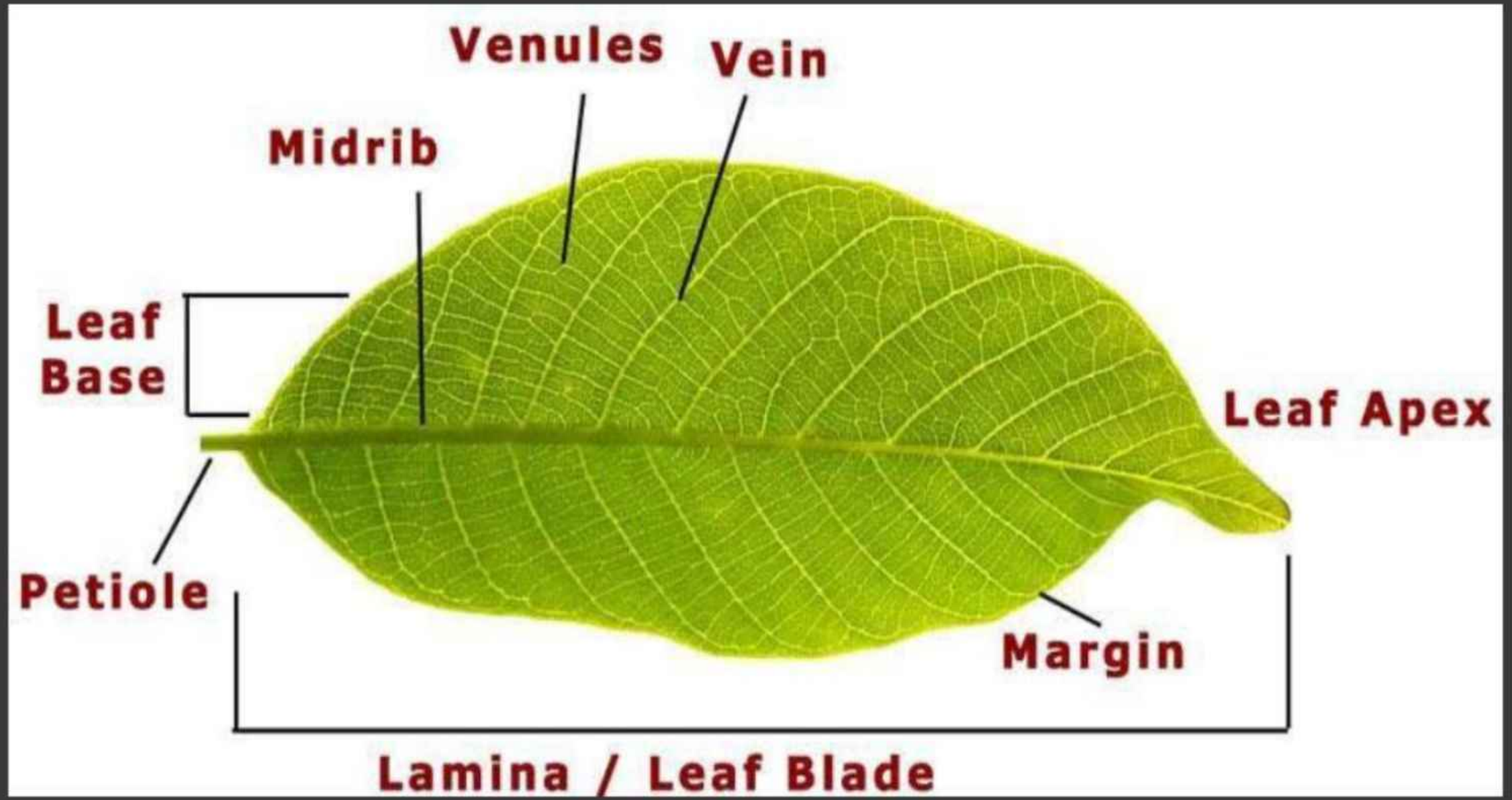
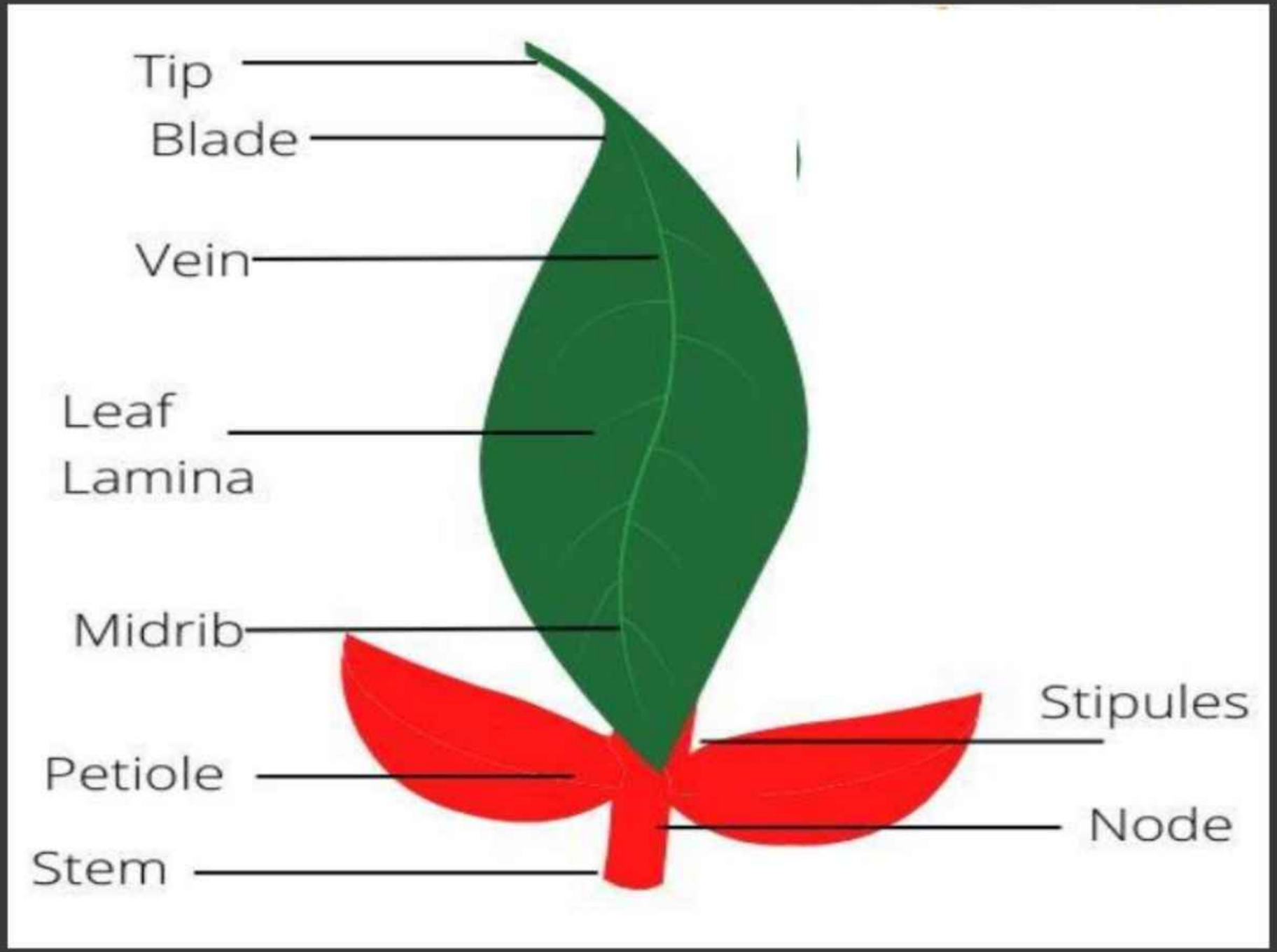
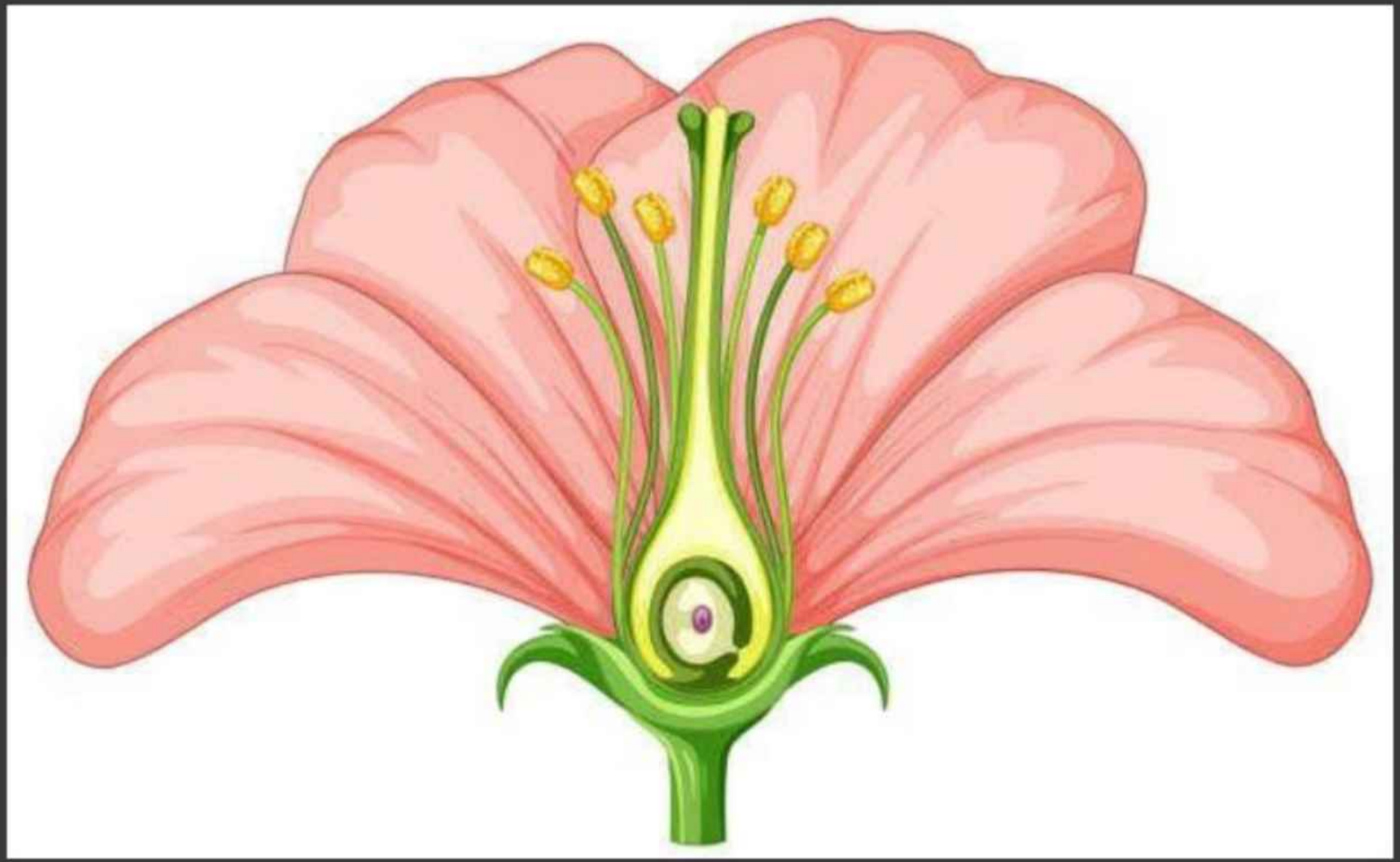
