Unit-2
The leaf too has to say
EVS
Class- 4

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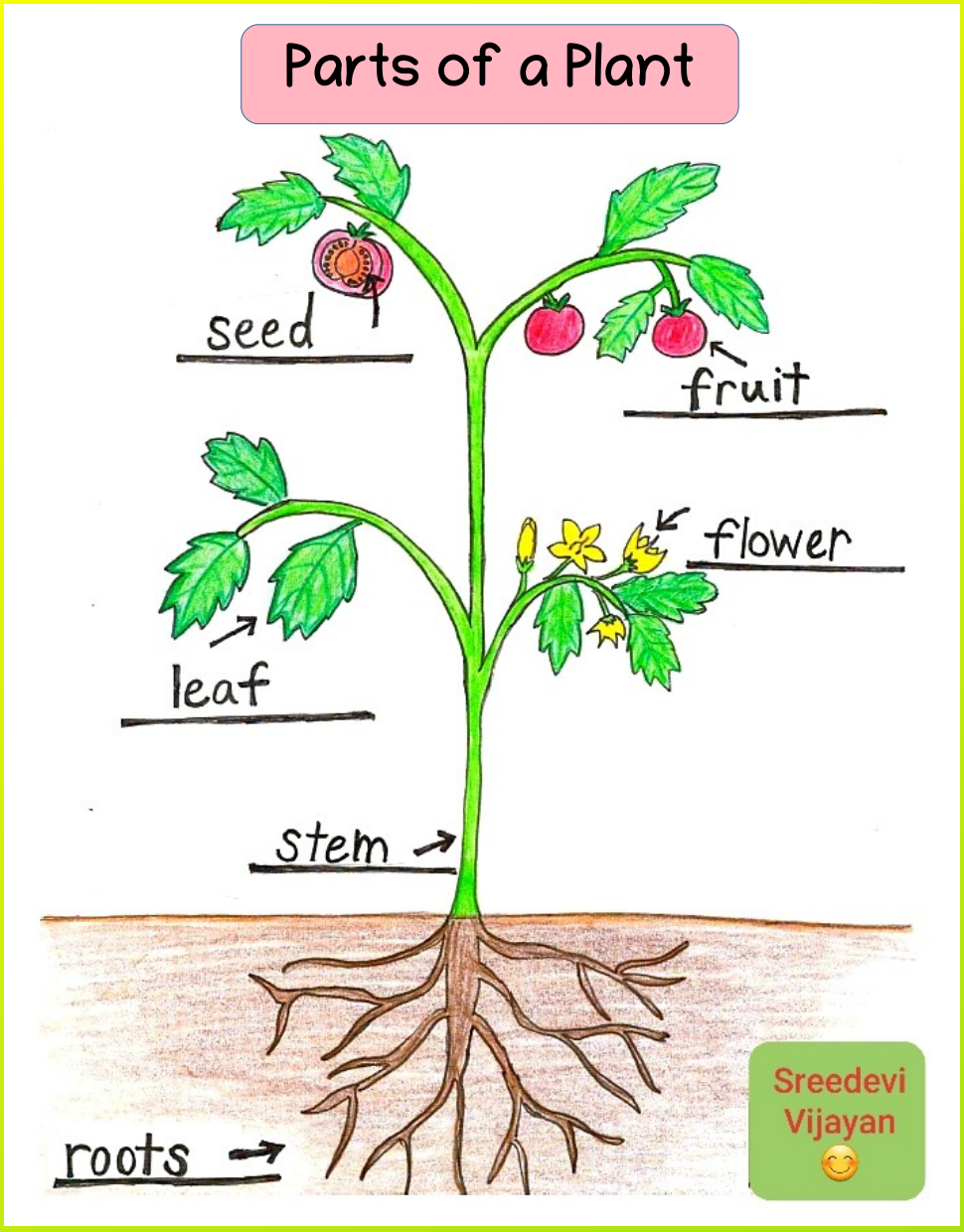
Parts of a Plant



- **Root :** Fix the plant firmly in the soil.
  Absorbs water and minerals from the soil.
- **Stem :** Supports the plant.
  Transports absorbed water and minerals to different parts.
- **Leaf :** Prepares food for the plant by photosynthesis.
- **Flower :** Helps in reproduction.
- **Fruit :** Protects the seed :
- **Seed :** Helps in the germination of new plant.

