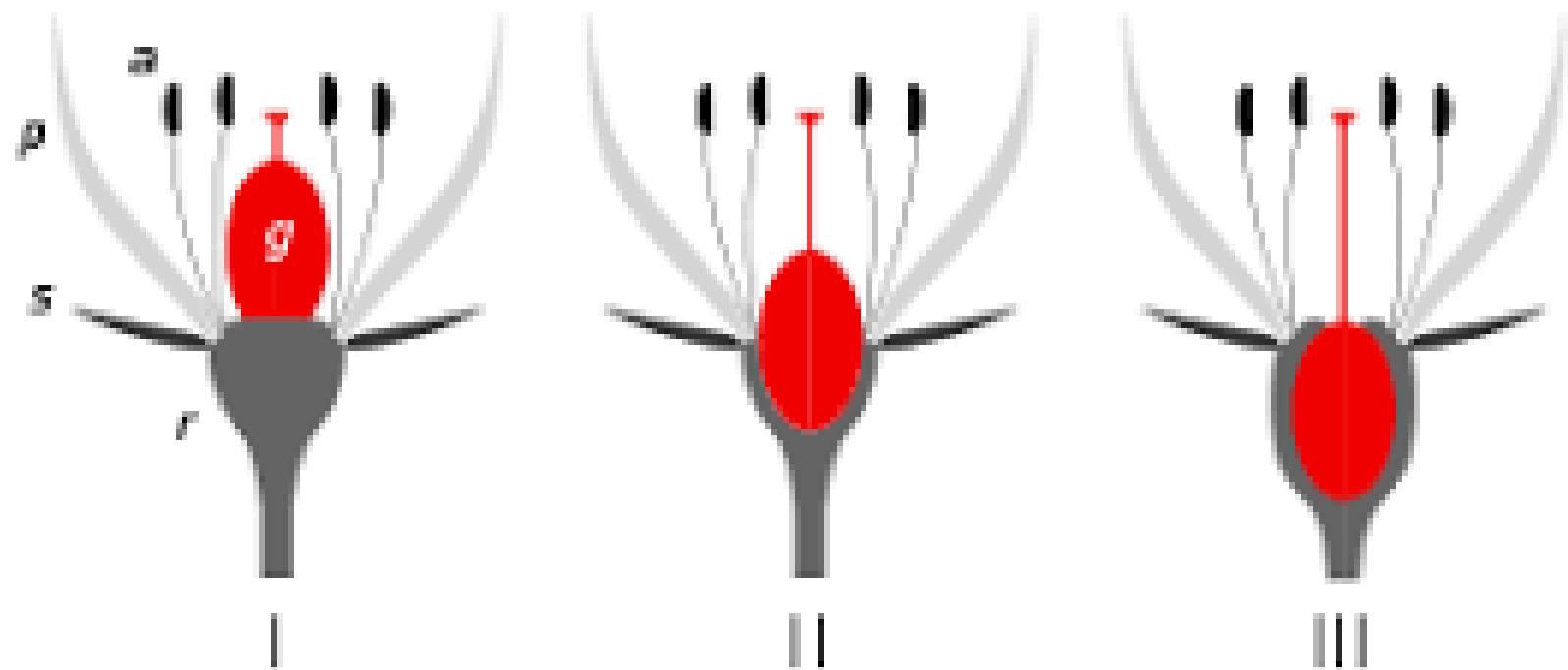
*Ipomea
purpurea*(Common
morning glory)



Ipomea indica(Sweet
potato flower)



In specimens I, II and III, identify ovary position and give reasons for your answer.

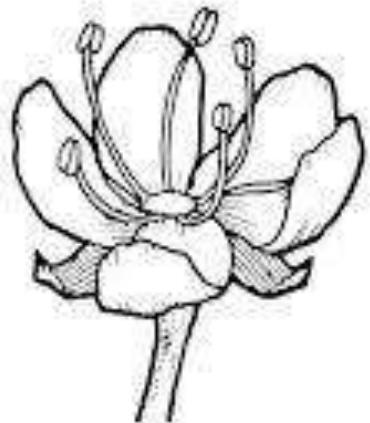


FLOWER TERMINOLOGIES

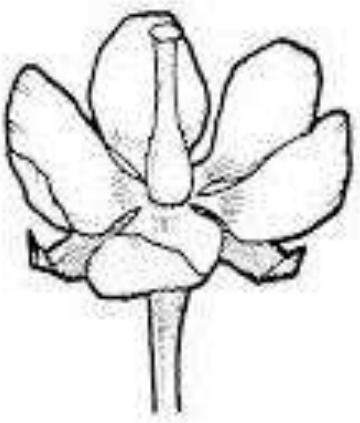
Complete Vs Incomplete flower

Complete flowers have all typical parts (sepals, petals, stamens, and pistil).

Incomplete flowers are missing a typical part - like the petals.



A



B



C

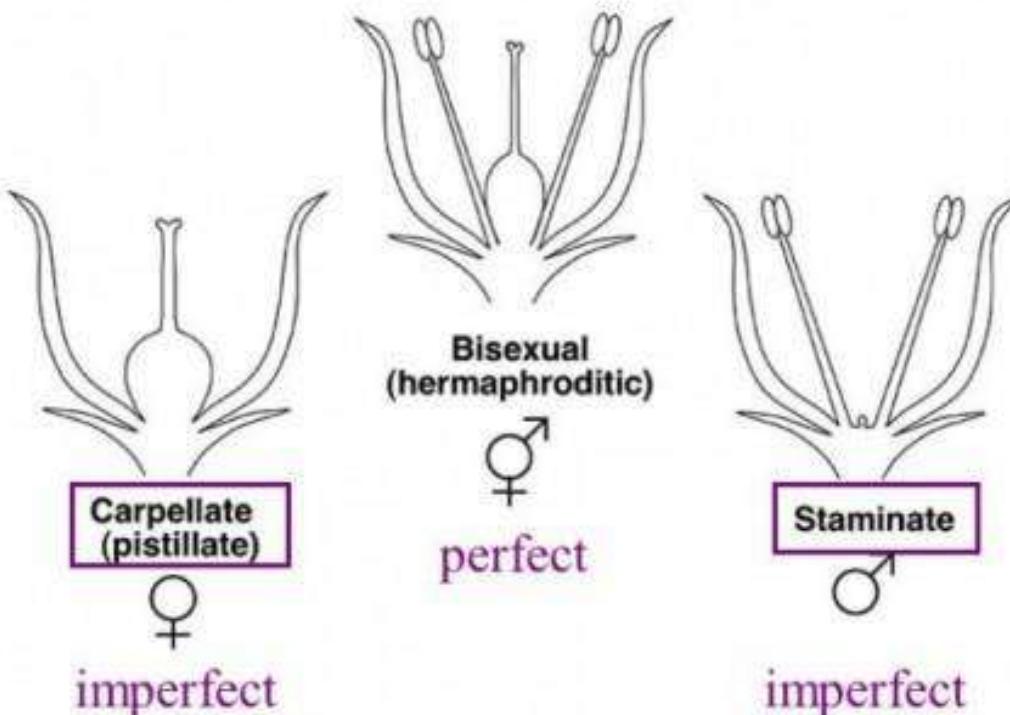
Flowers Without Sepals



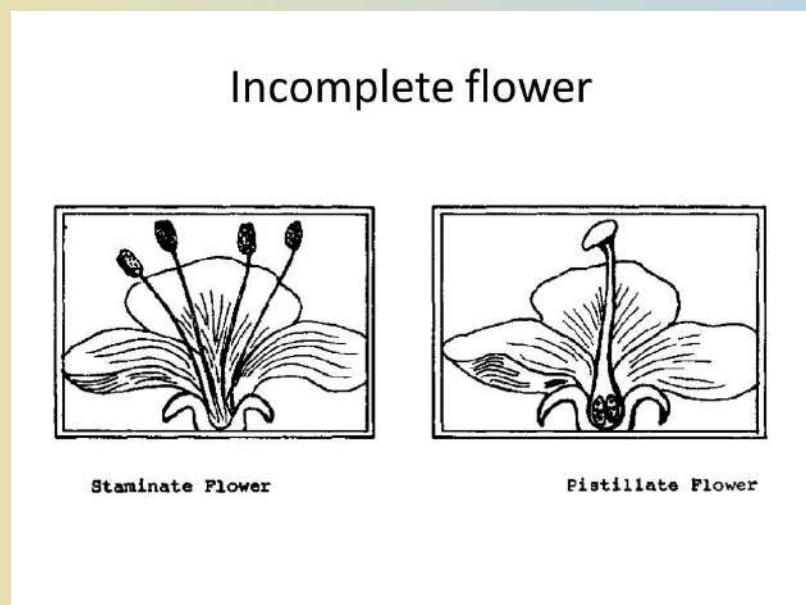
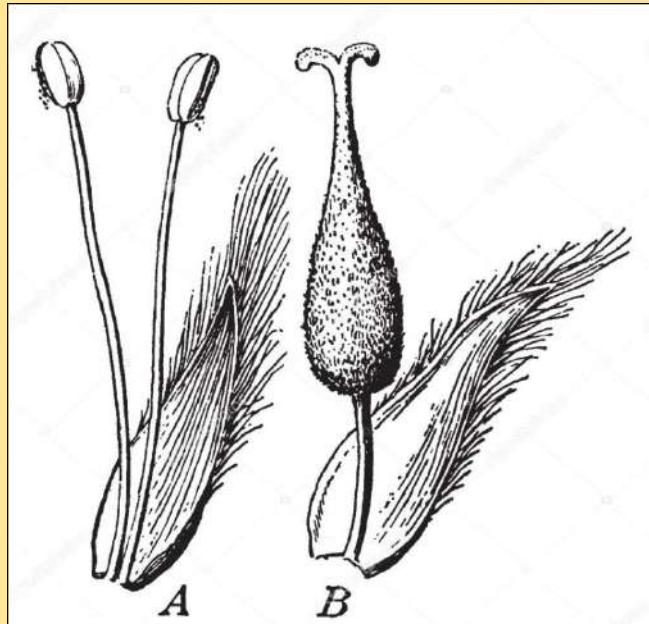
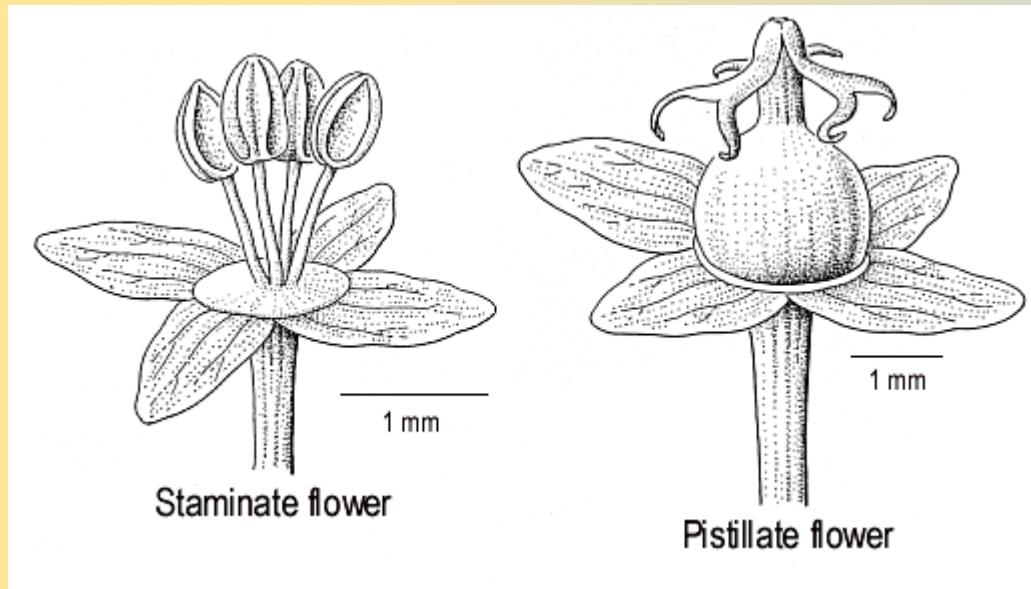
PERFECT Vs IMPERFECT FLOWER

Flower Structure Variation

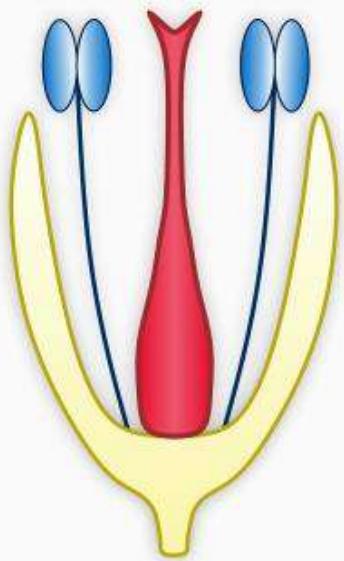
Flower Sexual Conditions



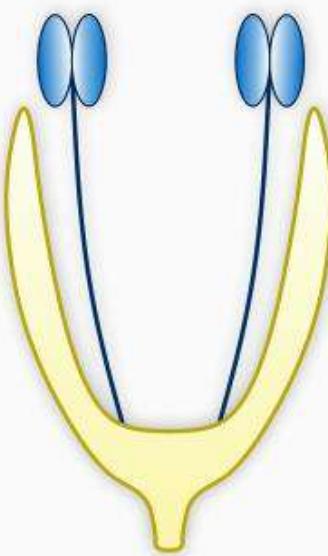
STAMINATE Vs PISTILLATE FLOWERS



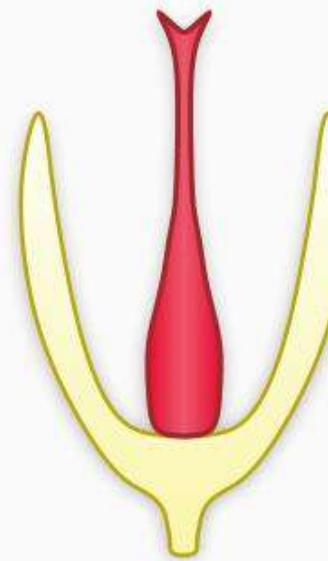
UNISEXUAL Vs BISEXUAL FLOWER



A



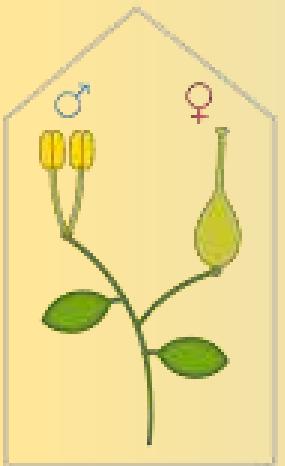
B



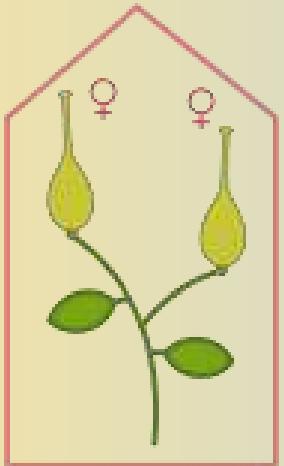
C

**Which name can you give to each of the flowers above A, B and C?
Are they perfect, imperfect, complete or incomplete?**

