

# Stem

↳ axil part ~~is~~ straight that bear branches, leaves, flowers and fruits.

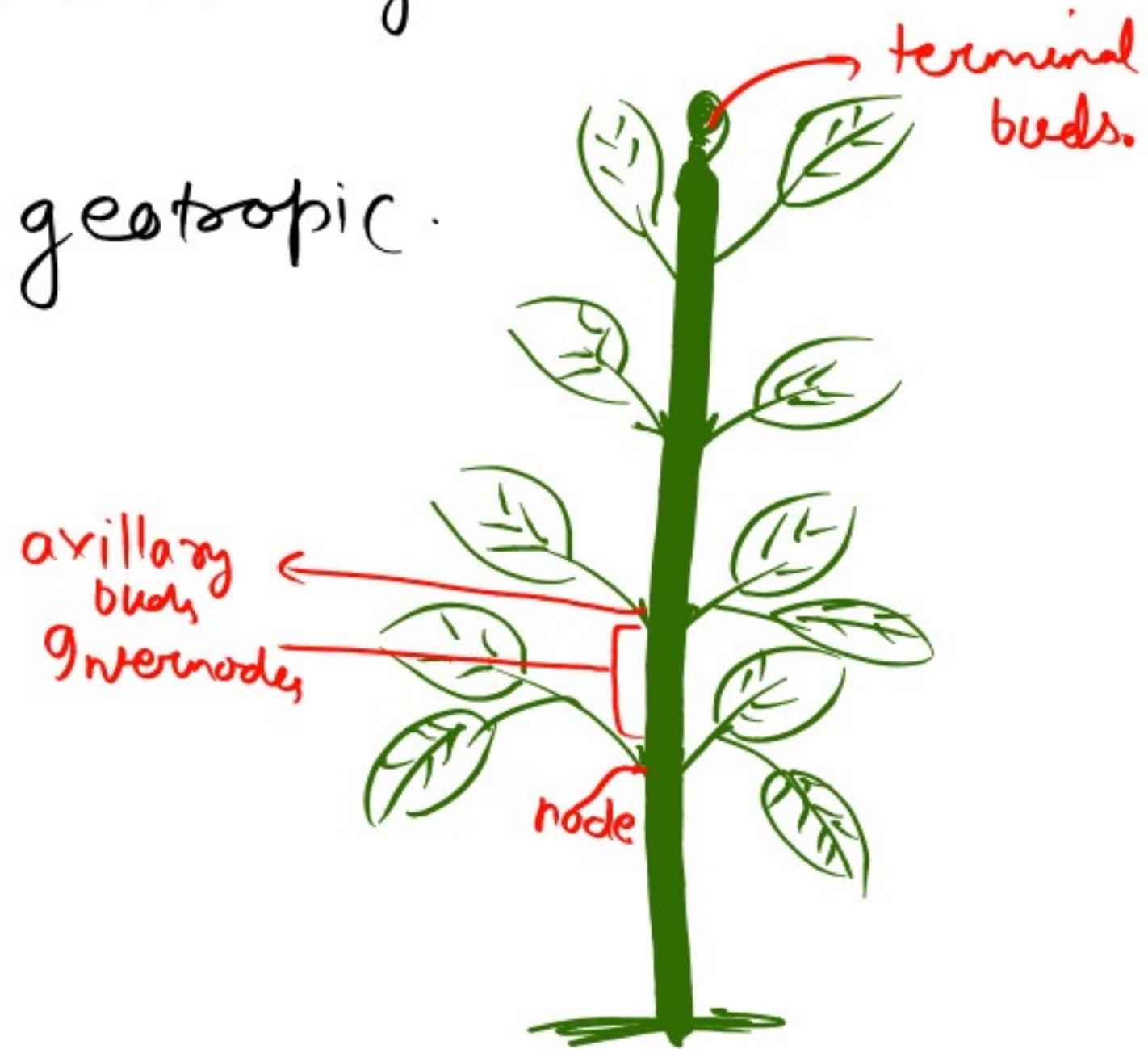
↳ when young → green (photosynthesis)  
Mature → Dark brown → woody (lenticels).