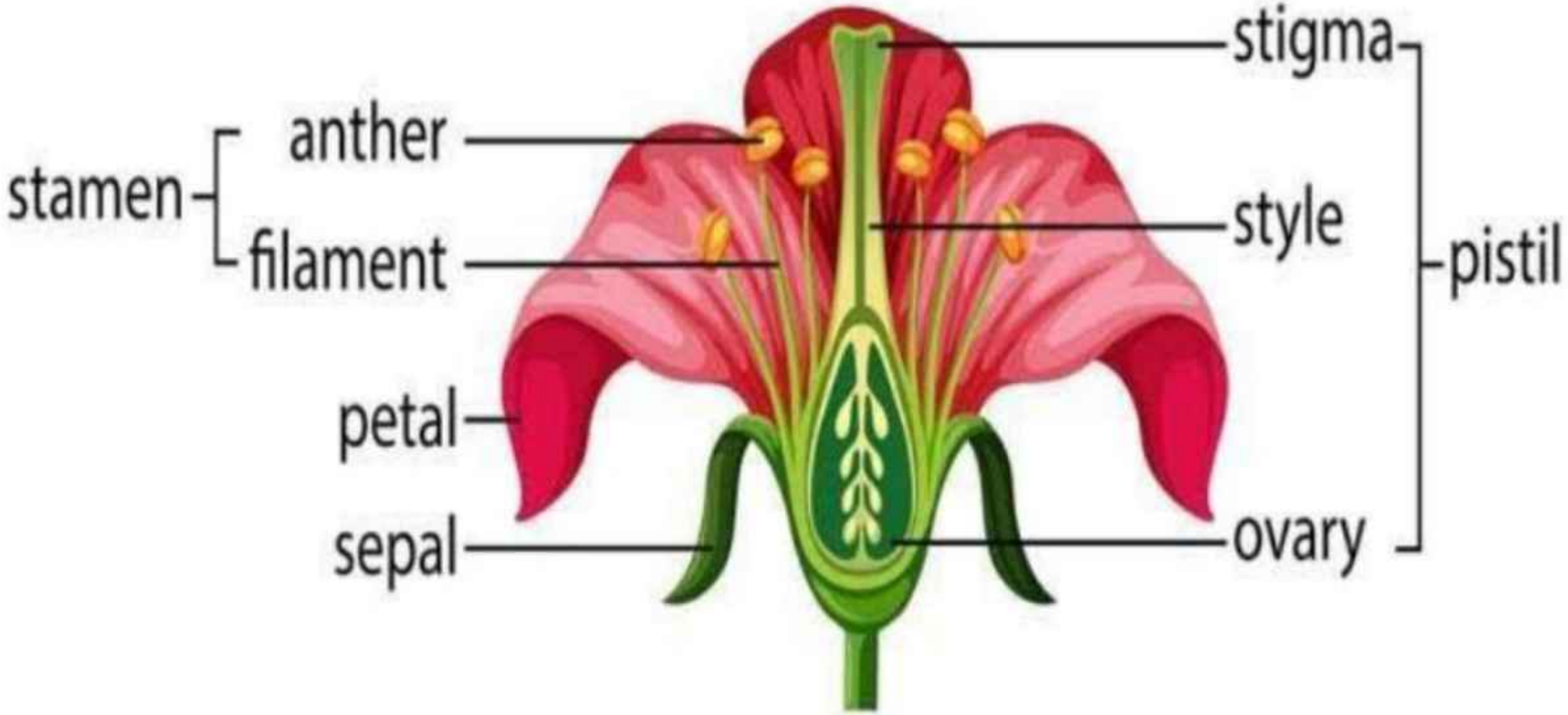
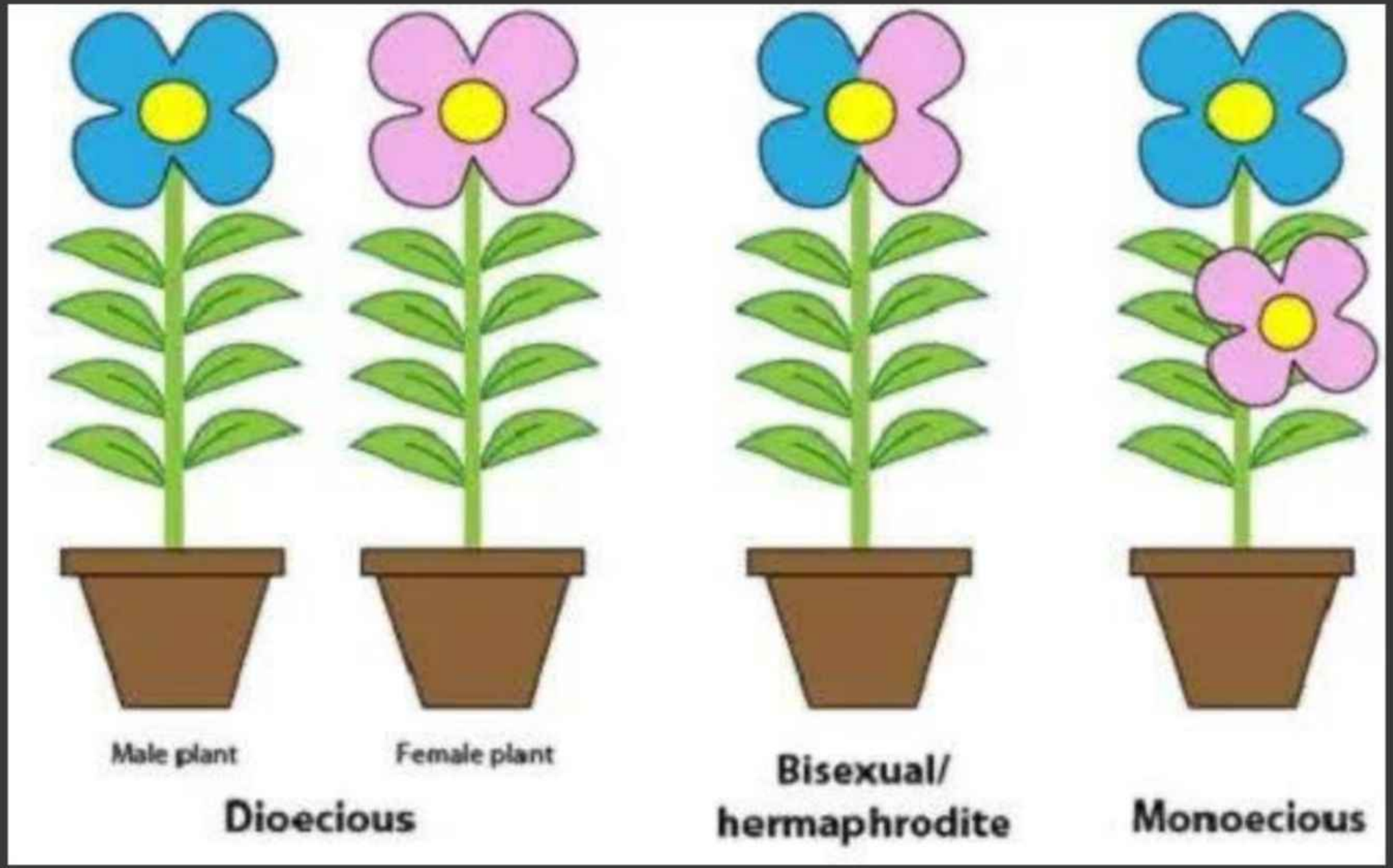