MONOECIOUSNESS Vs DIOECIOUSNESS



monoecious plant



dioecious plant

Castor oil plant



Maize plant



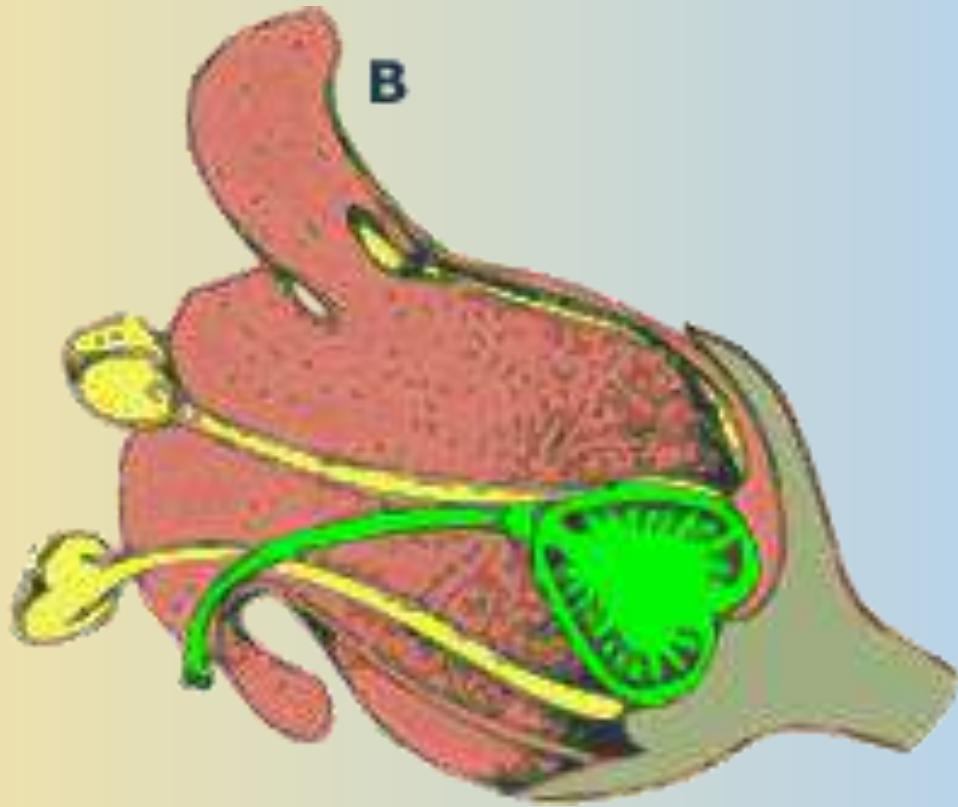
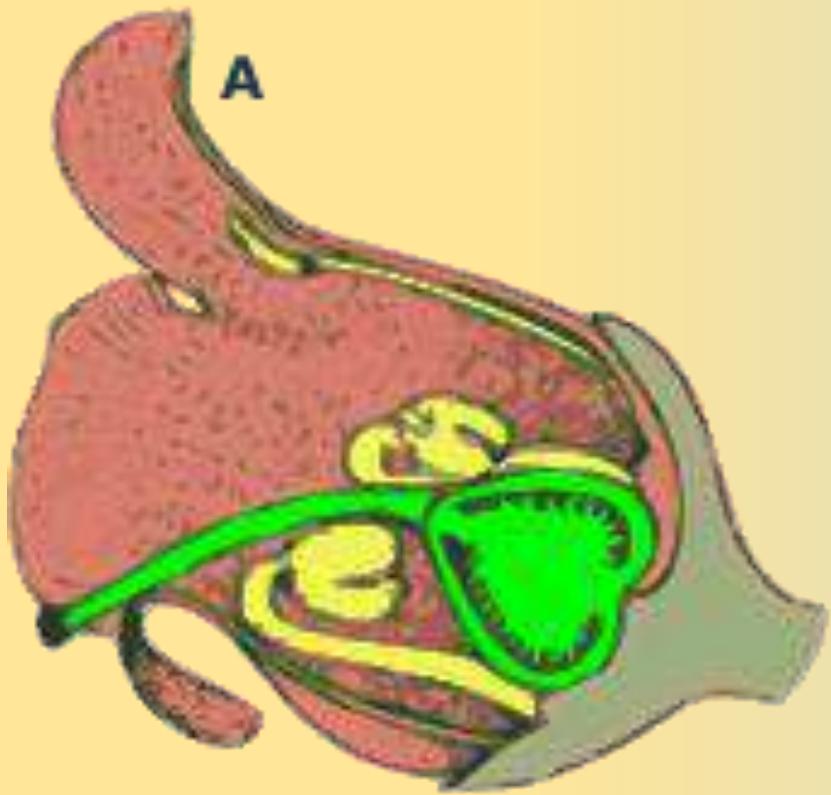
Male papaya



Female papaya



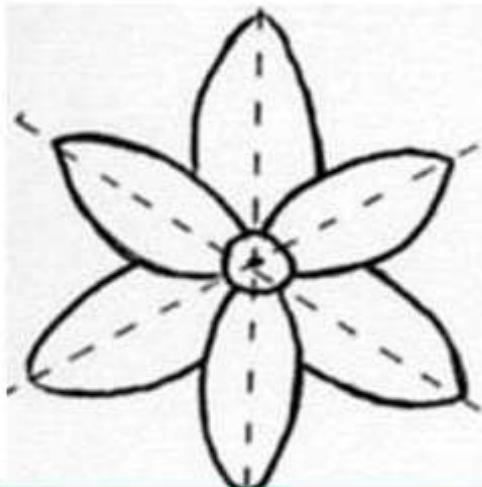
PROTOGNY Vs PROTANDRY



Compare the sizes of the stigma and anthers in each specimen

What do you observe?

ACTINOMORPHIC



REGULAR FLOWER
With
RADIAL SYMETRY

ZYgomorphic

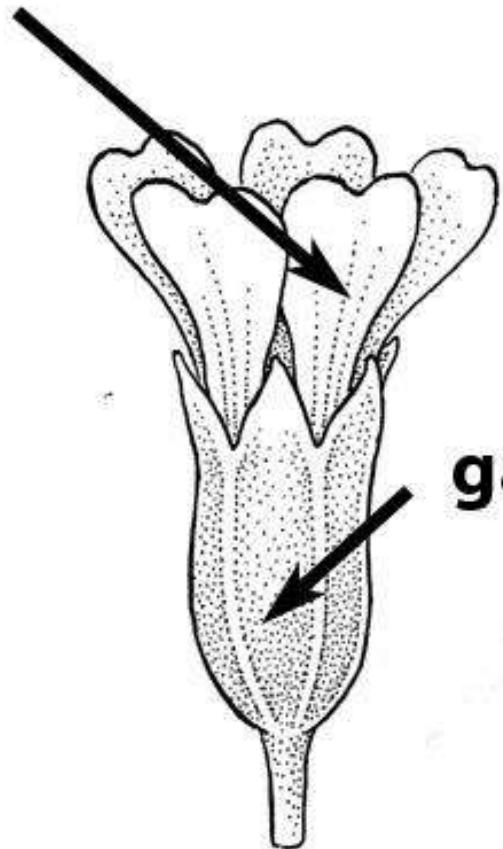


IRREGULAR FLOWER
With
SYMETRY in one plane only

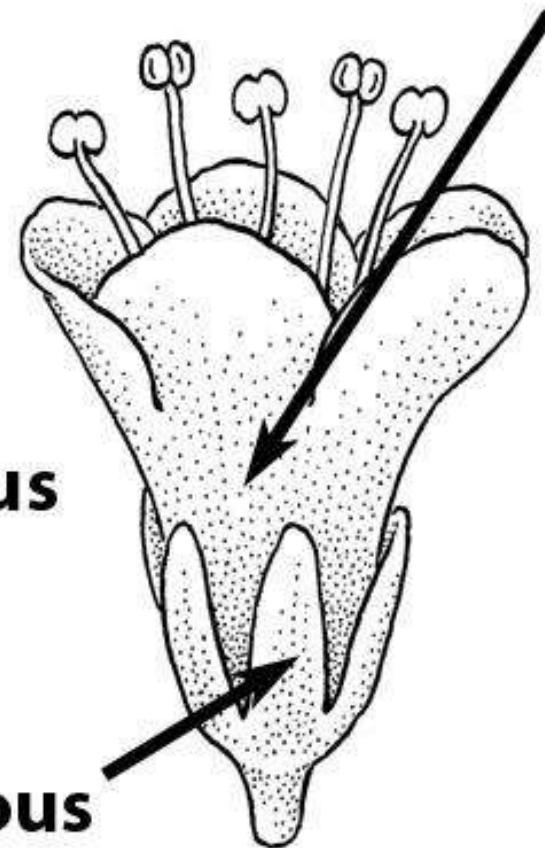
Regular or irregular flowers?

POLYPETALOUS Vs GAMOPETALOUS

polypetalous



gamopetalous



sepal and petal fusion

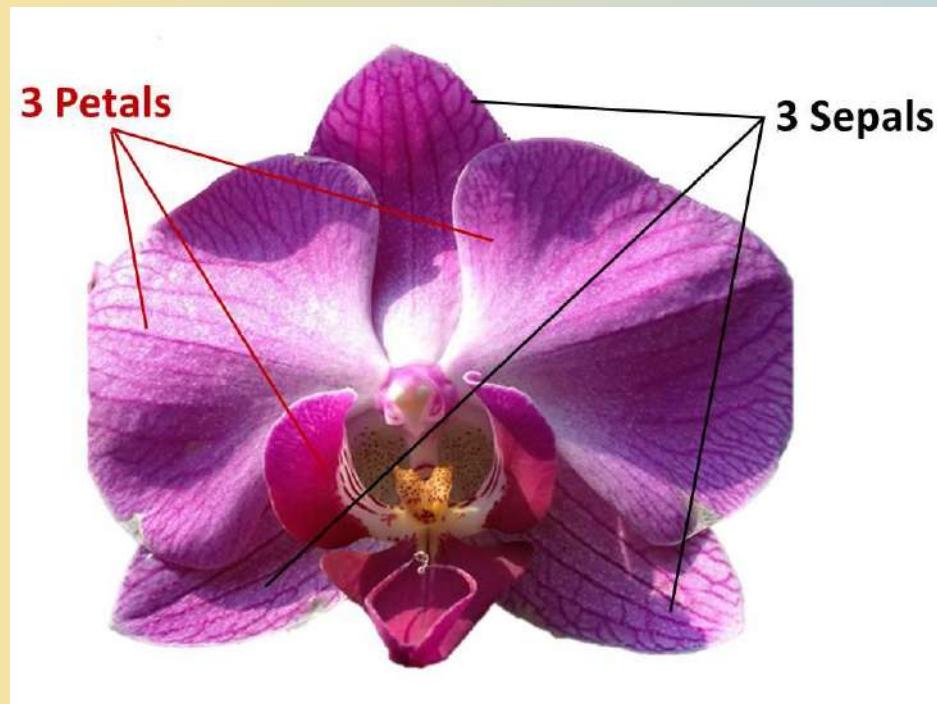


Is It A Weed Or A Flower?

SPRING-GREEN
Your Neighborhood Lawn Care Professional

PETALOID Vs SEPALOID

Is it a petal or a sepal?