Roots - Two types

Tap root

Fibrous root

The root system consisting of a large tap root that arises from the base of the stem and small branches growing from it is called **tap root system**

The root system consisting of a cluster of similar roots growing from the base of the stem is called **fibrous root system**

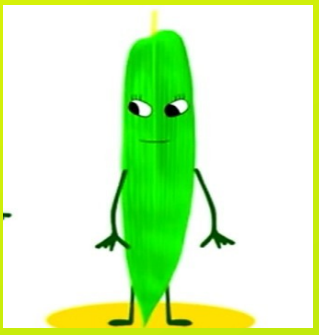
Difference between taproot system & fibrous root system

Tap root system	Fibrous root system
	
• There is a main root (tap root).	• There is no main root.
• The main root grows from the base of the stem and large number of small roots (branch roots) grow from the main root.	• All the roots grow from the base of the stem and there is no branch root .
• The main root is thick and long.	• All roots are thin and they are of same size.
• It grows deep into the soil.	• It doesn't grow deep into the soil.
• It is difficult to uproot.	• It is easy to uproot.
• **Examples :** Roots of Mango tree, Neem tree, Banyan tree, Jack tree, Tamarind tree, Teak, Tulsi, Brinjal, Papaya, Carrot, Beetroot, Chilly, Mustard, Groundnut, Coriander, Pea, Turnip. Jasmine, Hibiscus, Rose...	• **Examples :** Roots of Coconut tree, Arecanut tree, Palm tree, Date palm tree, Sugarcane, Bamboo, Grass, Banana Plant, Paddy, Wheat, Maize, Millet, Onion, Ginger, Corn, Garlic, Yam,Turmeric,Ramacham