Venules
Vein
Midrib
Leaf
Base
Leaf Apex
Petiole
Margin
Lamina / Leaf Blade

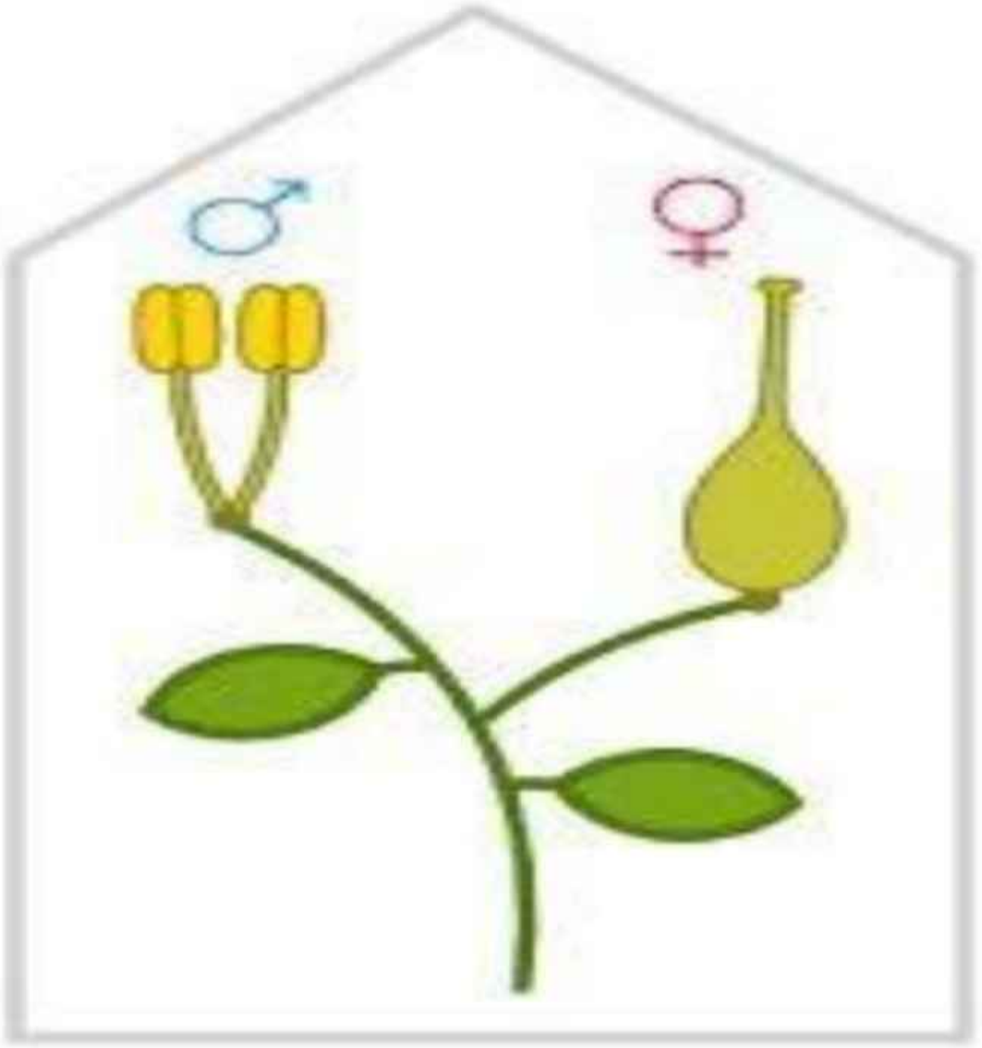

Tip
Blade
Vein
Leaf
Lamina
Midrib
Stipules
Petiole
Node
Stem



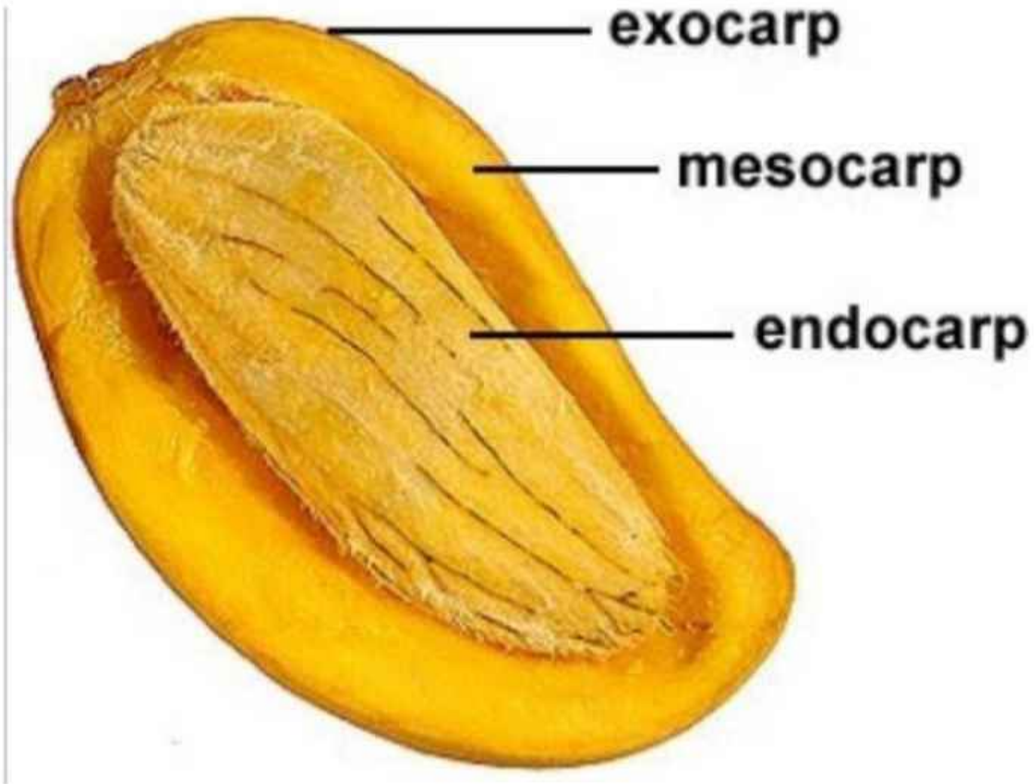

stigma
anther
stamen
style
filament
pistil
petal
sepal
ovary

Monoecious	Dioecious
Male and female flowers occur on the same plant. **Eg:** coconut.	Male and female flowers occur on different plants. **Eg:** *Papaya*, date palm.
In some plants caster and maize autogamy is prevented. But geitonogamy occurs.	In this both autogamy and geitonogamy are prevented.

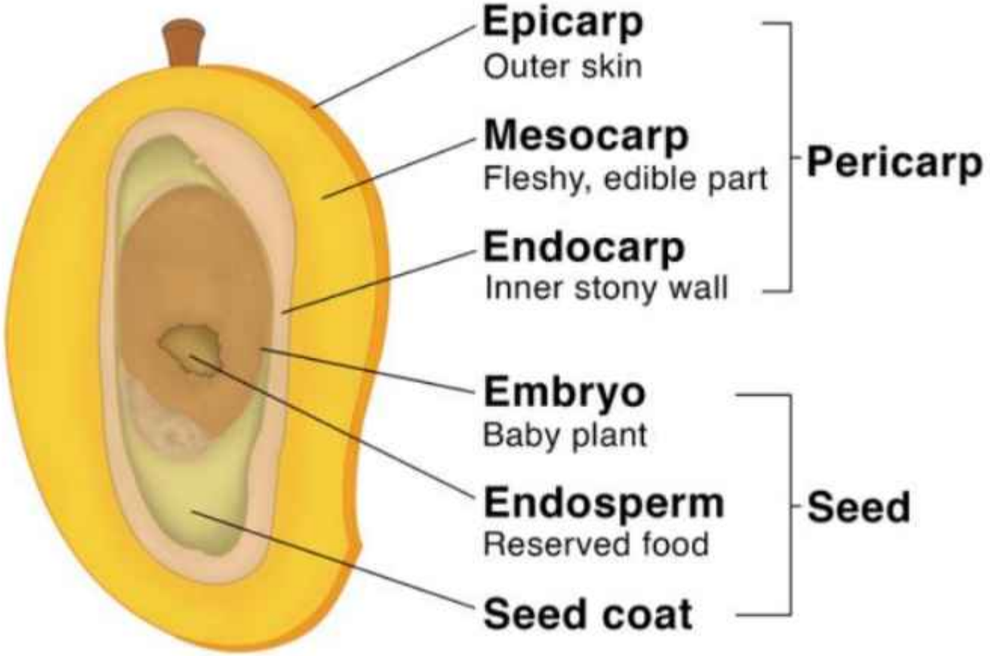

Male plant
Female plant
Dioecious
Bisexual/
hermaphrodite
Monoecious



monoecious
plant


exocarp
mesocarp
endocarp

Parts of a Fruit



Plant morphology
पादप आकारिकी

Types of stem
तने के प्रकार – (3)