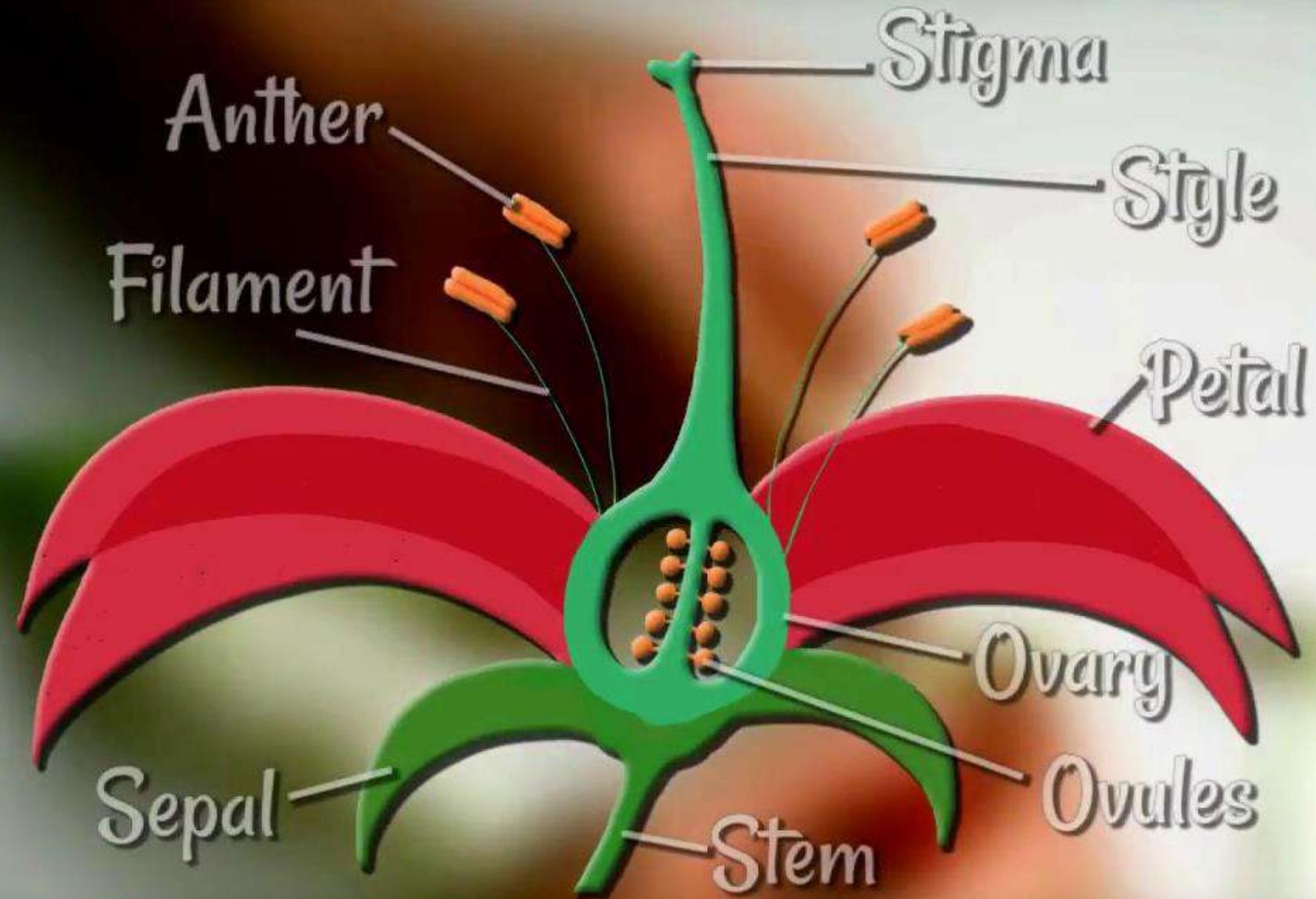


Iris Versicolor

Iris Setosa

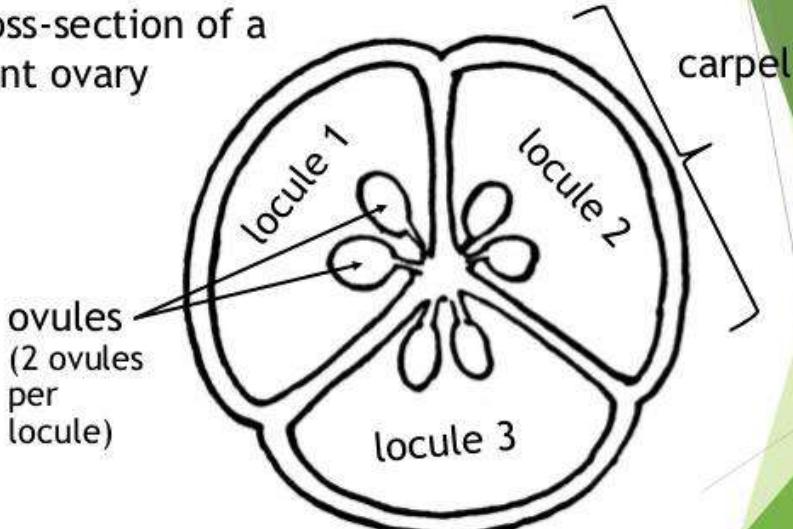
Iris Virginica

LETS GO INSIDE THE OVARY



SEPTUM AND LOCULE

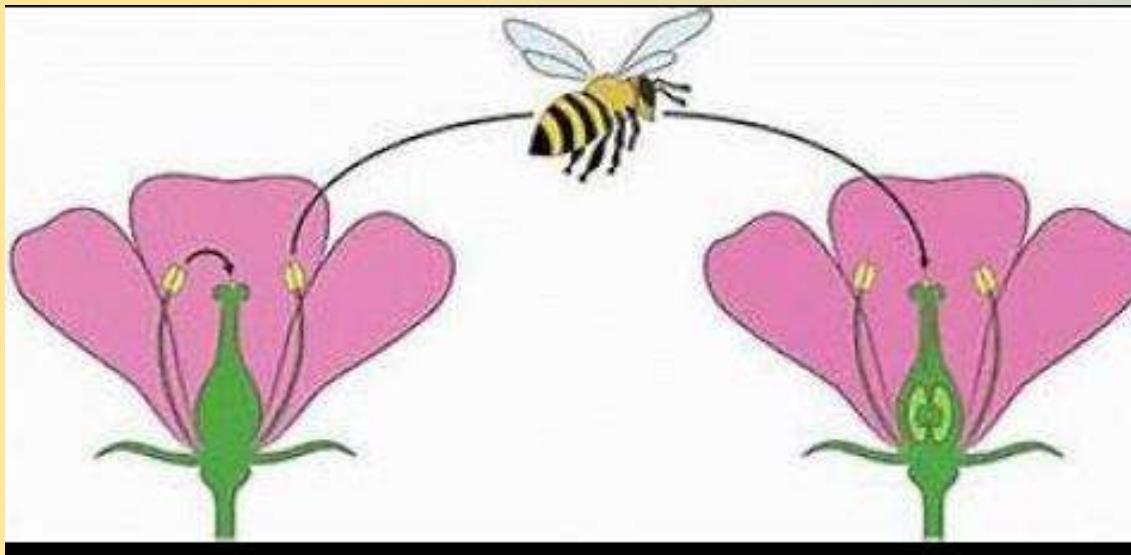
Cross-section of a plant ovary



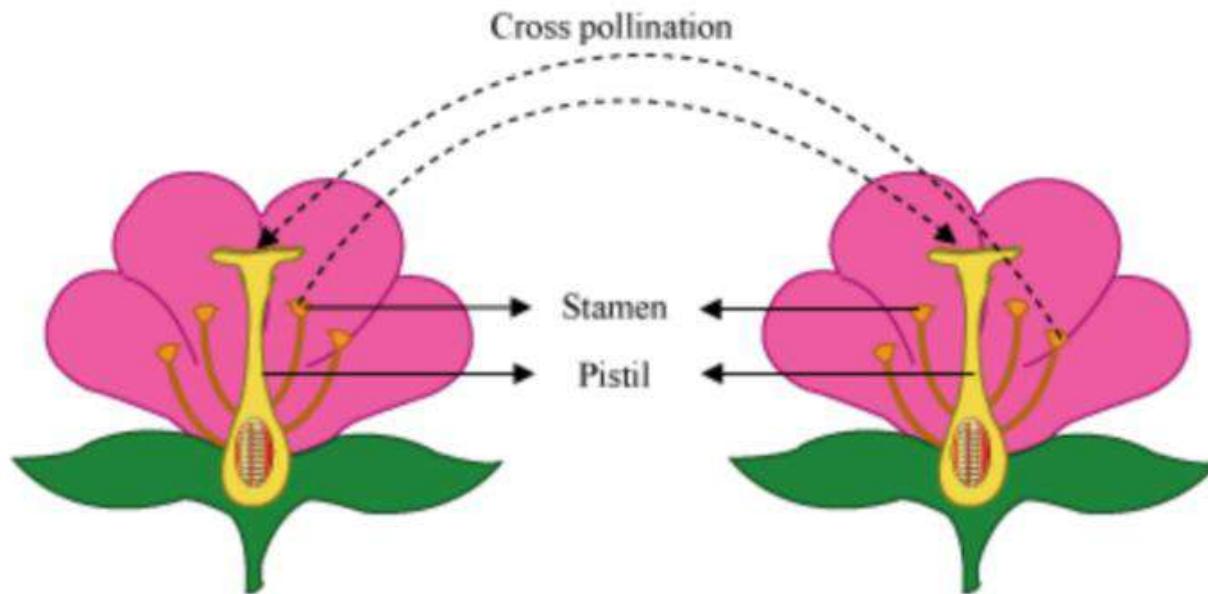
Campanulaceae
G. K. Linney

POLLINATION

Self Vs Cross Pollination



Cross pollination

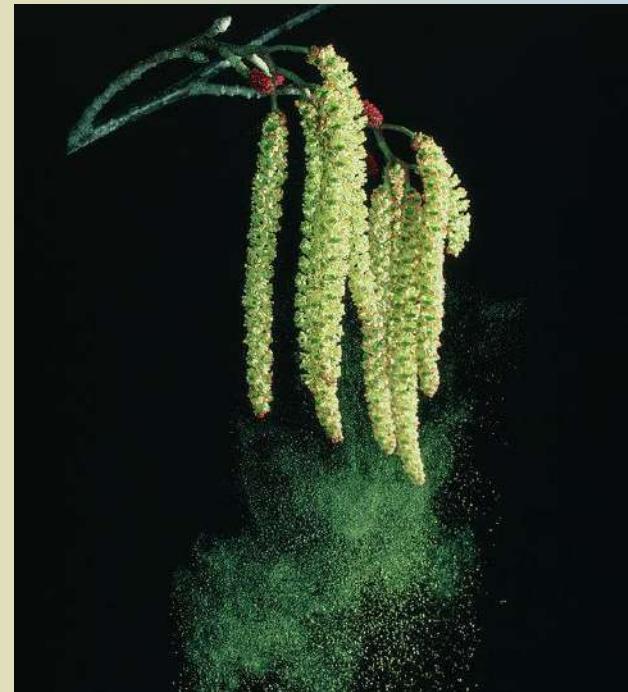


AGENTS OF POLLINATION

Humming bird pollinating a flower



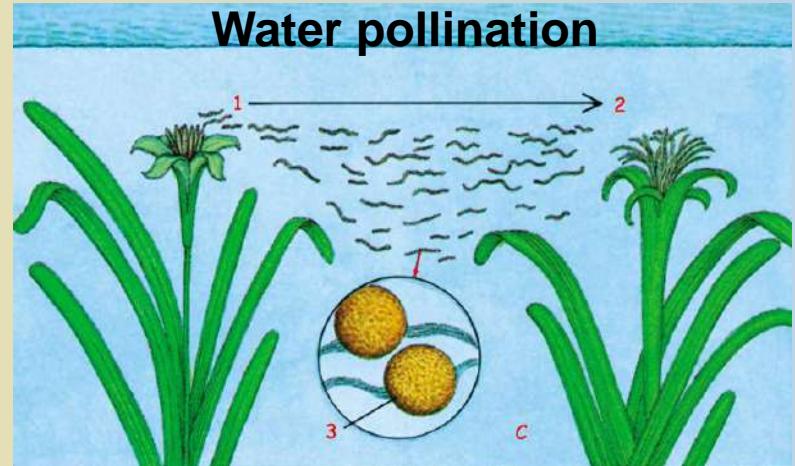
Wind



Animal pollination



Water pollination



INSECT POLLINATED FLOWERS

Brightly coloured petals



Good scent



Produce nectar



Large petals



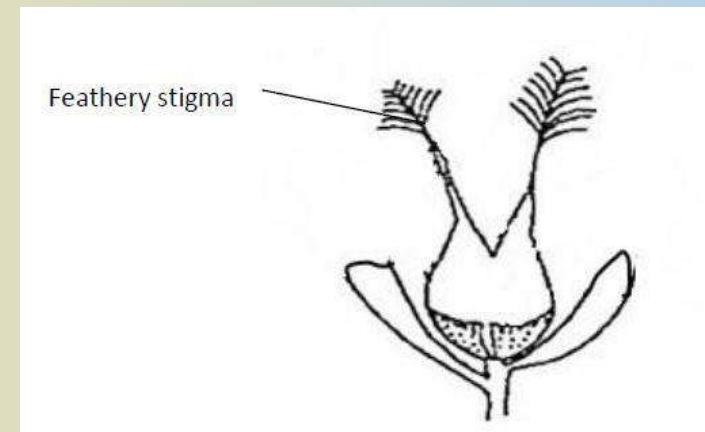
Sticky pollen grains



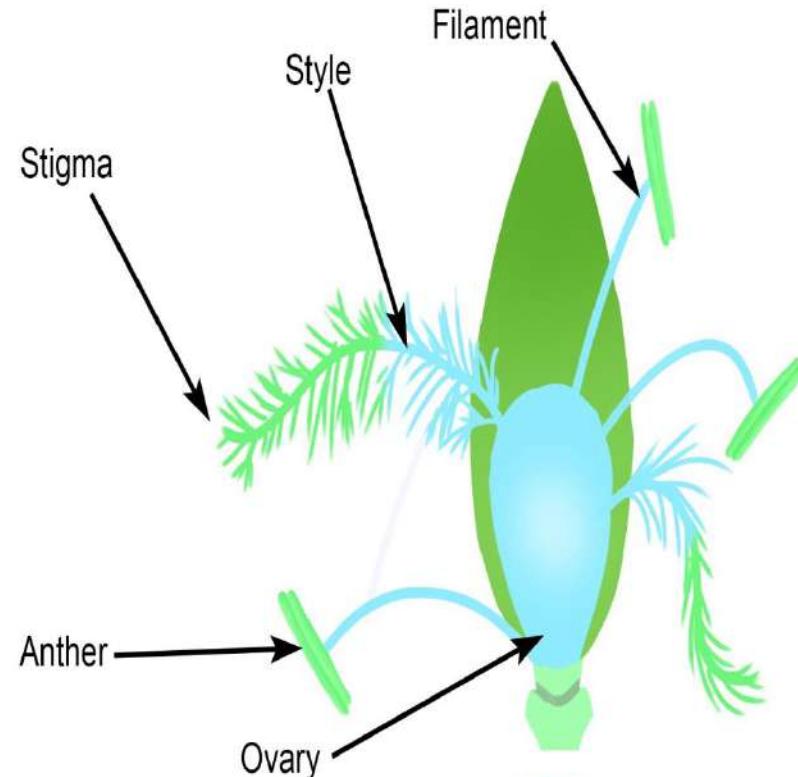
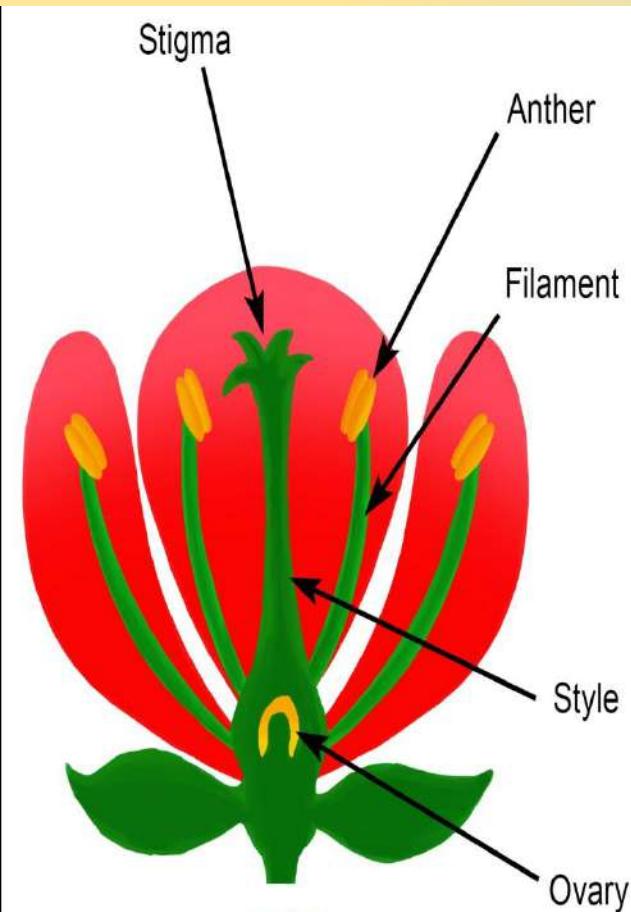
WIND POLLINATED FLOWERS

Can you mention any characteristics of these wind pollinated flowers?

Use the pictures below.