Venation in leaves – Two types

Reticulate Venation

Parallel Venation



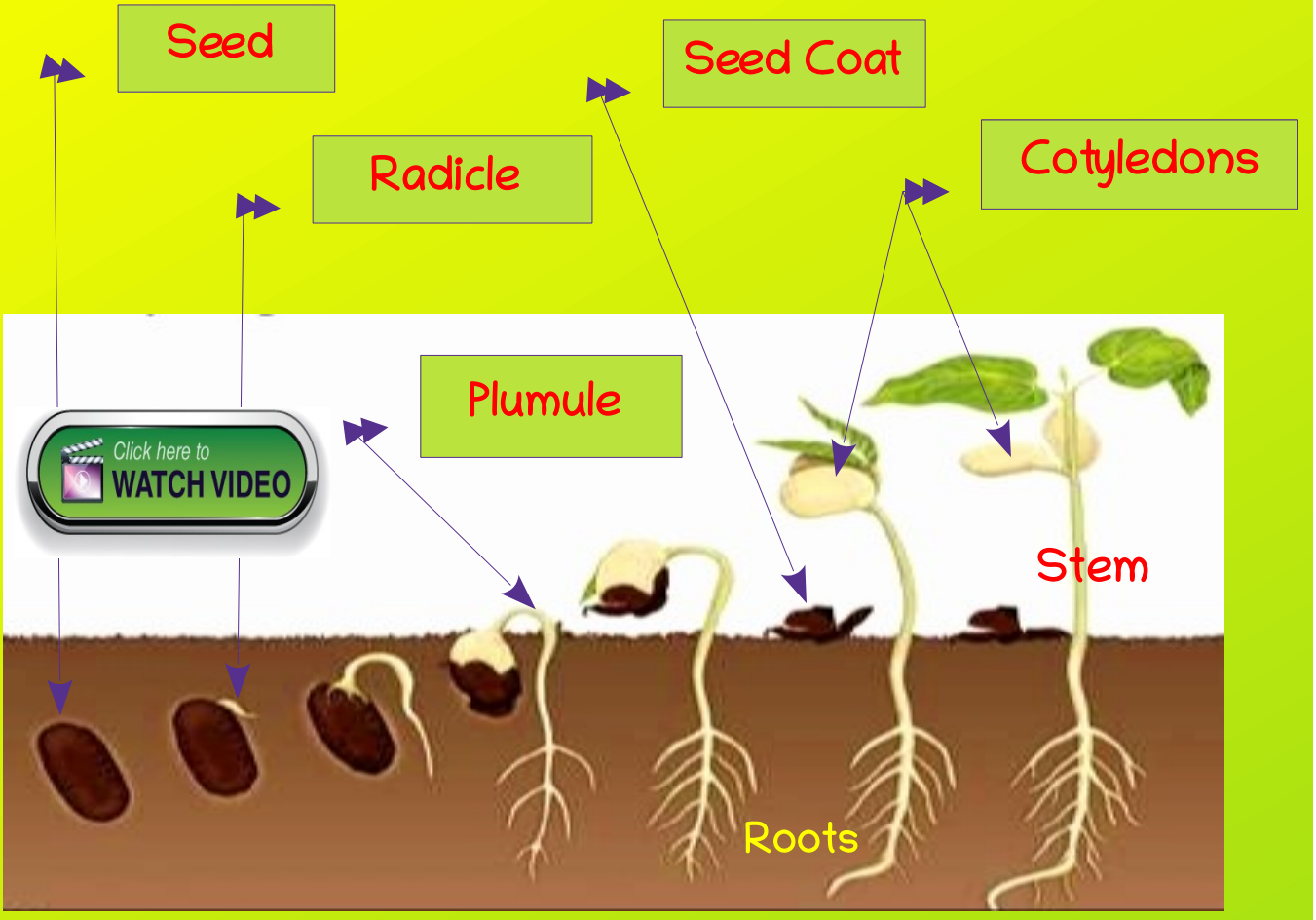
The network-like venation in leaves is called reticulate venation

The parallel arrangement of veins in leaves is called parallel venation

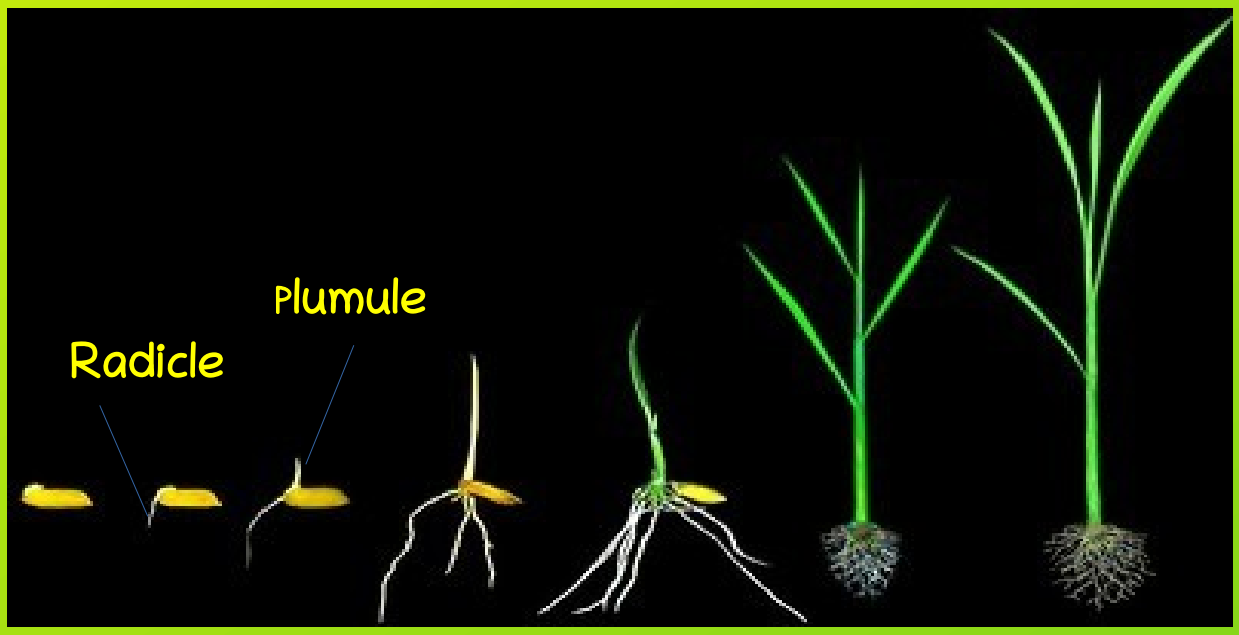
Difference between reticulate venation & parallel venation