1. वायवीय तना
Aerial stem
2. अर्धवायवीय तना
Subaerial stem
3. भूमिगत तना
Underground stem

वायवीय तना
Aerial ⇒ रूपान्तरित भाग
Modification

① phyllocaid पर्णाभवृत - नागफनी Optiuma

② thorn काँट → बोगनवुलिया Bougainvillea

③ Cladode क्लैडोड्स → कवक fungi

④ Tendrils प्रतान = Grapevine अंगूर

भूमिगत तना
underground stem

① आलु potato ⇒ tuber कंद

② हल्दी Turmeric ⇒ Rhizome राइजोम (प्रकंद)

③ अदरक Ginger ⇒

④ अरबी Arbi ⇒ Corm कॉर्म

⑤ प्याज Onion, लहसुन Garlic ⇒ bulb पत्र

Note

चुकन्दर Beetroot जड़ Root

→ ③ ⇒ पत्तियाँ leaves

① प्रकाशसंश्लेषण की क्रिया होती है
Photosynthesis take place in leaves

② वाष्पोत्सर्जन की क्रिया होती है transpiration take place by leaves

③ पत्तियों में एक वर्णक पर्णहरित पाया जाता है
A pigment is present in leaves called chlorophyll

वाष्पोत्सर्जन ⇒ "पौधों के द्वारा अतिरिक्त जल का वाष्प के रूप में उत्सर्जन"

Transpiration

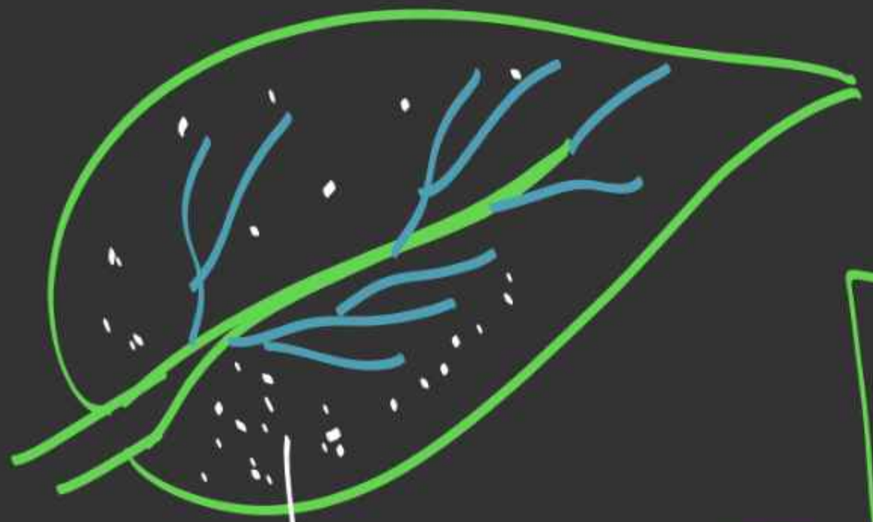
Excretion of extra water from the plant in the form vapour.

९७ - ९९ %

100% ⇒ 1 - 3% पर उपयोग

⇒ पत्तियों पर छोटे - छोटे छिद्र पाये जाते हैं इन्हें रन्ध्र कहते हैं

Small pores are present on leaves that are called 'Stomata'



Stomata रन्ध्र

→ वाष्पोत्सर्जन करते हैं
transpiration

→ गैसों का आदान-प्रदान करना
exchange of gases
O2 - बाहर out
Co2 - अंदर In

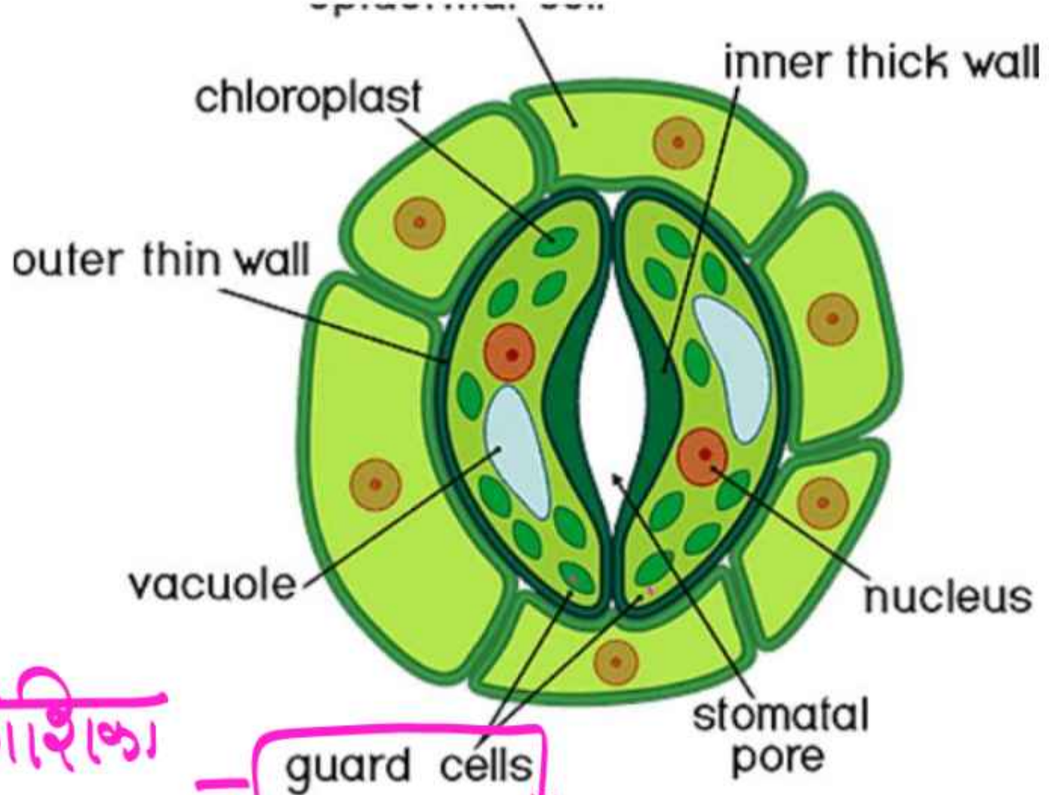
→ Lungs of the plant पादप फेफड़ें

Imp

→ Guard cell द्वार कोशिका ⇒ खुलना और बंद करना
opening, closing

Note = रेगिस्तानी पादपों में वाष्पोत्सर्जन की क्रिया से बचने के लिए पादप पत्तियों को काँटों में रूपान्तरित कर लेते हैं