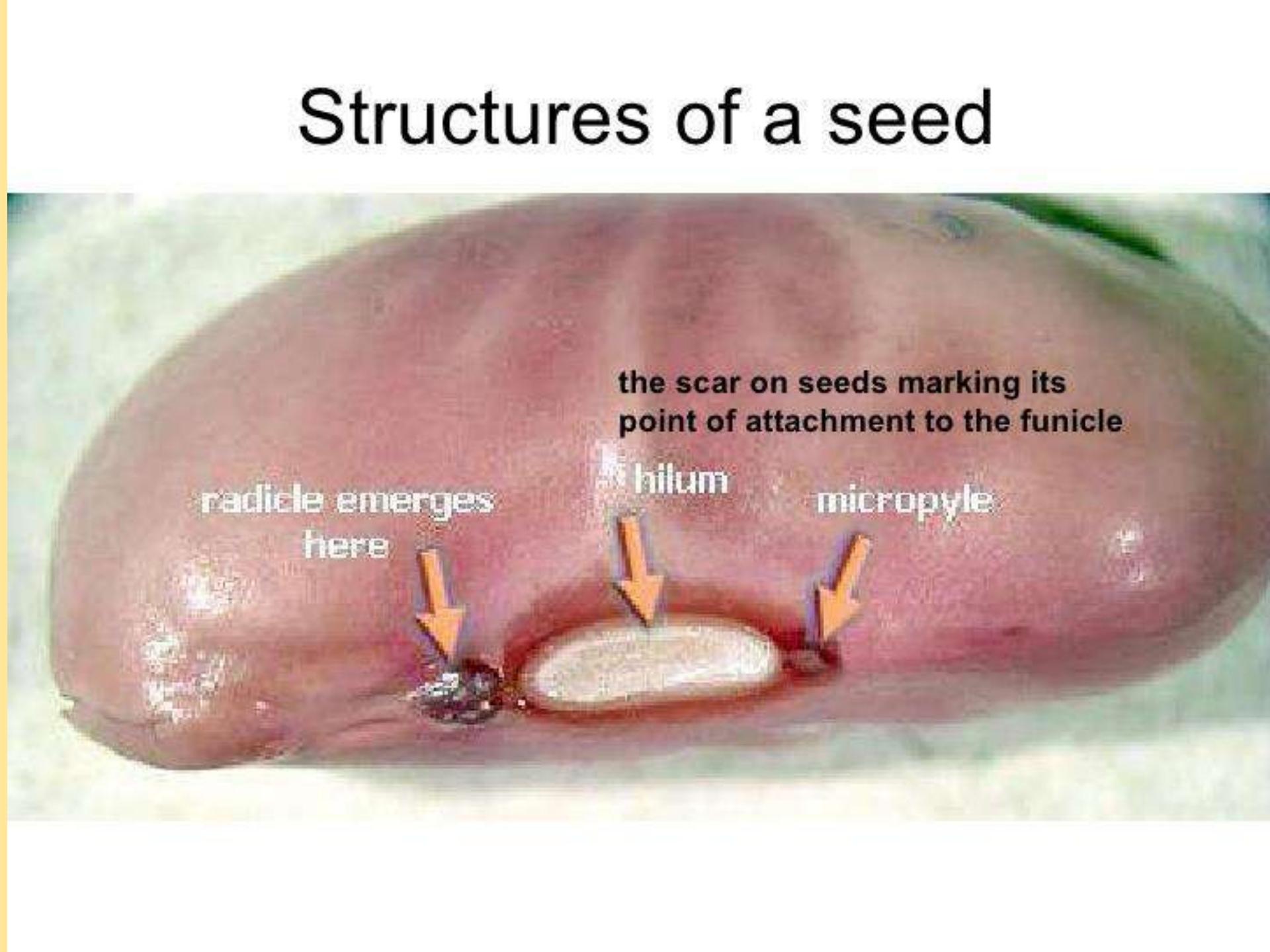
State whether each of the following A and B is an insect or wind pollinated flower? Give reasons



A

B

Structures of a seed



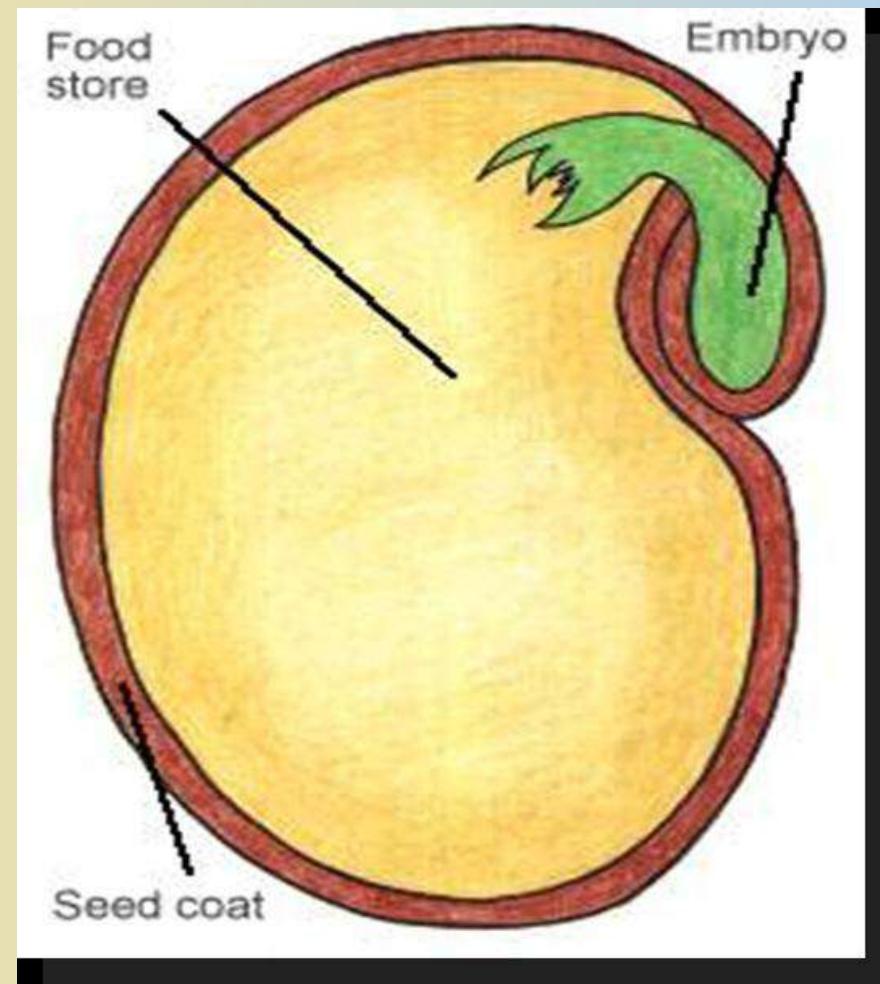
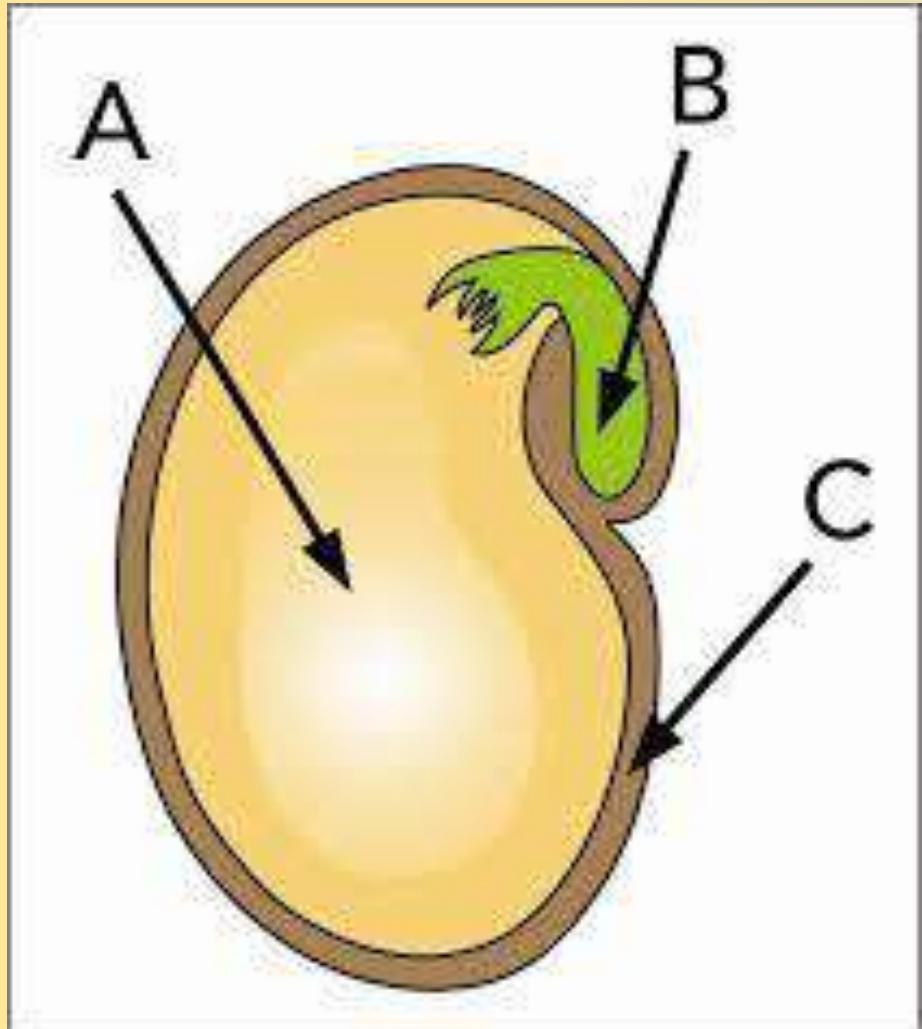
the scar on seeds marking its point of attachment to the funicle

radicle emerges here

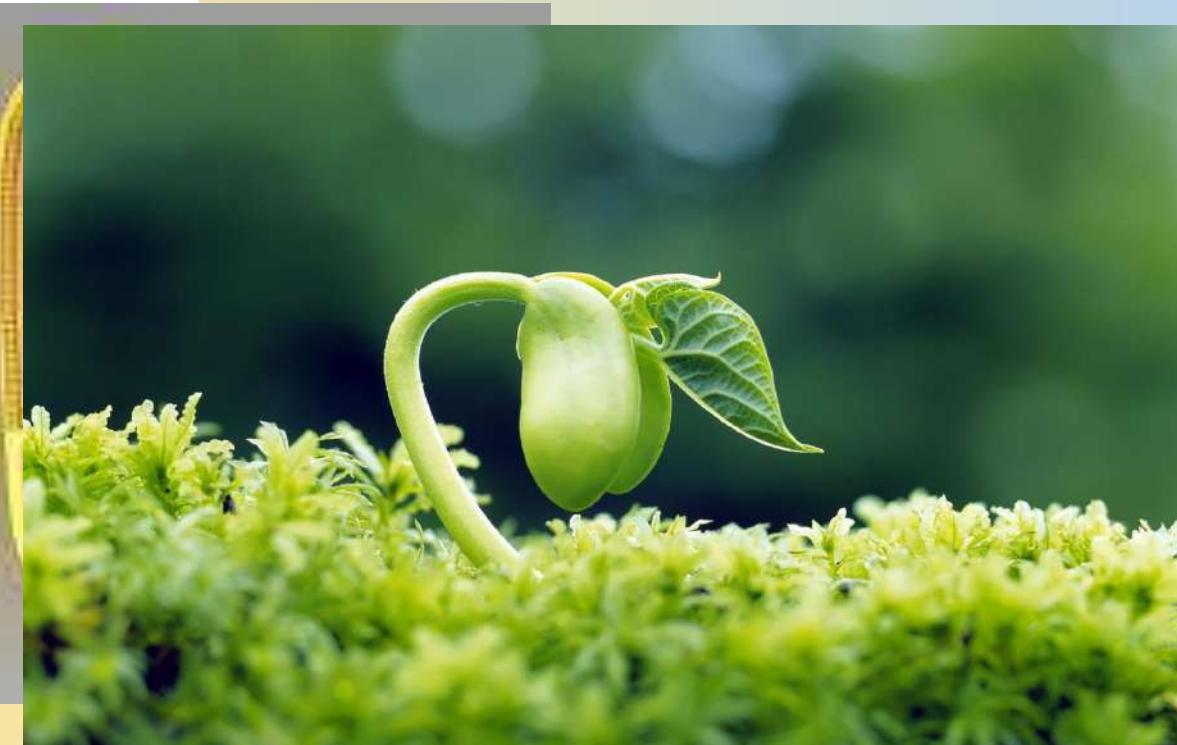
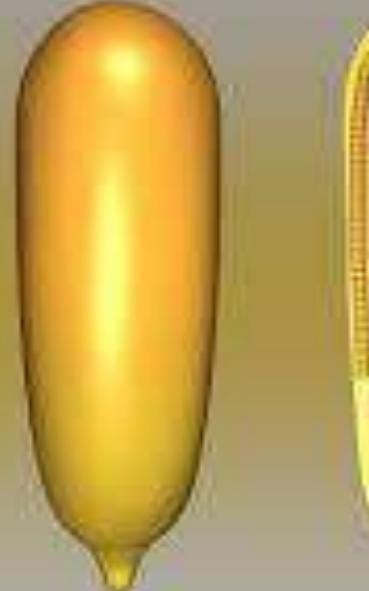
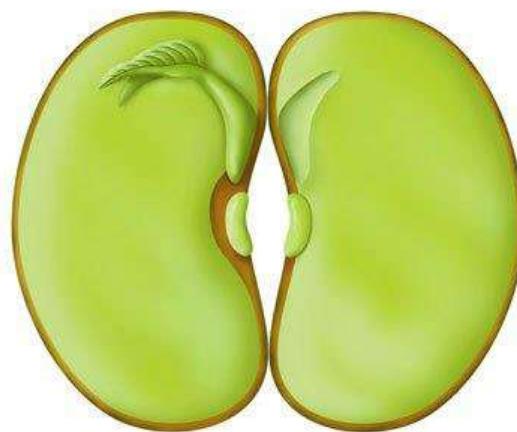
hilum

micropyle

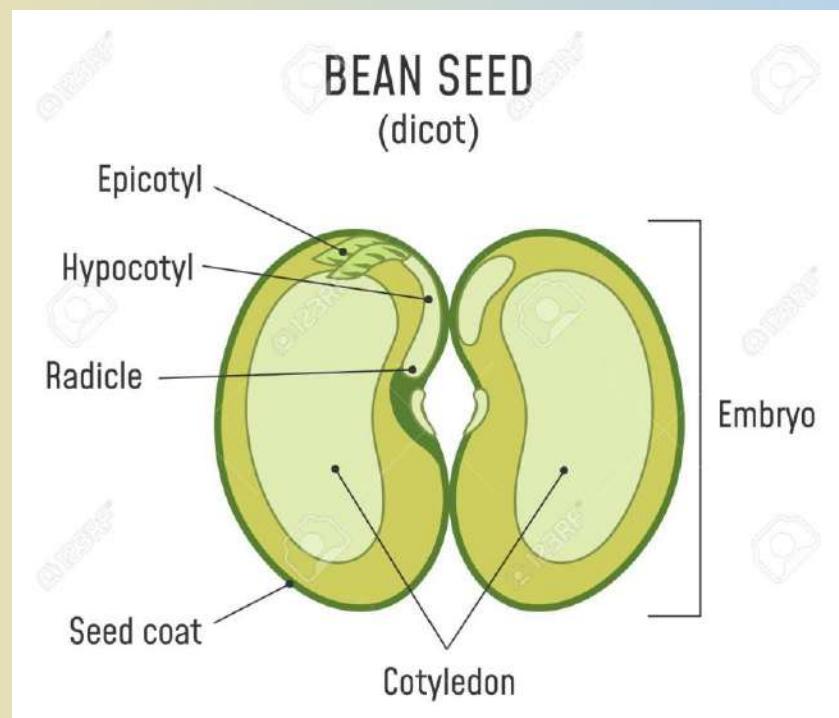
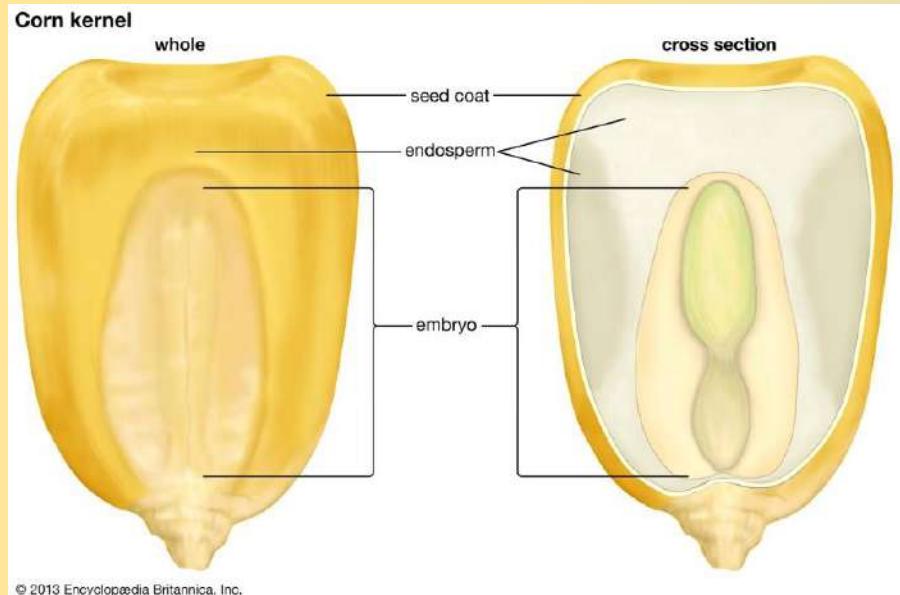
Name the following parts



