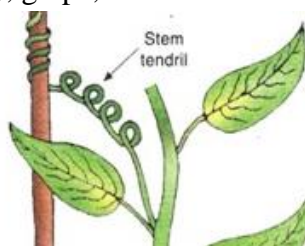


## Chapter – 7: Getting to Know Plants

- Lots of plants around us – neem, *bougainvillea*, grass
- Urban area – gardens – many plants
- Rural area – fields – many crops
- Plants – living things – BUT – cannot move from one place to another
- These – do not take food – BUT – produce their own
- Different shapes and sizes – most plants – green leaves – some plants – reddish leaves
- Most plants – bear flowers – flowering plants – rose, mango, *neem*, mustard, sunflower, etc
- Some plants – do not bear flowers – non-flowering plants – moss, algae, fungi (mushrooms), conifers (pine trees)

### Herbs, Shrubs and Trees

- Herbs –
  - Small plants – soft, delicate stem – non-woody plants
  - Stem – green, tender (soft) – easily bendable
  - Short size – upto a metre – short life span – upto 1-2 seasons
  - Stem – a bit soft – BUT – strong enough – plant stands erect
  - Example – tomato, mustard, wheat, paddy, cabbage, turnip, etc
- Shrubs –
  - Medium size plants – hard, woody stem – branching near ground
  - Stem – a bit hard – BUT – not very thick
  - No main stem or trunk – branches coming out near ground
  - Larger than herbs – smaller than trees – life-span – few years – lesser than trees
  - Example – rose, tulsi, jasmine, *bougainvillea*, henna (*mehndi*), etc
- Trees –
  - Tall, big plants – hard and thick woody stem
  - One main stem – trunk – branches and leaves – comes out from trunk
  - Palm tree – coconut – never branch
  - Trees – largest in size – life-span – many, many years
  - Example – *neem*, mango, oak, sandalwood, Banyan, etc
- Some plants – different from all these three
- Climbers –
  - Thin, long, weak stem – cannot stand upright – readily climbs available support
  - Special part – tendrils – wind up on the support – help in climbing
  - Some plants – stem tendrils – others – leaf tendrils
  - Example – Bottle guard (*lauki*), grape, etc

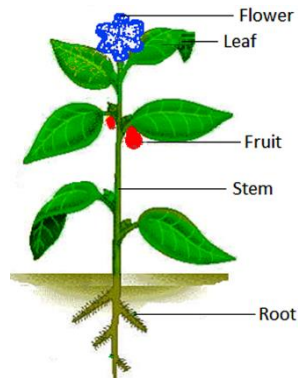


- Creepers –
  - Thin, long, weak stem – cannot stand upright – spreads on the ground

- No climbing organs – spreads on ground through long branches
- Tie it with a string – climb like climbers
- Example – strawberry, money plant, etc

## Parts of a Plant

- Each plant – many parts
- Each part – many functions



## Root

- Part of plant – under the ground (inside soil)
- Many functions –
  - Anchor plant to soil
    - Fix the plant in the soil
    - Plant cannot be pulled away or blown away easily
  - Absorb water and minerals from soil
    - Water and minerals – needed for manufacture of food
  - Help in holding soil
    - Prevent soil from blowing away or washing away
    - Helps in conservation of soil
- Soil contain water – minerals dissolve in this water
- Roots absorb water – transported to leaves through stem
- Leaves – prepare food – transported to other parts including roots
- Some plants – store food in roots – we can eat such roots – carrot, radish, turnip – modified roots

## Types of roots

- Tap roots –
  - Straight root – grows vertically downwards – gives out branches
  - Smaller side roots – lateral roots
  - Tap root – thicker – side roots – thinner
  - Example – pea, *neem*, mango, marigold, beet, turnip, etc



- Fibrous roots –
  - No main root – BUT – lots of similar roots

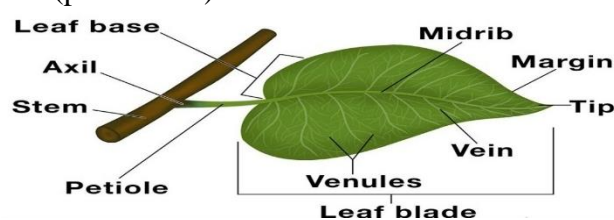
- Many thin, fibre-like roots – similar size
- Roots spread out in the ground – provide firm support to plant
- Example – wheat, paddy, grass, maize, sugarcane, etc

## Stem

- Part of plant – rises vertically upwards
- Supports branches and leaves – link between roots and rest of the plant
- Most stems – strong – keeps the plant erect – some stems – weak – cannot keep the plant erect
- Tree stem – strongest – called trunk – covered with tough layer – bark – protects the stem
- Functions of stem –
  - Holds the plant upright (erect)
  - Carries water and minerals to all the parts
  - Carries the prepared food to all the parts
  - Hold the leaves – such a way – get plenty of sunlight
- Stem contain – lots of narrow tubes
- One kind of tube – xylem – carries water and minerals to leaves
- Leaves – photosynthesis – prepare food
- Other kind of tube – phloem – carries prepared food to all other parts