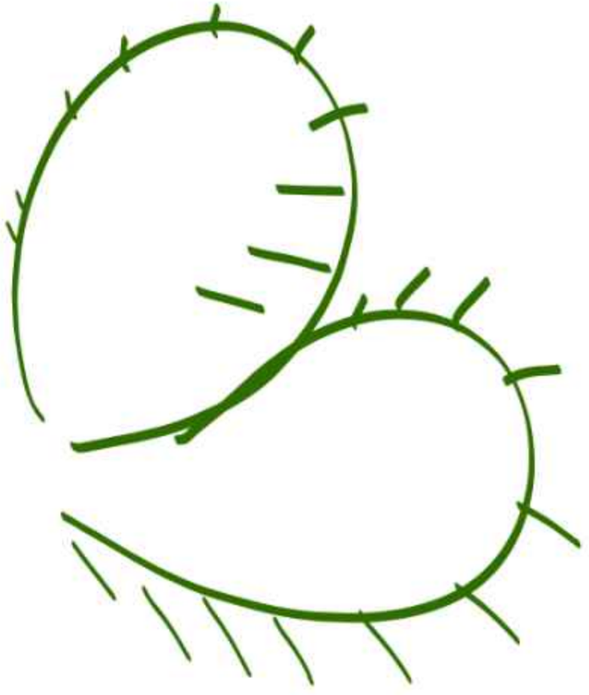
In Xerophitic plant modified their leaves in Spine to Reduced water