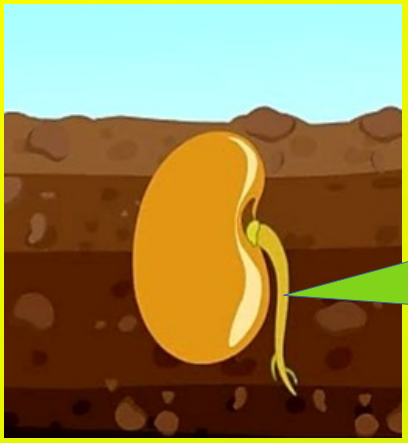
Reticulate Venation	Parallel Venation
	
• There is a main vein.	• There is no main vein.
• The main vein in the middle of the leaf, starts from the stalk and ends at the tip.	• All the veins start from the leaf stalk and join at the tip.
• Network-like arrangement of veins.	• Parallel arrangement of veins.
• It is difficult to tear the leaves.	• It is easy to tear the leaf.
• Leaves are generally short and broad.	• Leaves are generally long and narrow.
• **Examples:** Leaves of Mango tree, Neem tree, Banyan tree, Jack tree, Tamarind tree, Teak, Tulsi, Brinjal, Pea, Papaya, Carrot, Beetroot, Chilly, Mustard, Turnip, Rose Coriander, Hibiscus, Jasmine,Groundnut...	• **Examples:** Leaves of Coconut tree, Arecanut tree, Palm tree, Date palm tree, Bamboo, Grass, Banana Plant, Paddy, Wheat, Maize, Millet, Onion, Ginger, Garlic, Turmeric, Yam, Sugarcane,Ramacham,...

Different stages of germination of a pea seed



Different stages of germination of a paddy grain



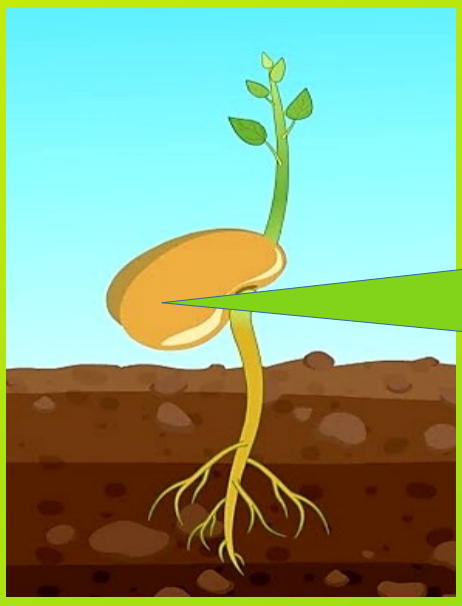


Radicle

The part that comes out **first** from the seed is called **radicle.** The radicle grows **downwards** and forms the **root** of the plant.