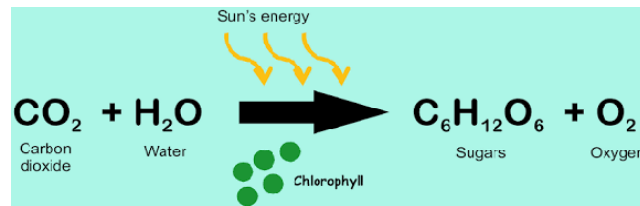
## Leaf

- Part of plant – thin, broad, flat and green – attached to branch or stem
- Plant – lots of leaves
- Different plants – different shapes and sizes – same basic structure
- Mainly 2 parts –
  - Lamina
    - Broad, green part
  - Petiole
    - Thin stalk (part of leaf) – leaf attached to stem



- Mid-rib (main vein) – centre of lamina
- Lots of thinner ribs (veins) – branch out from mid-rib
- These veins – many tubes – some – carry water – other – carry prepared food
- Small pores on the surface – stomata – gases ( $O_2$  and  $CO_2$ ) exchange through here – access water vapour also goes out from here
- Leaves also contain – green pigment – chlorophyll – gives green colour to leaves – absorbs energy from sunlight
- Functions of leaves –
  - Make food – photosynthesis
  - Get rid of excess water – transpiration

- Carry out respiration – produce energy from food
- Leaves – combine Carbon Dioxide and water – in presence of sunlight and chlorophyll – produce Oxygen and food – photosynthesis



- Carbon Dioxide – taken from air – through leaves
- Water – taken from soil – through roots
- Sunlight – provides energy for making food
- Chlorophyll – traps sunlight
- Oxygen – produced during photosynthesis – get out through leaves
- Prepared food – glucose – converted to starch – stored as food in different parts
- Plants – keeps absorbing water – lots of water collected – some water – used to make food – rest water – get out through leaves - transpiration
- Activity –
  - Pluck a green leaf – soak it in alcohol
  - Place the alcohol containing beaker inside a water containing beaker
  - Heat the water beaker – it heats the alcohol
  - WARNING – do not heat the alcohol beaker directly – alcohol catches fire
  - Heat it till leaf becomes colourless
  - Afterwards – rinse it with water – removes all the chlorophyll
  - Perform iodine test – pour some iodine solution on the leaf – leaf changes to blue-black – confirms presence of starch
- Keep the plant in dark – 2-3 days – perform same activity again
- This time – leaf does not change colour – confirms – not starch present
- Conclusion – sunlight – required for food production

## Venation

- Arrangement of veins – venation
- 2 main types –
  - Reticulate
    - Veins – irregular way – form net-like structures
    - Veins – branch out from mid-rib in random order
    - Example – pea, *neem*, mango, marigold, beet, turnip, etc
  - Parallel
    - Veins – run parallel to each other – both sides of mid-rib
    - Example – wheat, paddy, grass, maize, sugarcane, etc

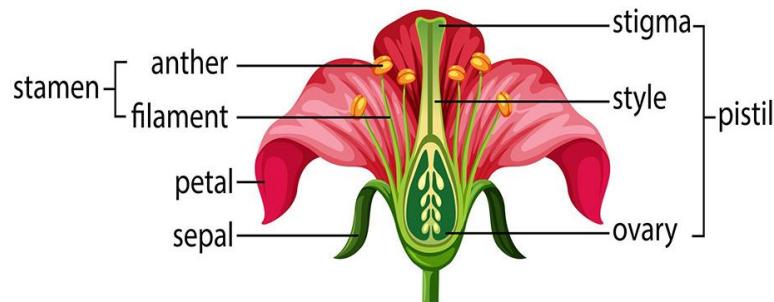


**Relation between venation and types of roots**

- Plants – reticulate venation – tap roots
- Plants – parallel venation – fibrous roots

**Flowers**

- Most beautiful part
- Different plants – different types of flowers – many shapes, sizes, colours, smells
- This part – contain reproductive organs
- Main function – produce fruits and seeds

**Parts of a flower**

- Sepals –
  - Green, leaf-like – outermost circle
  - Protect the flower – budding stage
  - May be separate or joined together
- Petals –
  - Inside sepals – most attractive part
  - Different shapes, sizes, colours – some – natural scent – smell very nice
  - Attract insects – provide a protective layer – reproductive organs
  - Most of the flowers – number of petals = number of sepals
  - Some flowers – number of petals >> number of sepals
- Stamen –
  - Inside petals – many little stalks – swollen tops
  - Male part of flower
  - 2 parts –
    - Filament
      - The stalk part
    - Anther
      - Swollen top
      - Contain yellow powder – pollen grains
      - Pollen – contain male cells for reproduction
  - Many stamen – form ring around female part
- Pistil –
  - In the centre – flask-shaped organ
  - Female part of flower
  - 3 parts –
    - Stigma
      - Top part – very sticky – pollen sticks to it
    - Style

- Middle part – tube – connects stigma to ovary
- Ovary
  - Swollen part – bottom
  - Contain – tiny, egg-like structures – ovules
  - Contain female cells for reproduction
- Pistil – surrounded by stamen
- Most plants – both pistil and stamen – same flower
- Other plants – pistil and stamen – separate flowers

## **Fruits and Seeds**

- Part of plant – contain seeds
- Fruits and seeds – produced from flowers – through pollination and fertilization
- Pollination –
  - Transfer of pollen – stamen to pistil
  - Done by – insects, wind, water
- Fertilization –
  - Pollen grains – fall on stigma – move down to ovary
  - Male cells and female cells – mix together – fertilization
  - Afterwards – ovules grow – become seeds – ovary grows – become fruit
  - Fruit protects seeds – rest parts of flower – dry up and fall off
- All seeds – germinate – suitable conditions – produce new plants