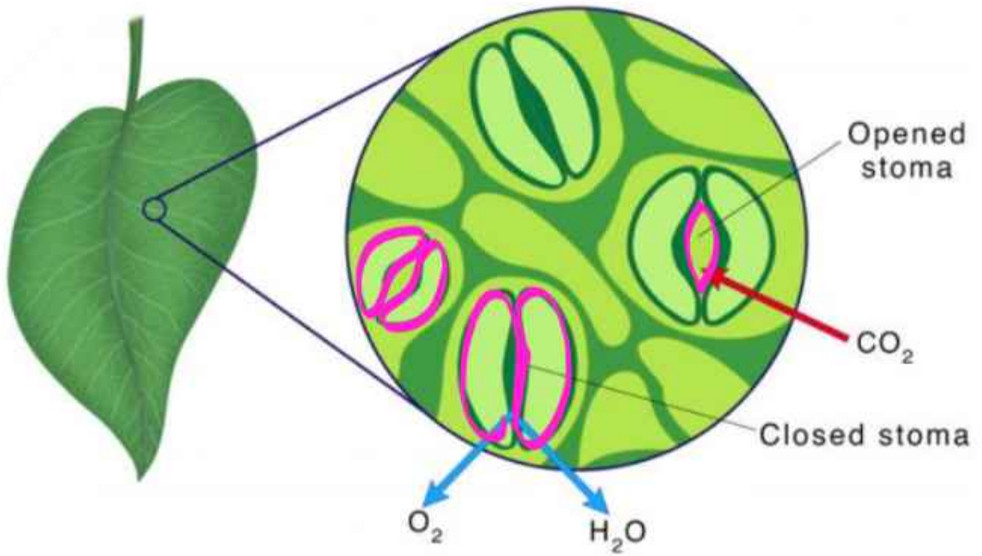
रक्षक कोशिका = guard cells

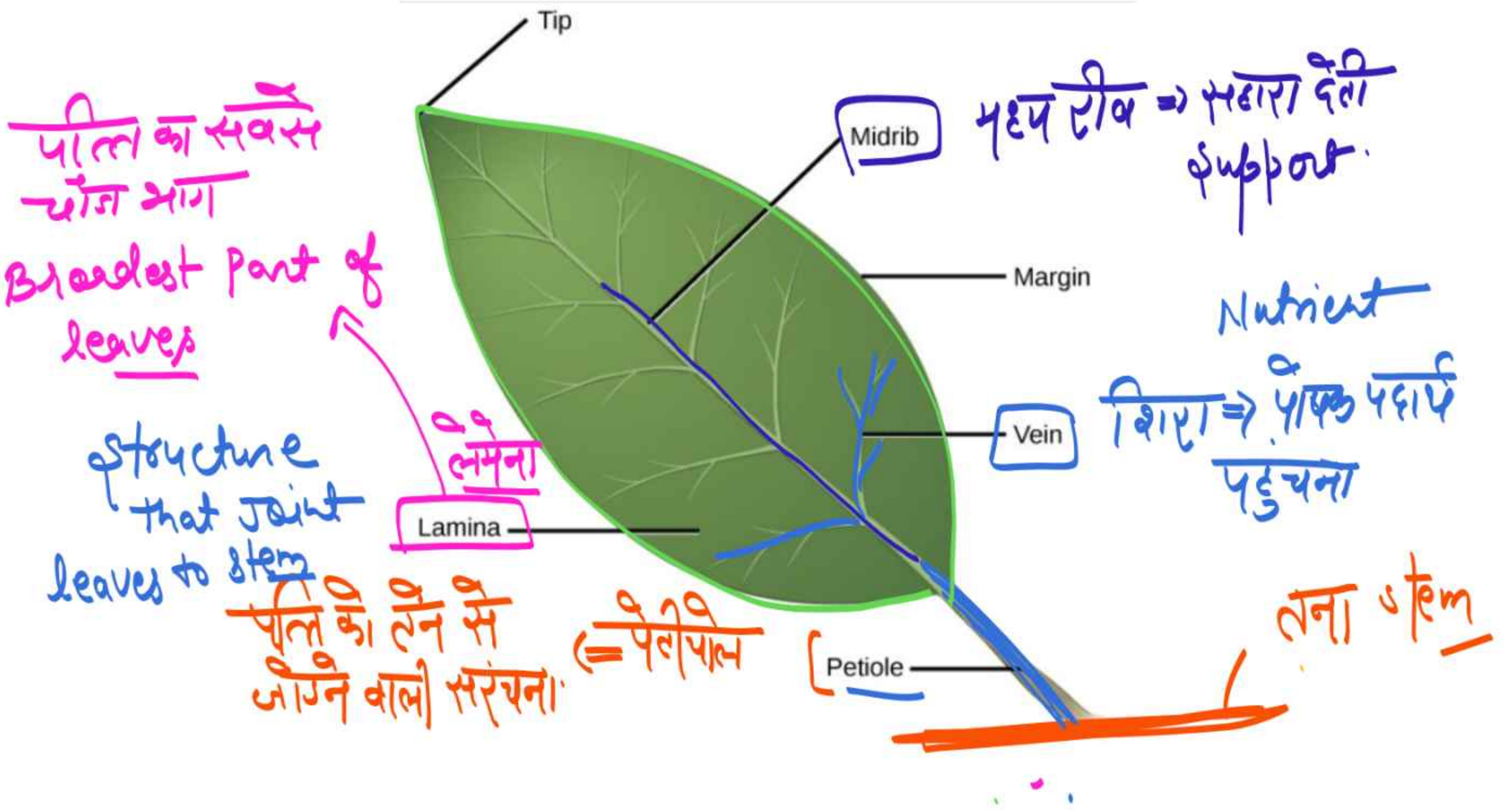
द्वार कोशिका

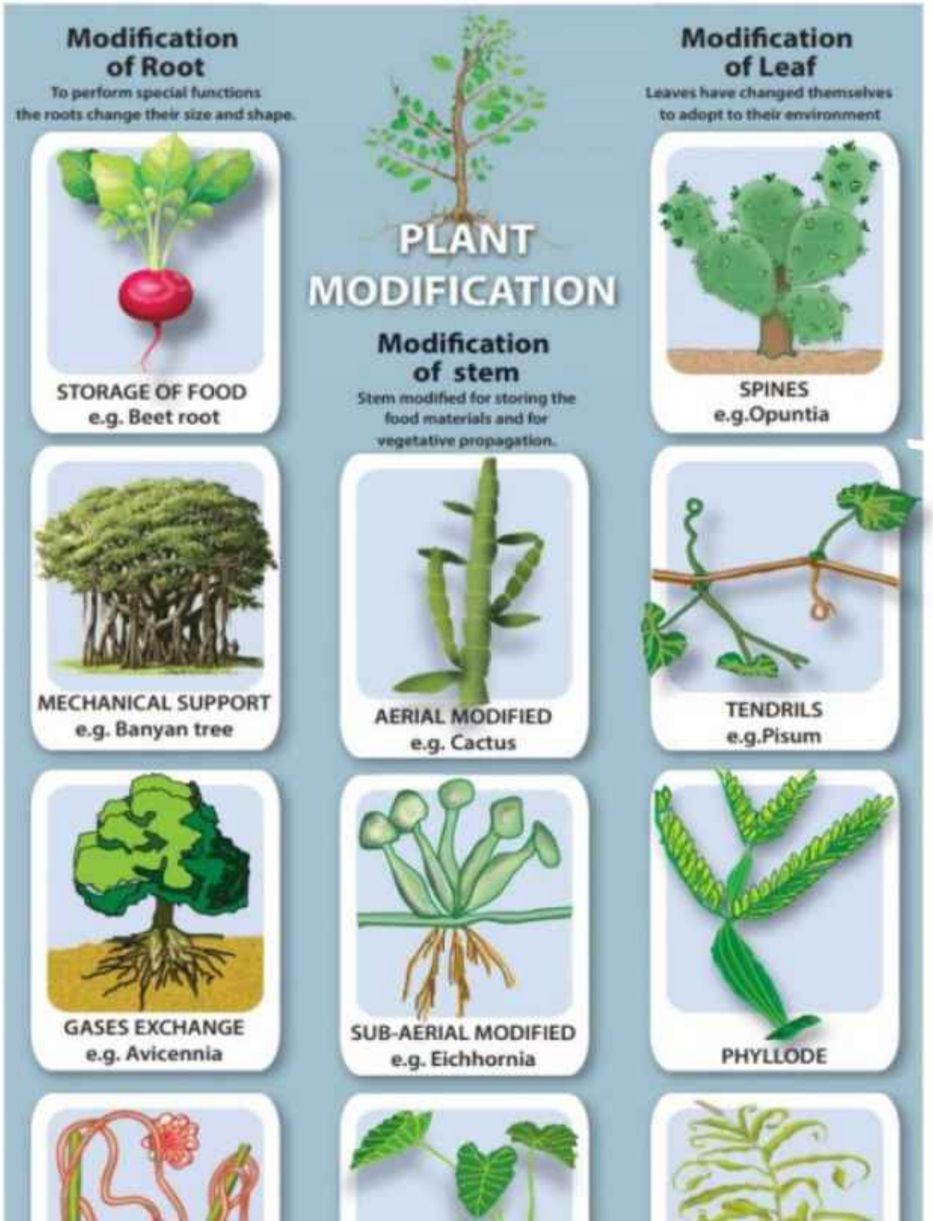
stoma open



Stomata




Tip
Midrib
Margin
Vein
Lamina
Petiole
पत्ती का सबसे चौड़ा भाग
Broadest part of leaves
structure that joint leaves to stem
पत्ती को तने से जोड़ने वाली संरचना
लैमेना
(=पैटीयोल
मध्य शीरा ⇒ सहारा देती
support
Nutrient
शिरा ⇒ पोषक पदार्थ पहुंचना
तना stem



Thron → stem
कांटे तना

spines → पत्तियां
कांटें leaves

Tendril: These types of stems are slender, spirally coiled, which help a plant to climb. Example: Passiflora, Grapevine etc.

Bulbil: These are modified axillary buds which become fleshy and swollen due to the storage of food. They help in vegetative propagation to form a new plant. Example: Dioscorea.

Thorn: These are hard, woody, and pointed structures that protect plants from grazing animals. It originates from the axillary or terminal bud. Example: roses, citrus, bougainvillea, duranta etc.