Plumule

The part that comes out **second** from the seed is called **plumule.** The plumule grows **upwards** and forms the **stem** of the plant.



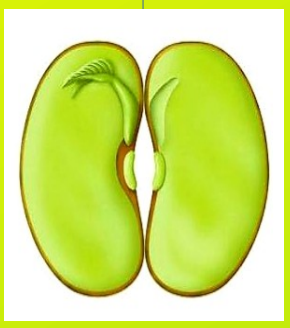
Cotyledons

The **thick leaf-like part** seen in the plumule is called the **cotyledon.** The cotyledon **stores the food** required **for the germination** of a seed.

Plants – Two types

Monocots

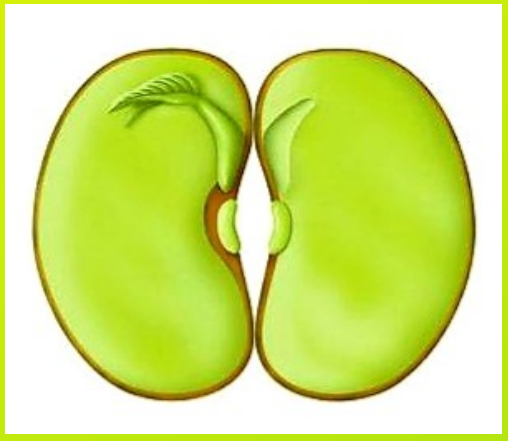
Dicots



Plants having only one cotyledon are called **monocotyledonous plants (Monocots)**

Plants having two cotyledons are called **dicotyledonous plants (Dicots)**

Difference between monocots & dicots

Monocotyledonous Plants (Monocots)	Dicotyledonous Plants (Dicots)
	
• Have only one cotyledon.	• Have two cotyledons.
• Have parallel venation in leaves.	• Have reticulate venation in leaves.
• Have fibrous root system.	• Have tap root system.
• The outer part of the stem is harder.	• The inner part of the stem is harder.
• **Examples :** Coconut tree, Arecanut tree, Palm tree, Date palm tree, Bamboo, Grass, Banana Plant, Paddy, Wheat, Maize, Millet, Yam, Onion, Ginger, Garlic, Turmeric, Sugarcane, Ramacham,...	• **Examples :** Mango tree, Neem tree, Banyan tree, Jack tree, Tamarind tree, Teak, Tulsi, Brinjal, Mustard, Papaya, Carrot, Turnip, Beetroot, Chilly, Rose Coriander, Hibiscus, Ixora Jasmine,Groundnut,Pea,..

Plant	Root System	Venation	No. of Cotyledons
Ramacham	Fibrous root	Parallel venation	1
Groundnut	Tap root	Reticulate venation	2
Arecanut tree	Fibrous root	Parallel venation	1
Mango tree	Tap root	Reticulate venation	2
Coconut tree	Fibrous root	Parallel venation	1
Teak	Tap root	Reticulate venation	2
Date Palm tree	Fibrous root	Parallel venation	1
Tulsi	Tap root	Reticulate venation	2
Paddy	Fibrous root	Parallel venation	1
Jack tree	Tap root	Reticulate venation	2
Grass	Fibrous root	Parallel venation	1
Banyan tree	Tap root	Reticulate venation	2
Wheat	Fibrous root	Parallel venation	1
Chilly	Tap root	Reticulate venation	2
Palantain (Banana Plant)	Fibrous root	Parallel venation	1
Hibiscus	Tap root	Reticulate venation	2
Palm tree	Fibrous root	Parallel venation	1
Pea	Tap root	Reticulate venation	2
Bamboo	Fibrous root	Parallel venation	1
Tamarind tree	Tap root	Reticulate venation	2
Garlic	Fibrous root	Parallel venation	1
Beetroot	Tap root	Reticulate venation	2
Maize (Corn)	Fibrous root	Parallel venation	1
Mustard	Tap root	Reticulate venation	2
Yam	Fibrous root	Parallel venation	1
Brinjal	Tap root	Reticulate venation	2
Onion	Fibrous root	Parallel venation	1
Carrot	Tap root	Reticulate venation	2
Millet	Fibrous root	Parallel venation	1
Papaya	Tap root	Reticulate venation	2
Sugarcane	Fibrous root	Parallel venation	1
Jasmine	Tap root	Reticulate venation	2
Ginger	Fibrous root	Parallel venation	1
Turnip	Tap root	Reticulate venation	2