↳ Stem also bears → buds  
↳ Terminal  
↳ axillary buds.

↳ phototropic and negative geotropic.

↳ Storage, Conduction of water  
and minerals,



# Modification of stem

Underground stem

↳ non green.

↳ nodes and internodes.

Subaerial

Aerial  
stem

# Types of underground stem.

## Rhizome

↳ fleshy, grows horizontally,



↳ Perennial underground stem

↳ In favourable condition → form aerial shoots.

↳ Ginger → Zingiber officinale

↳ Turmeric → Curcuma domestica

## Corm



↳ thick fleshy underground unbranched stems

↳ Bears nodes and internodes also scaly leaves

↳ Crocus → Saffron

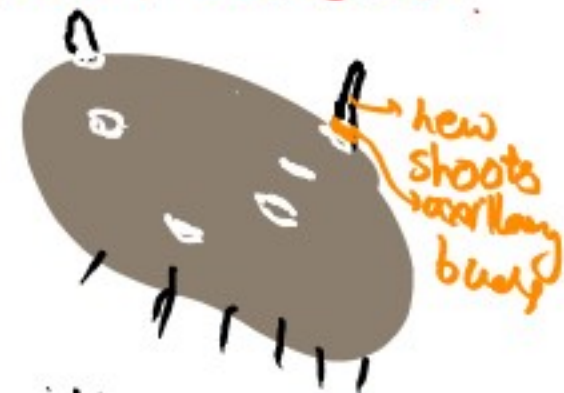
↳ Amorphophyllus → Zimikand

↳ Colocasia → Kachalu

## Tuber

Fleshy underground stem

↳ from axillary buds new shoot arises



## Bulbs

↳ fleshy underground having scales → protection



Onion, Lily, garlic.

# Subaerial Stem

## Runner

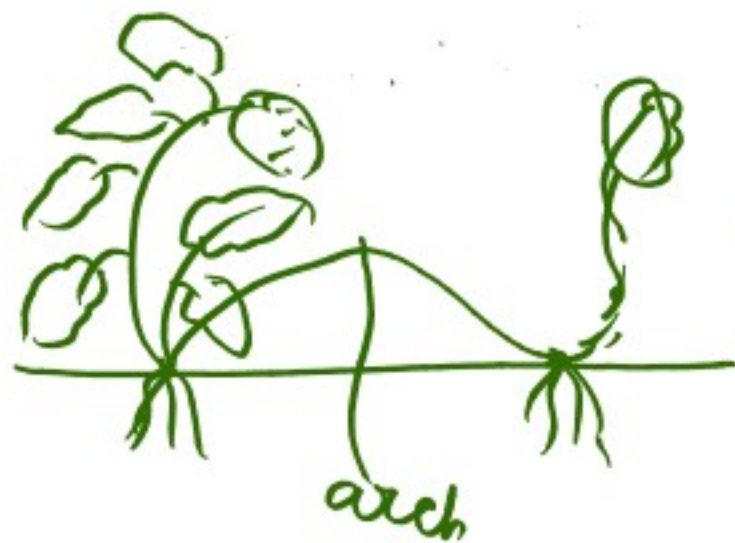
- ↳ Grasses.
- ↳ Oxalis

↳ Runners are those which grow horizontally and originate from axillary bud.