SEED GERMINATION



GERMINATION IN MONOCTS AND DICOTS

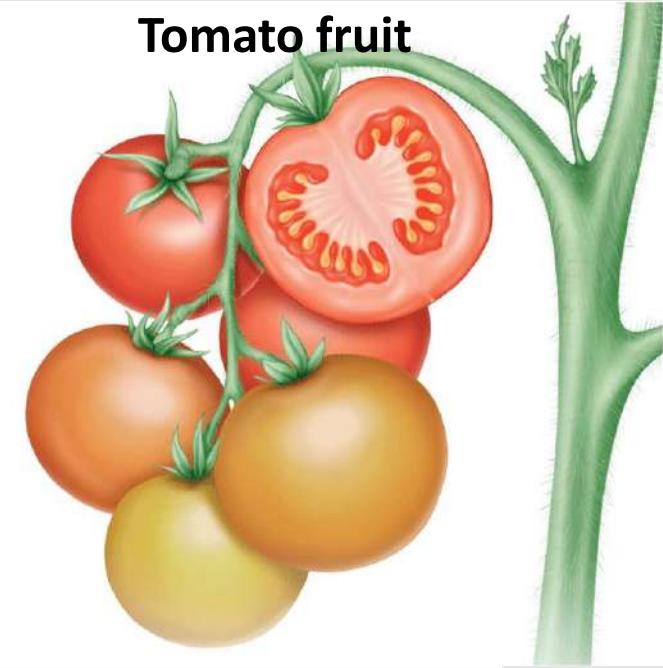


FRUITS

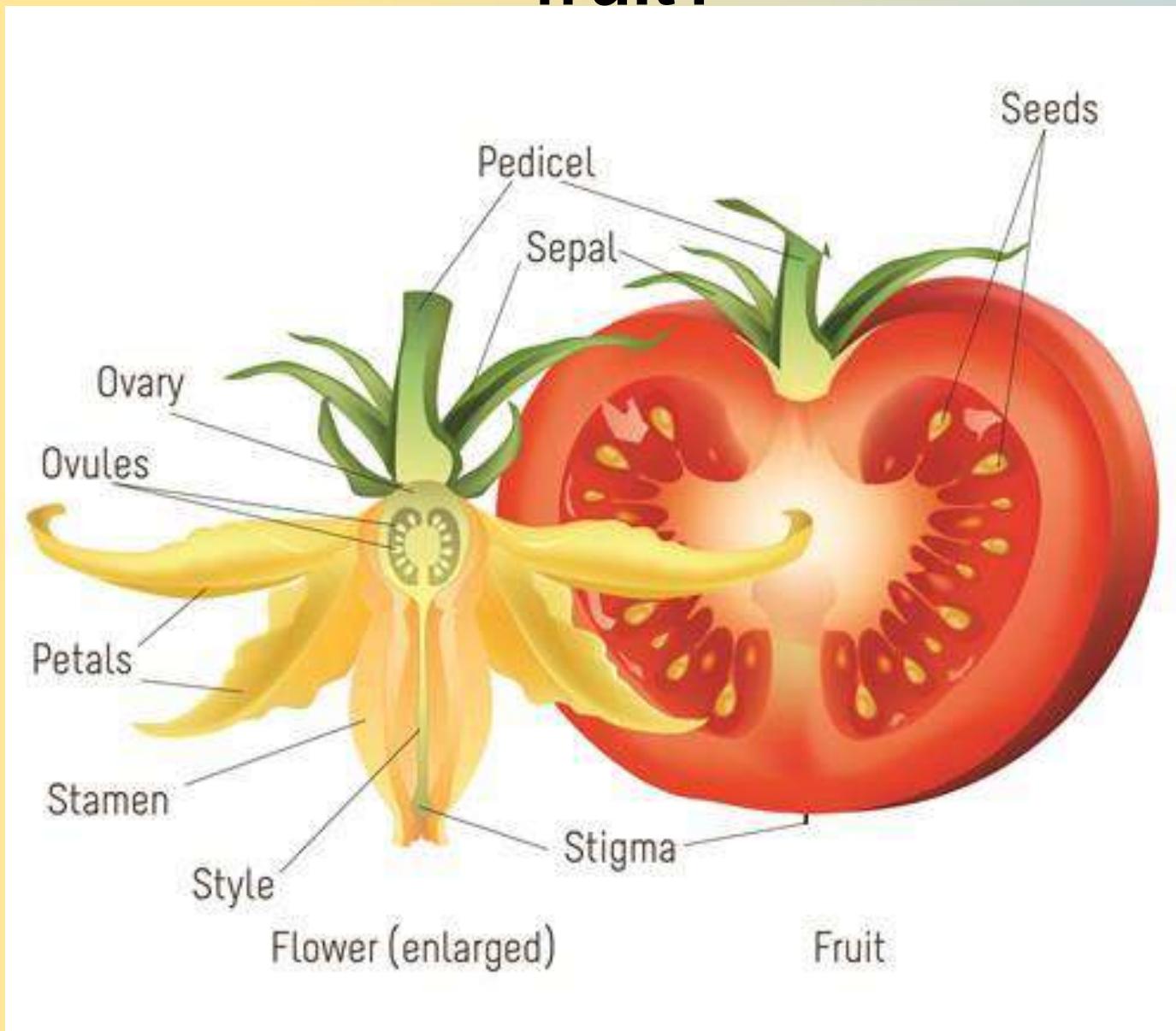
Tomato flower



Tomato fruit

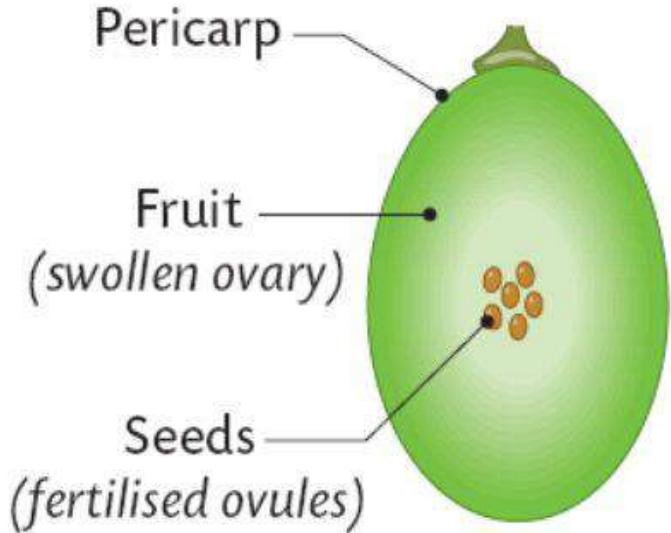


Which part of a flower turns into.....in a fruit?

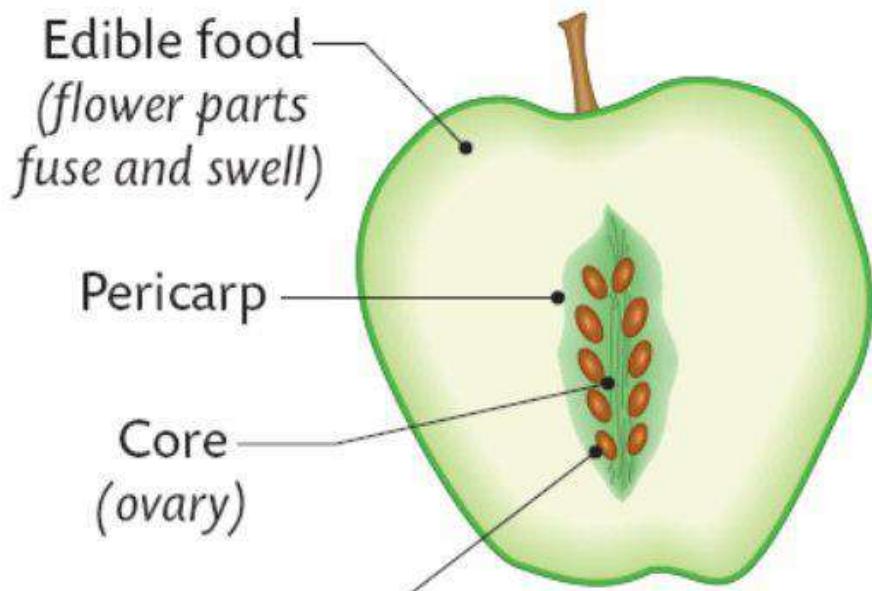


TRUE Vs FALSE FRUITS

Two types of fruit



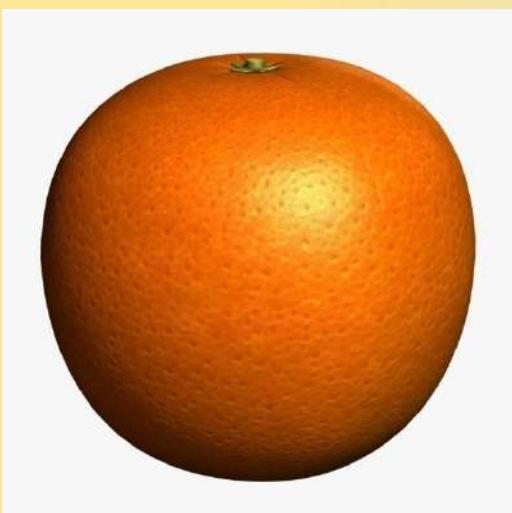
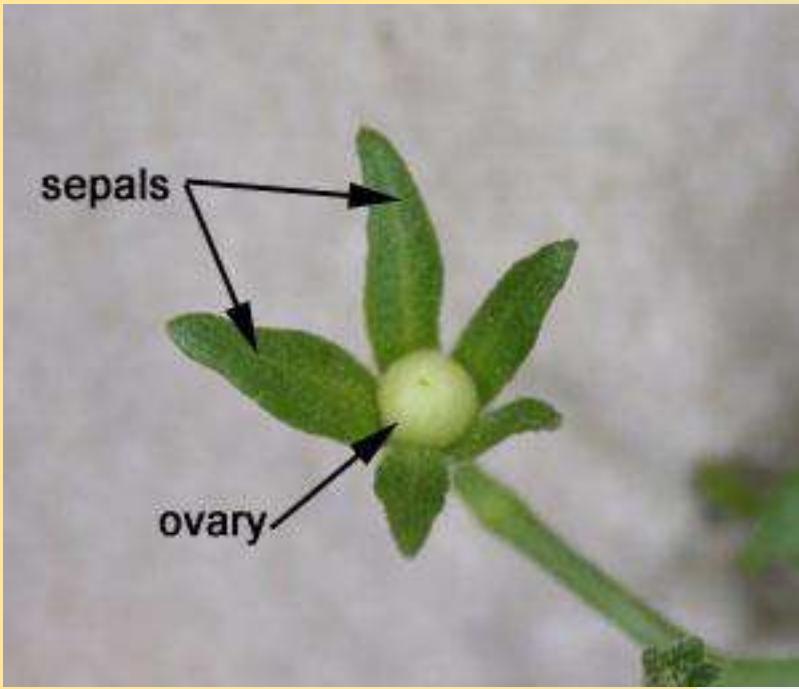
Grape
(true fruit)



Apple
(false fruit)

TRUE FRUITS

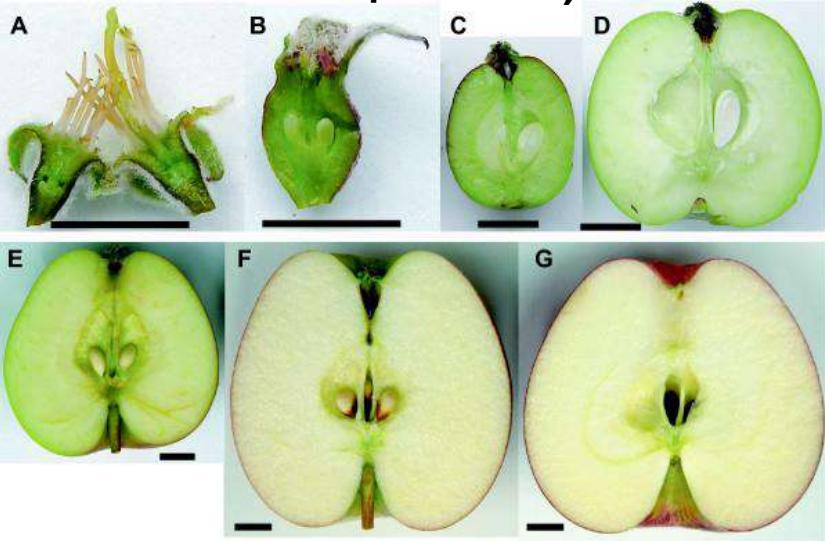
Are formed from the **ovary** or **ovaries** of a flower



FALSE FRUITS

Are formed from both the ovary and other floral parts e.g.