Cladodes: These are non-fleshy and cylindrical that contain only one internode. Example: Asparagus, butcher's broom.

Phylloclade: These are green, fleshy, and flattened or cylindrical branches containing chlorophyll and photosynthesis. This modification is found in xerophytic plants and stores water. Example: Opuntia, Casuarina,

Aerial stem वायवीय



Passiflora (Tendril) प्रतान



Dioscorea (Bulbil) कायिक कलिका



Bougainvillea (Thorn) बोगनविलिया काँटे



Asparagus (Cladodes) शतावर



Opuntia (Phylloclade) नागफनी

Runner: It is a creeper that runs horizontally along the surface of the soil. Runners have long internodes. The nodes have scale leaves, adventitious roots, and auxiliary buds. An underground runner is known as sobole. Example: Grass, Cynodon, Oxalis.

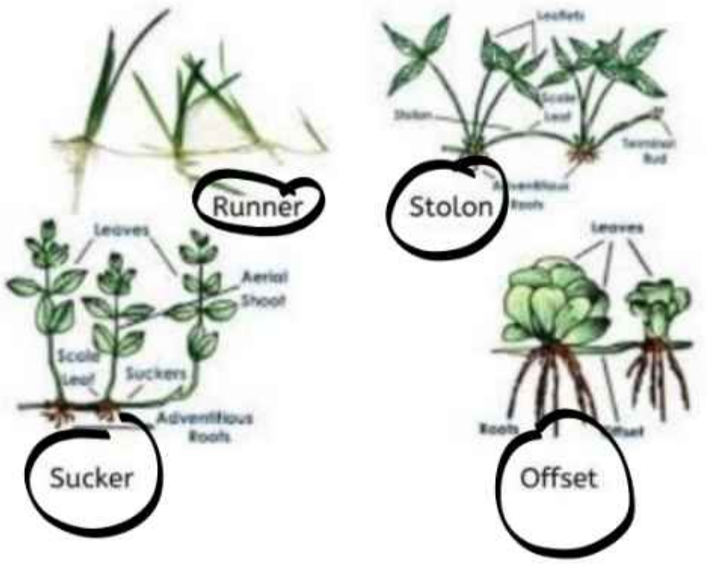
Offset: These are shorter and thicker than the runner with a single internode. It originates from the leaf axis and grows horizontally. Offsets are often found in aquatic plants like water lettuce, water hyacinth, etc.