## Stolon

- ↳ lateral branches arise from base of the stem
- ↳ Form arch



## offset

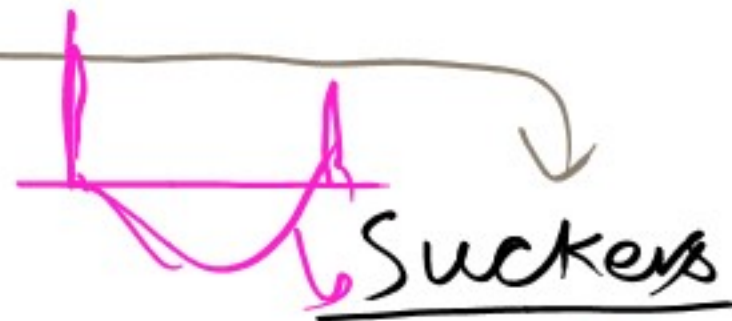
- ↳ long horizontally from long internode
- ↳ form tuft of roots
- ↳ Eichornia, Pistia



## Suckers

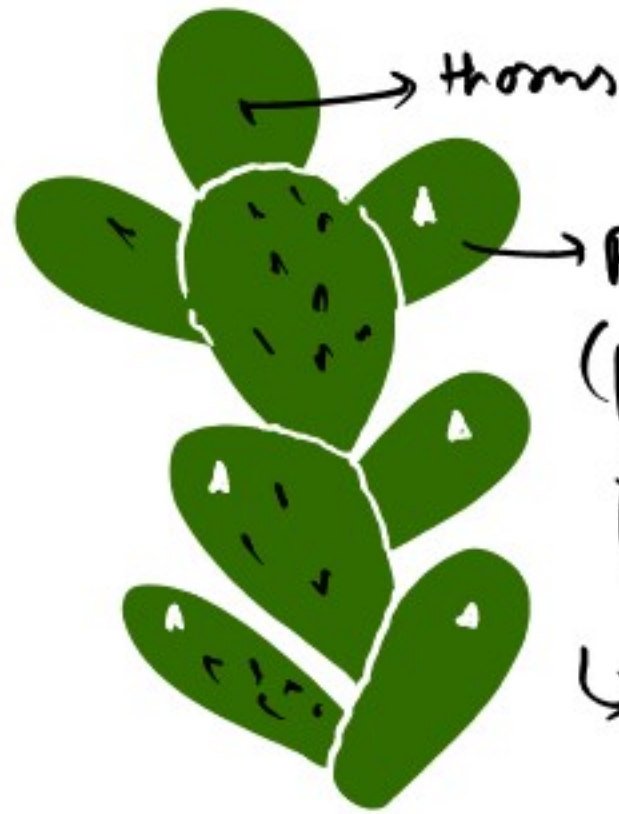
- ↳ lateral branches grow obliquely and give rise to new shoots

- ↳ Banana, pineapple, Crysanthemum



# Aerial stem modification

## Phylloclade



phylloclade  
(photosynthetic flattened structure)  
↳ Storage of water

↳ Opuntia, Euphorbia

## Cladode



↳ Asparagus, Ruscus  
↳ Flattened stem branches have one long internodes

## Stem tendril

↳ Cucurbits  
↳ grapevines



↳ axillary bud  
↳ Spiral, flattened, unbranched structures that help in support and climbing of plant