Apple development(both ovary and receptacle fuse)



The soursop



Pine apple flower

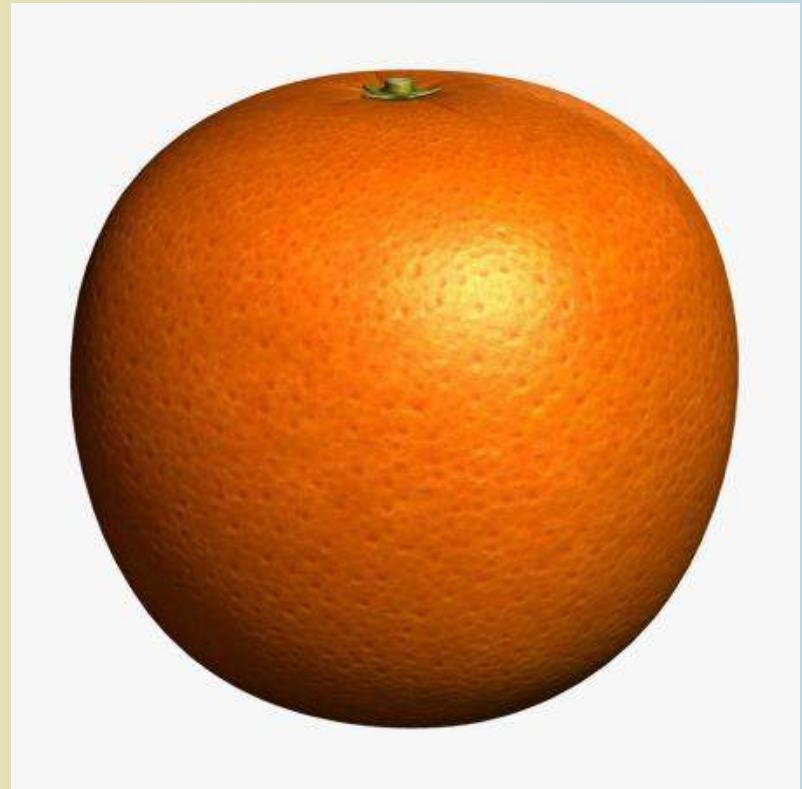
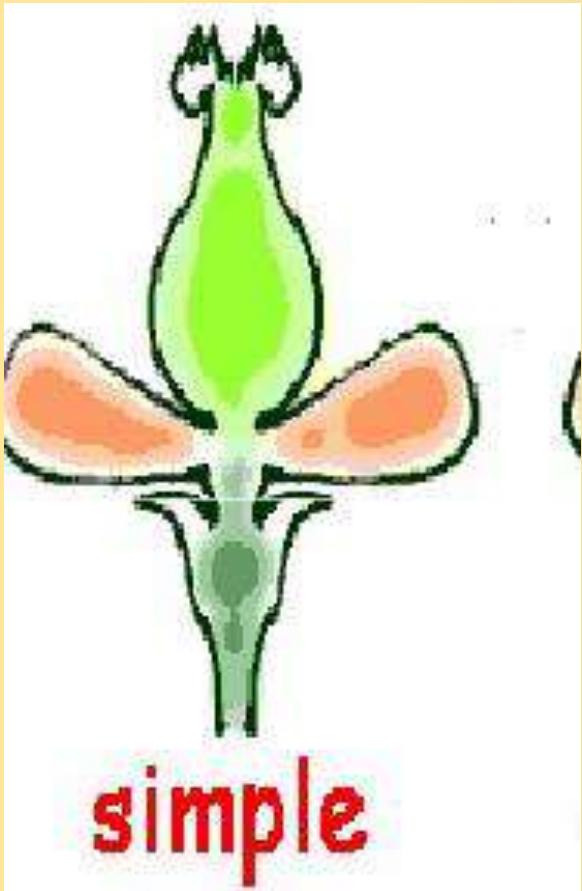


The pine apple(A cluster of flowers forming a fruit)



SIMPLE Vs AGGREGATE Vs MULTIPLE FRUITS

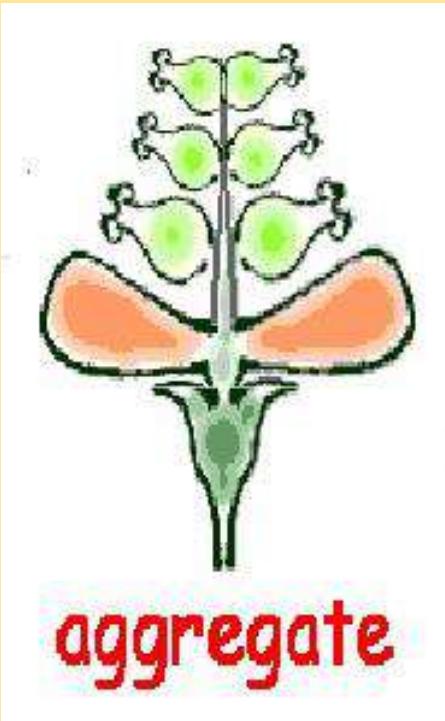
Simple fruits. Formed from monocarpus flowers i.e from a single carpel e.g oranges



Monocarpous pistil forms a simple fruit

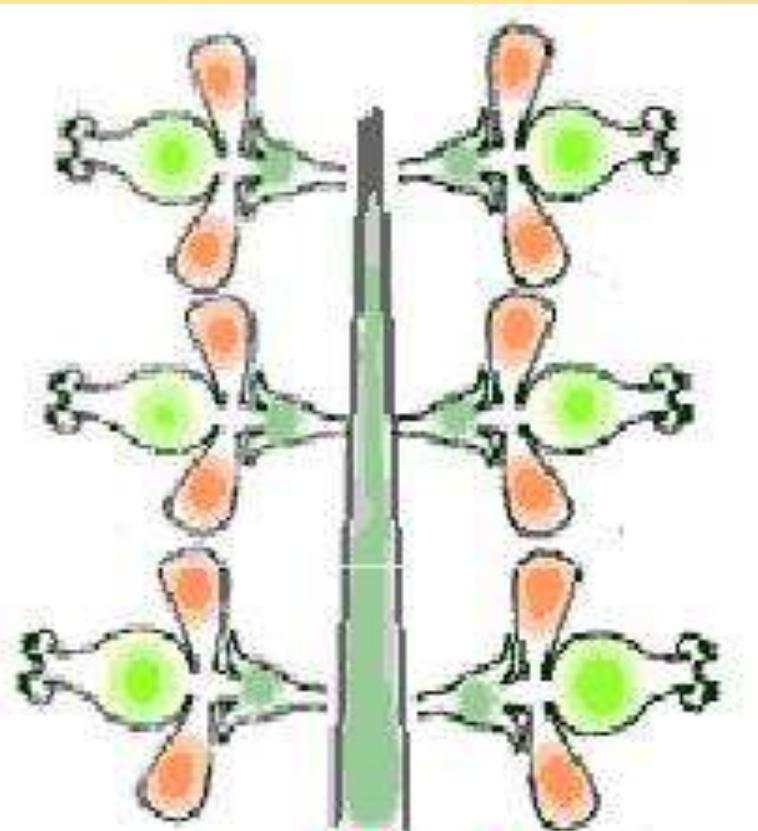
• SIMPLE Vs AGGREGATE Vs MULTIPLE FRUITS

Aggregate fruits. Formed from syncarpous flowers i.e from a several fused carpels on a single flower e.g apples, straw berries and the locally called 'matungulu' in Luganda language.



SIMPLE Vs AGGREGATE Vs MULTIPLE FRUITS cont....

Multiple fruits. Formed from several fused flowers e.g jackfruit, pine apples e.t.c



multiple

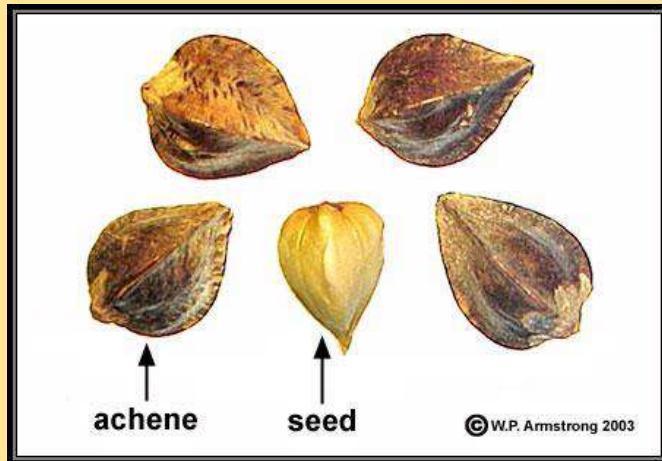


SIMPLE FRUITS

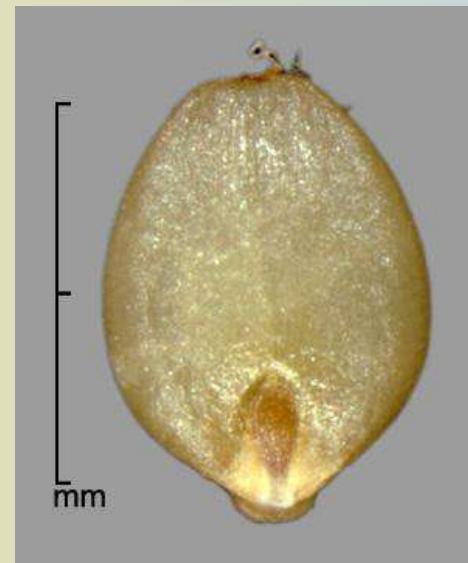
(Dry or succulent fruits)

A.Dry indehiscent fruits(Don't split open to release seeds)

Sun flower Achene



Maize caryopsis

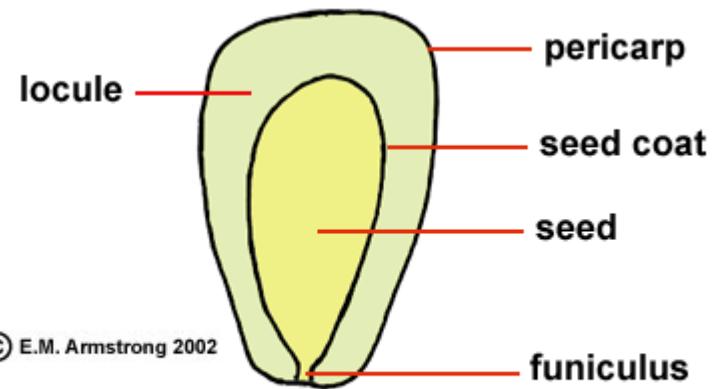


TYPES OF SIMPLE FRUITS

1. ACHENE

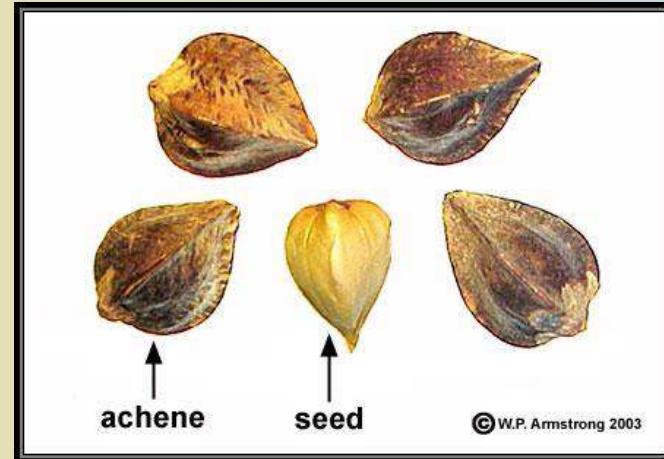
This is a one seeded fruit covered by a dry pericarp, which does not split open

Example: Sunflower achene



© E.M. Armstrong 2002

Achene (e.g. fruit of a sunflower)



2. Samara

This is a fruit similar to an achene in which the pericarp is extended to form one or more wings

Samara of Jacaranda

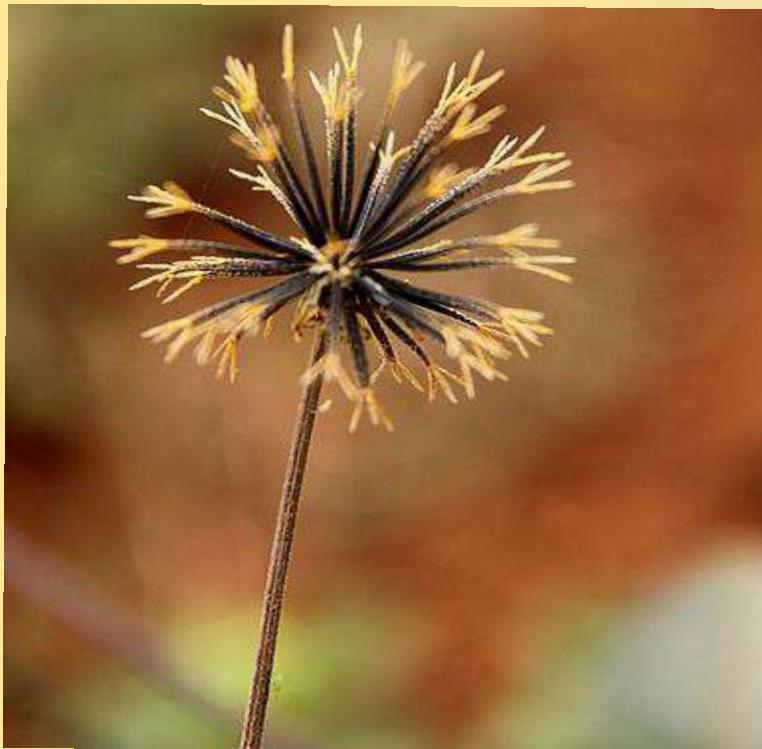


African rose wood samara



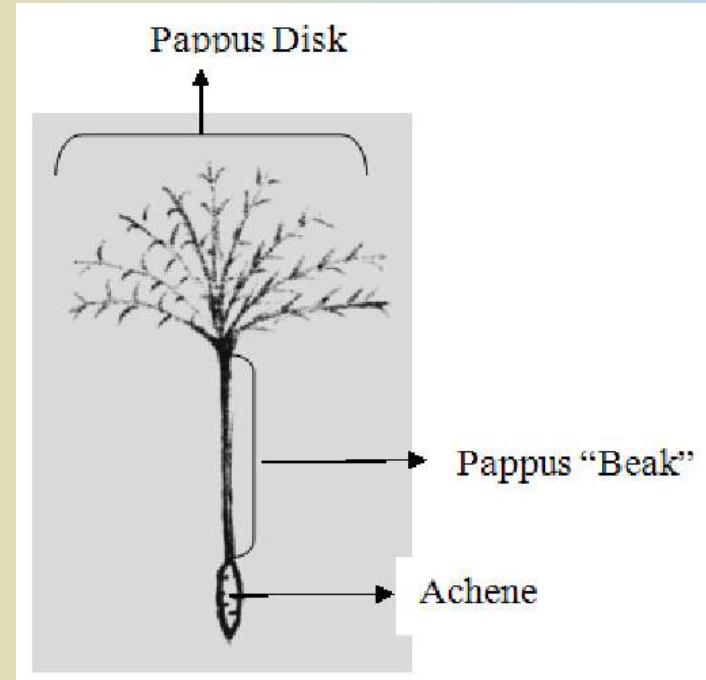
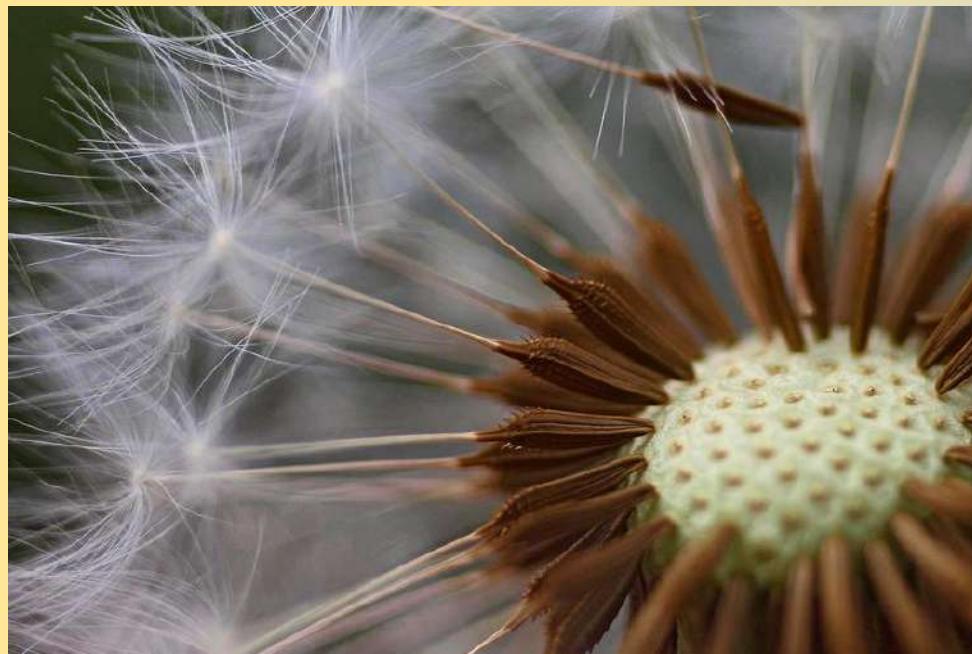
3. CYPSELA: Achene forms a wing like pappus

Cypsela of *Bidens pilosa*



CYPSELA CONTINUED....