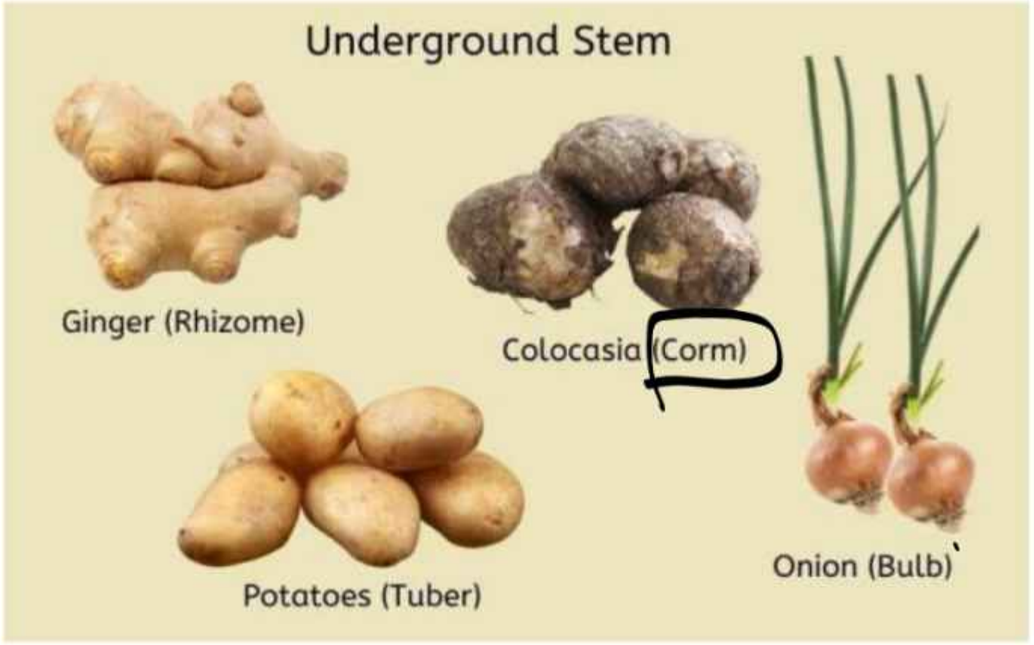
Stolon: It grows above ground for some time and then bends towards the ground until it touches the ground. Stolon arises from the lower part of the main axis. Example: Jasmine, colocasia, etc.

Sucker: The sucker stem is very similar to the stolon, but it grows obliquely upwards and gives rise to a new plant. Example: Garden chrysanthemum, strawberry, pineapple, mentha, etc.

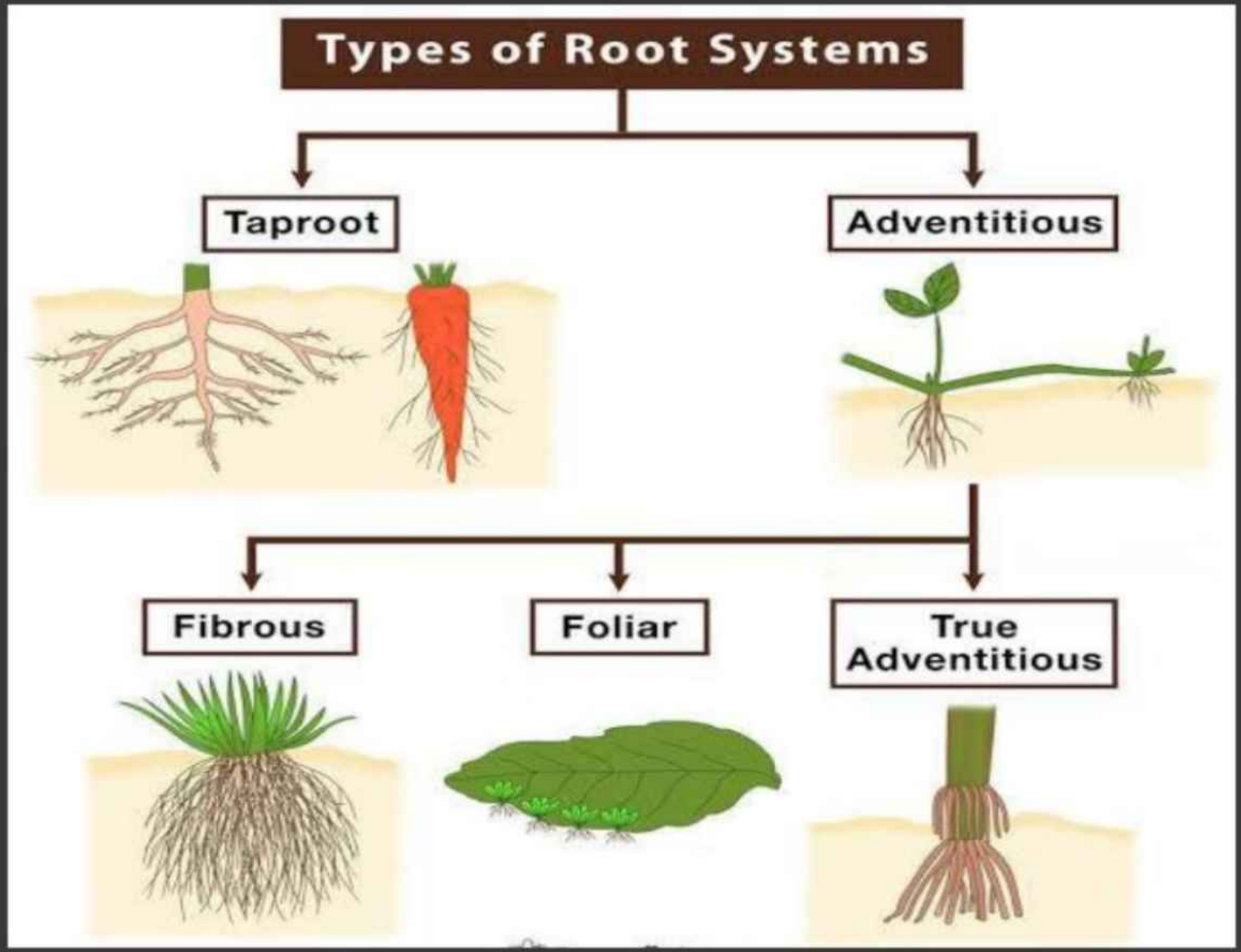
Sub-Aerial Stem

उपवायवीय तना




Underground Stem
Ginger (Rhizome)
Colocasia (Corm)
Potatoes (Tuber)
Onion (Bulb)


Underground Stem
Aerial Stem
Sub-Aerial Stem
Rhizome
Corm
Bulb
Tuber
Phylloclades
Cladodes
Thorns
Runner
Stolon
Sucker
Offset


Types of Root Systems
Taproot
Adventitious
Fibrous
Foliar
True Adventitious





भूमिगत तना के रूपांतरण
(Underground Modification of Stem)



प्रकंद (Rhizome)



घनकंद (Corm)



बल्ब (Bulb)



कंद (Tuber)

वायवीय तना के रूपांतरण
(Aerial Modification of Stem)



पर्णाभकूट (Phylloclades)



क्लेडोड्स (Cladodes)



काँटे (Thorns)



तना प्रतान (Stem Tendrils)

उपवायवीय तना के रूपांतरण
(Sub-aerial Modification of Stem)



रनर (Runner)



स्टोलॉन (Stolon)



चूषक (Sucker)



भूस्तारिका (Offset)