## Thorn

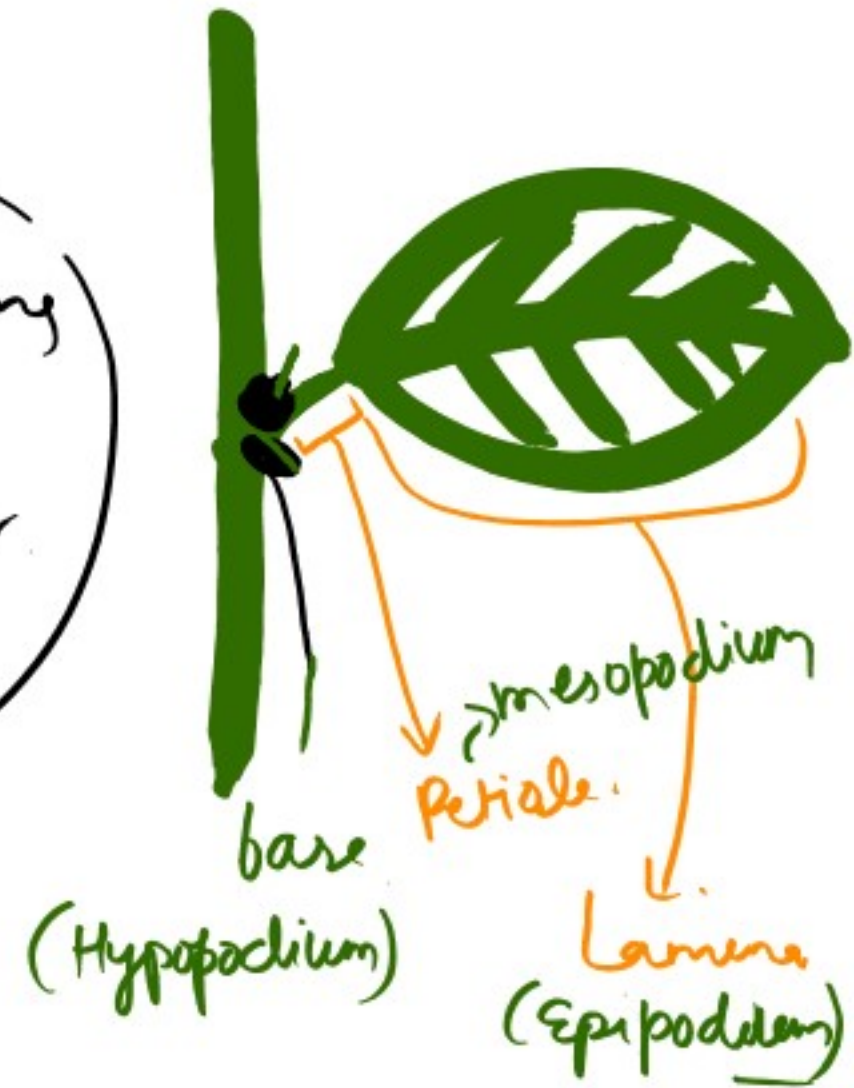
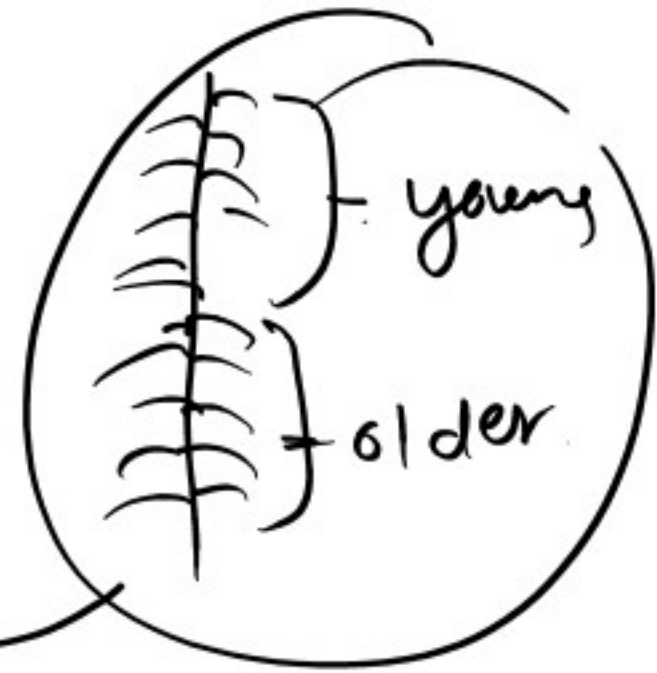
↳ axillary bud modified into thorn



↳ woody, pointed  
Changes colour when matures.  
↳ Bougainvillea  
↳ Citrus fruit

# Leaf

- ↳ Photosynthetic, flattened,
- ↳ arises from nodes
- ↳ have chlorophyll
- ↳ Acropetal manner.