Cypselas of tridax



4.NUT(Both fruit and seed are not edible at all)

A dry, hard-shelled, fully enclosed fruit that does not split on maturity to release seeds e.g.

Chestnuts



Hazel nuts



Acorn nuts



EXAMPLES OF FALSE NUTS(Fruit or seed are edible)

Cashew nut is a drupe



Oyster nut is a seed of a berry in pumpkin family



Coconut is a drupe



Ground or Peanut is a legume



5.CARYOPSIS

This is an achene-like fruit in which the testa and pericarp are fused (All grasses)



CORN



Oat



Wheat

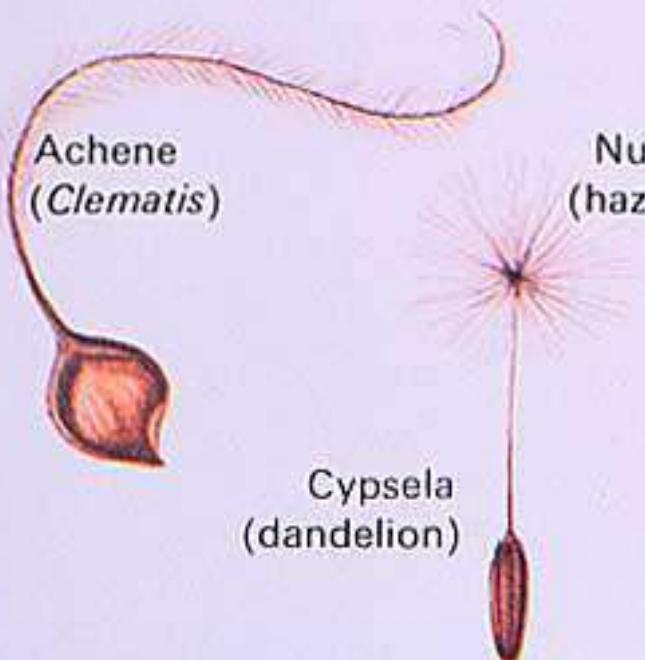


Rice

(= Caryopsis)

DRY INDEHISCENT FRUITS

Achene
(*Clematis*)



Nut
(hazel)



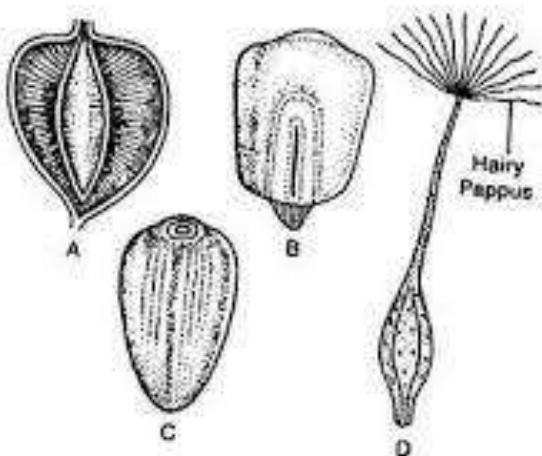
Samara
(elm)



Utricle
(*Chenopodium*)



Caryopsis
(wheat)



DRY DEHISCENT FRUIT

1. Follicle: This is a dry fruit with many seeds and splits open along one suture

Sodom apple Follicle



Milk weed follicle



DRY DEHISCENT FRUIT CONT'D...

2. Legume: This is a dry fruit(pod) with many seeds and splits open along two sutures

Barbados legume



Pea legume



Peanuts/ Ground nuts legume



Bean legume



Flamboyant legume



DRY DEHISCENT FRUIT CONT'D...

2.Capsule:This is a dry fruit with many seeds and splits open along many vertical slits. It is formed from an **apocarpous** flower

Dutch man's pipe capsule



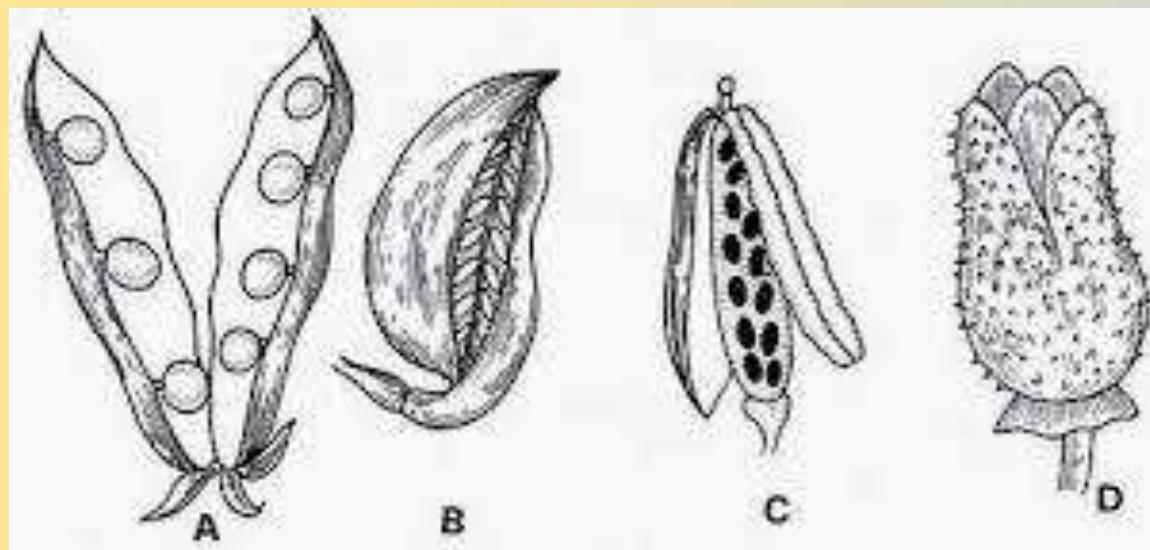
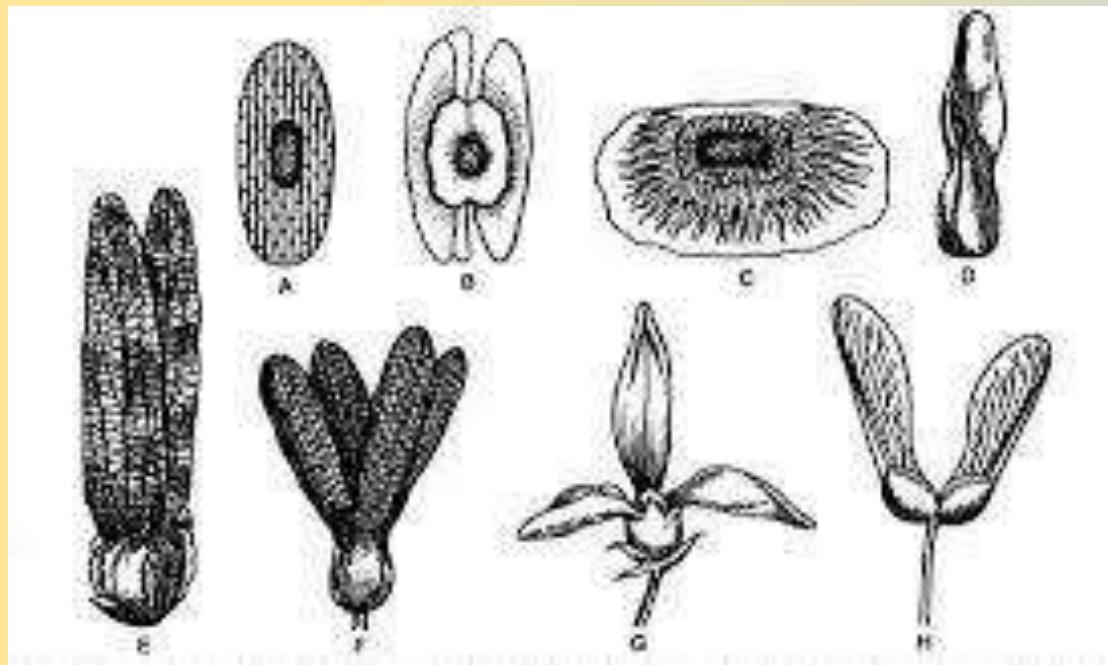
Cotton capsule



Balsam apple capsule



You are provided with specimens. Identify the specimens.



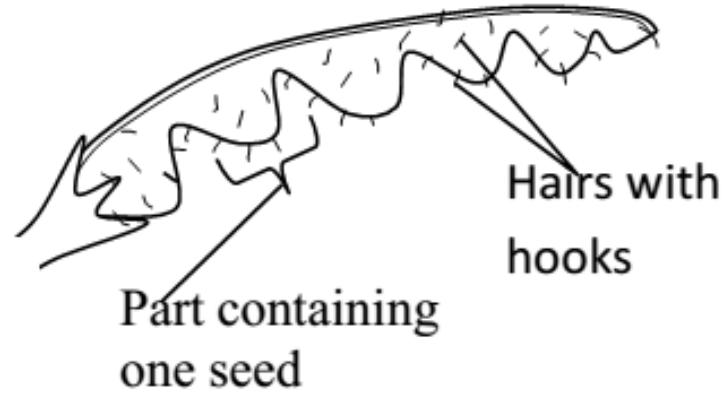
DRY DEHISCENT FRUIT CONT'D...

3. Schizocarp: This is a dry several seeded fruit, which breaks up into separate parts each containing one seed

Desmodium schizocarp



Schizocarp of desmodium.



Musk mallow shizocarp

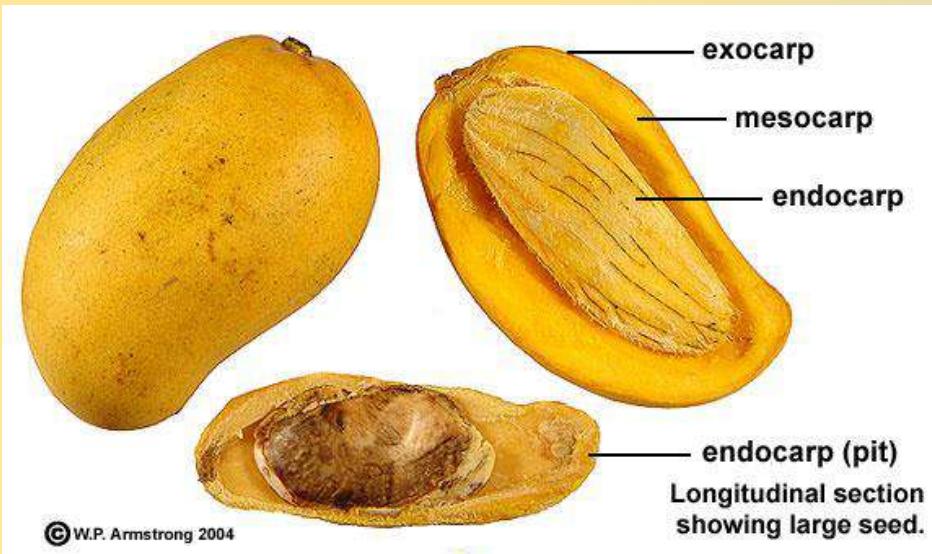


SUCCULENT FRUITS

These are either entirely fleshy or part of them is fleshy

1. Drupe: These are fruits with only one seed and only part of it fleshy (epicarp and mesocarp). The endocarp is fibrous and hard,

Mango drupe



Aggregate drupelets of black berry



Avocado drupe

Java black plum



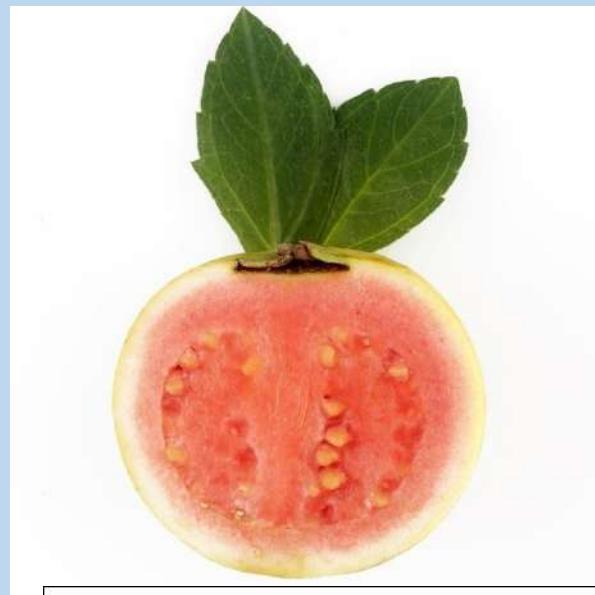
SUCCULENT FRUITS CONT'D...