Project - Format

Germination of Seed - Different stages of Growth

- **Introduction :** There are different types of plants around us. They all differ in their root system, venation and the number of cotyledons. Here, I am doing this project to find, whether there is any relationship between the root system, venation and the number of cotyledons in plants.

- **Problem faced :** Is there any relationship between venation, root system, and the number of cotyledons in plants?

- **My guess :** There is a relation between root system, venation and the number of cotyledons in plants.

- **Materials required :** Open necked glass tumblers, cotton, paper & seeds (I took 6 different types of seeds such as green gram, paddy, pea, wheat, mustard & maize)

- **Procedure :** Fold the paper and place it inside the glass tumbler.

  Place wet cotton between the tumbler and the paper.

  Place soaked seeds inside the cotton.

  Keep the cotton moist, everyday.

- **My observations :** (Findings)

  I observed the different stages of germination of these seeds, everyday. The part called radicle came out first from the seed . The part called plumule came out next from the seed. Also, I could see that the radicle grew downwards and formed the root of the plant . The plumule grew upwards and formed the stem of the plant. A thick leaf like part called cotyledon was seen in each germinating seed.

  At the same time , I noticed that some seeds have only one cotyledon and some others have two cotyledons. I also noticed that their root system and venation in leaves also differ. Some of them have a thick tap root and network-like venation in leaves. Some others have a cluster of thin fibrous like roots and parallel venation in leaves.

• Analysis Table :

Sl.No	Name of the Seed	Tap Root	Fibrous Root	Reticulate Venation	Parallel Venation	Two Cotyle-dons	One Cotyle-don
1	Green Gram	✔		✔		✔	
2	Paddy		✔		✔		✔
3	Pea	✔		✔		✔	
4	Wheat		✔		✔		✔
5	Mustard	✔		✔		✔	
6	Maize		✔		✔		✔

• Conclusion/ Result :

My guess and findings are the same.

There is a relation between root system venation and the number of cotyledons in plants.

* Plants with one cotyledon, that is monocots, have fibrous root system and parallel venation in leaves.
* Plants with two cotyledons, that is dicots, have tap root system and reticulate venation in leaves.

Plants

Monocots

Parallel Venation

Fibrous root

Coconut tree, Arecanut tree, Palm tree, Date palm tree, Bamboo, Grass, Banana Plant, Paddy, Wheat, Maize, Millet, Onion, Ginger, Garlic, Turmeric, Yam, Sugarcane, Aloevera Ramacham...

Dicots

Reticulate Venation

Tap root

Mango tree, Neem tree, Banyan tree, Jack tree, Tamarind tree, Teak, Tulsi, Brinjal, Pea, Papaya, Carrot, Beetroot, Chilly, Mustard, Turnip, Coriander, Hibiscus, Jasmine, Ixora, Rose, Groundnut..

EVS – Std 4
The leaf too has to say
ഇലയ്ക്കുമുണ്ട് പറയാൻ

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വിക്ടർ ചാനലിലെ ക്ലാസുകൾ കാണാൻ ഇവിടെ ക്ലിക്ക് ചെയ്യുക

Class 1

Class 2

Class 3

Class 4

Class 5

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Thank you!