- ↳ Base → Lowermost part.
- ↳ protects axillary bud.
- ↳ responsible for sleep & shock movement (Mimosa pudica)

(Swollen base  
↳ Pulvinous)

(Stipules → are lateral outgrowths  
↳ at the base protect bud.)

## petiole / Mesopodium →

- ↳ Cylindrical long stalk.
- ↳ provides exposure.
- ↳ Without petiole → sessile leaves.
- ↳ With petiole → petioled leaves.



↳ midrib — veinlets  
↳ vein

↳ venation → arrangement of veins on leaf

Dicot

Reticulate

↳ Neem, Ficus religiosa



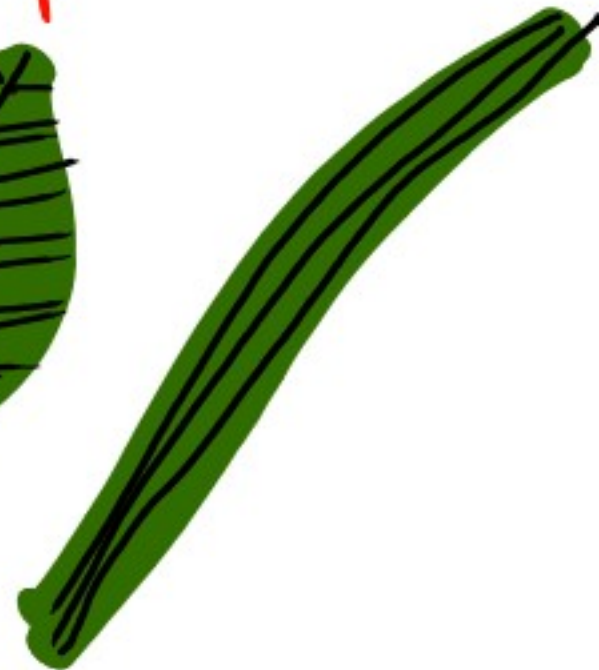
→ Form network of veins.

Monocot

parallel

↳ grasses

veins are  
parallel  
to each  
other



# Leaf

## Simple



- no incisures
- If incision present  
→ do not reach  
up to midrib.
- 1) Guava, Apple, Mango, Ficus.

## Compound



P.V.O.

Rachis



Neem



Silk, cotton  
Citrus fruit

# Phyllotaxy

Alternate

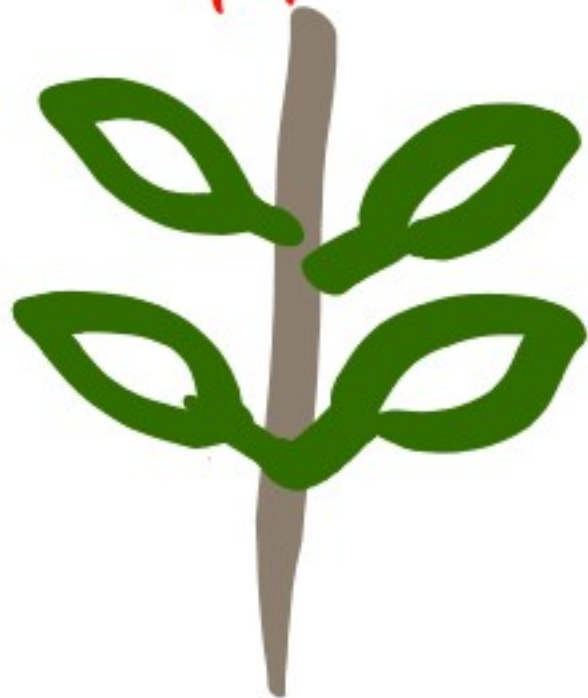


(Solanaceae  
Malvaceae  
Asteraceae)

From each node  
→ origin of single  
leaf.

↳ China rose, Mustard.

opposite



↳ Single node  
→ two leaves

→ Guava, Calotropis

Whorled



↳ Alstonia, Nerium

↳ Single node  
→ many leaves