2. Berry: This is a fruit with many seeds and the whole of it fleshy

Tomato berry



Guava berry



Orange berry

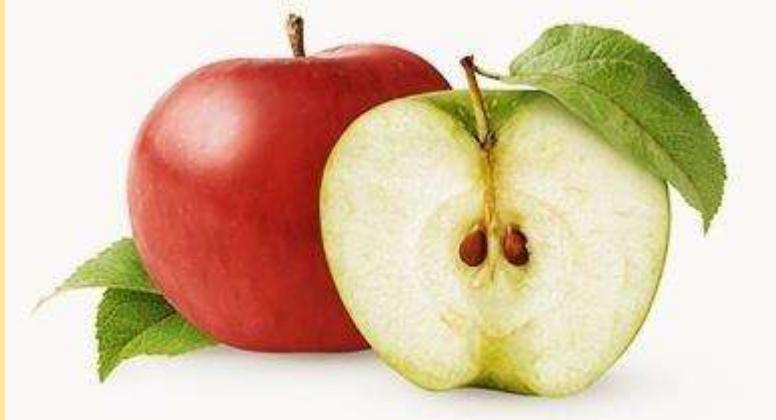


Banana berry

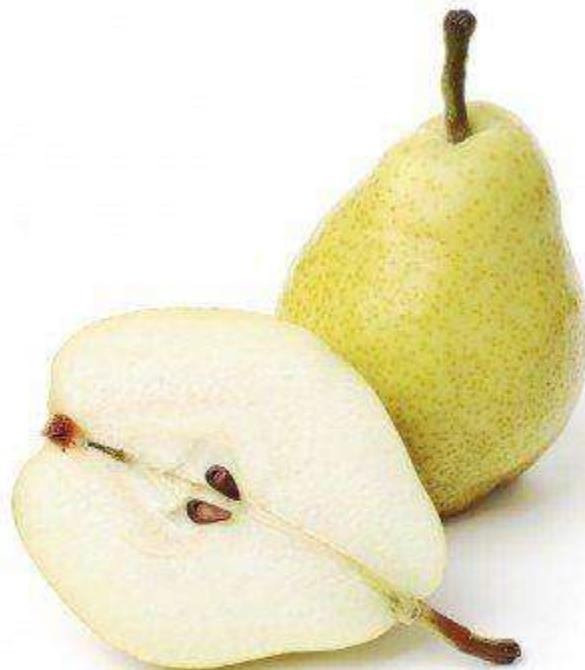
SUCCULENT FRUITS CONT'D...

3. POME: This is a succulent fruit in which the outer fleshy (normally edible) part develops from the calyx and receptacle. The ovary forms a papery Core containing seeds

Apple pome



Pear pome



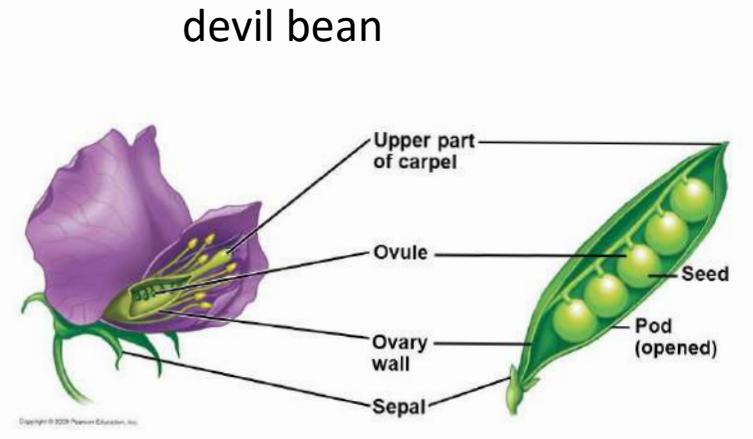
PLACENTATION

The arrangement of the seeds on the placenta within the ovary

1. Marginal: Ovules are attached to a placenta along the margin of the ovary wall

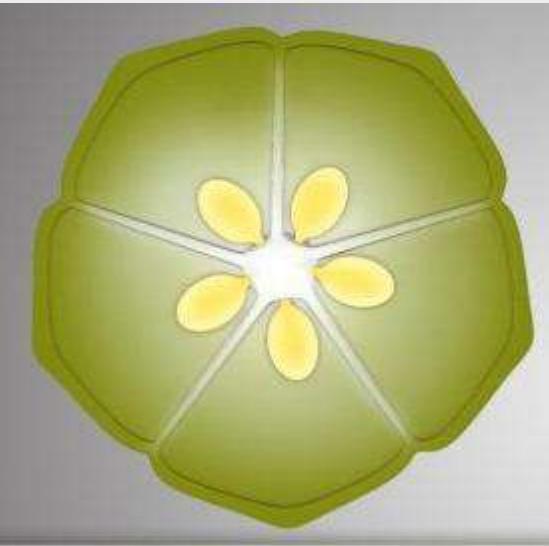
Crotalaria spp e.g

devil bean

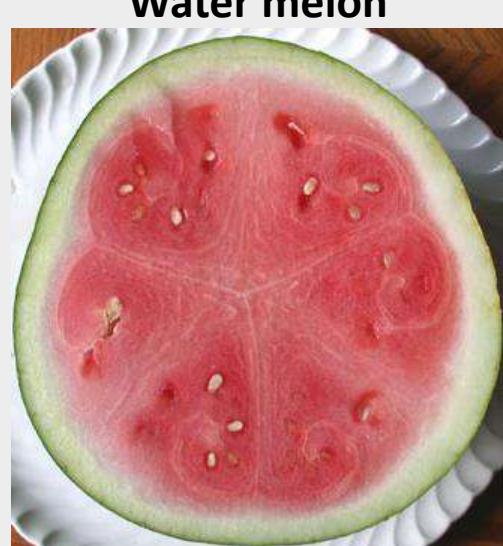


PLACENTATION CON'TD....

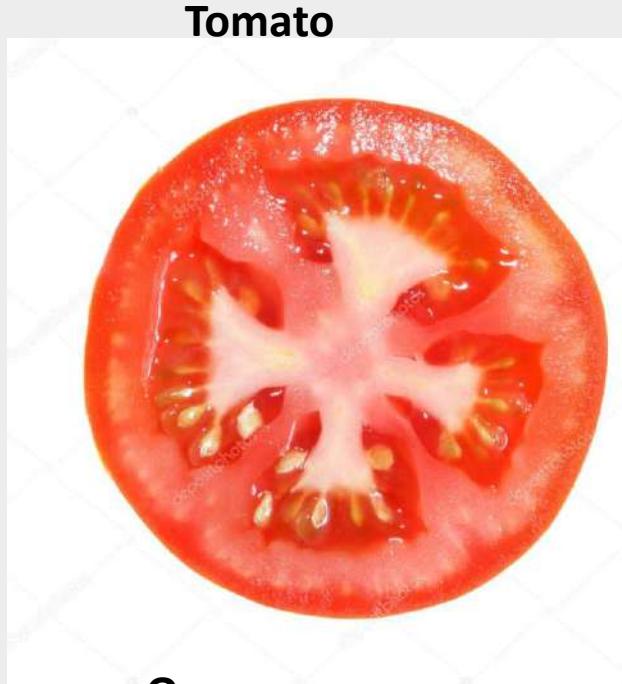
2.Axile: Ovules centrally located in the ovary with ovary divided into many chambers. Which types of fruit are these?



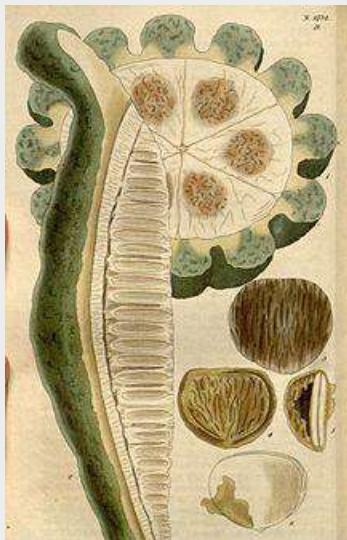
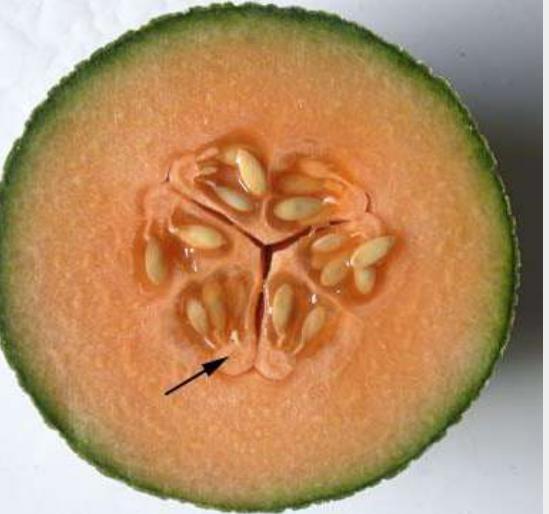
Pumpkin



Water melon



Tomato



Oyster nut



Orange

PLACENTATION CON'TD....

2. Central: Ovary is one chambered and ovules centrally located

Placentation in soap wort

Soap wort



PLACENTATION CON'TD....

3. Free central placentation: Ovules located on the projection from the base of a one chambered fruit



Free central placentation

Green bell paper

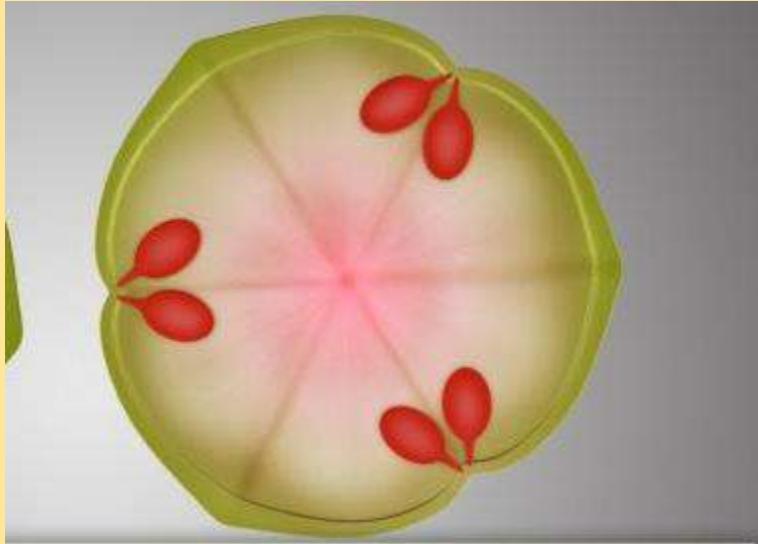


Red bell paper



PLACENTATION CON'TD....

4.Parietal: Placenta is found on the inner wall of the fruit and the ovules are attached on the inner wall



Cocoa



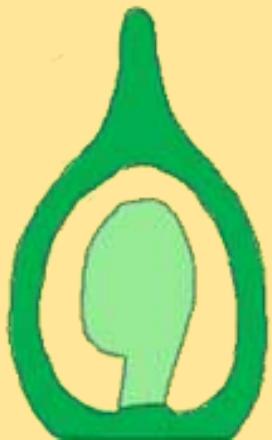
Passion fruit



Pawpaw

PLACENTATION CON'TD....

6. Basal: Ovule found on a placenta that arises from the base of the ovary, fruit usually single seeded



Sun flower fruit



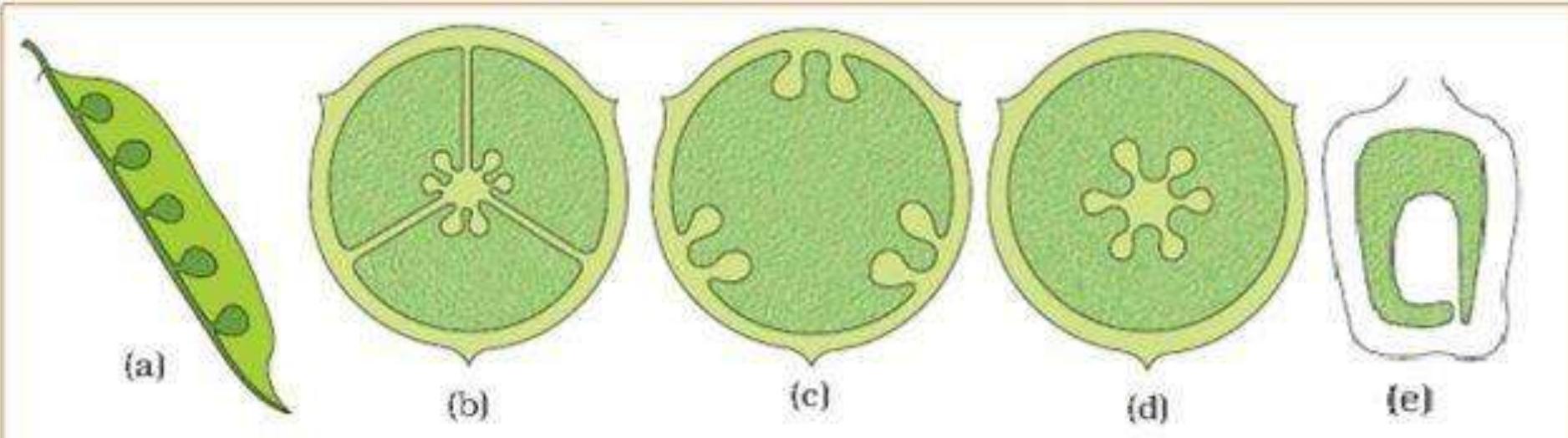
Avocado



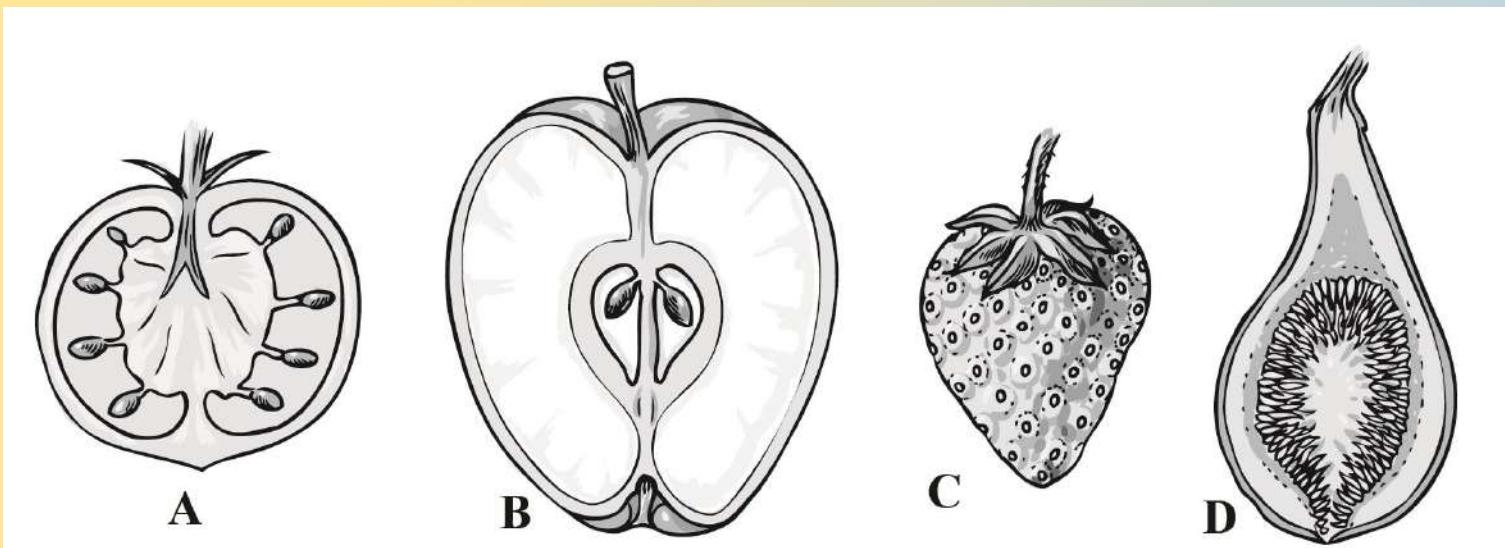
Mango fruit



With a reason, which type of placentation is



What do you observe in these fruits in line with seed arrangement?



END