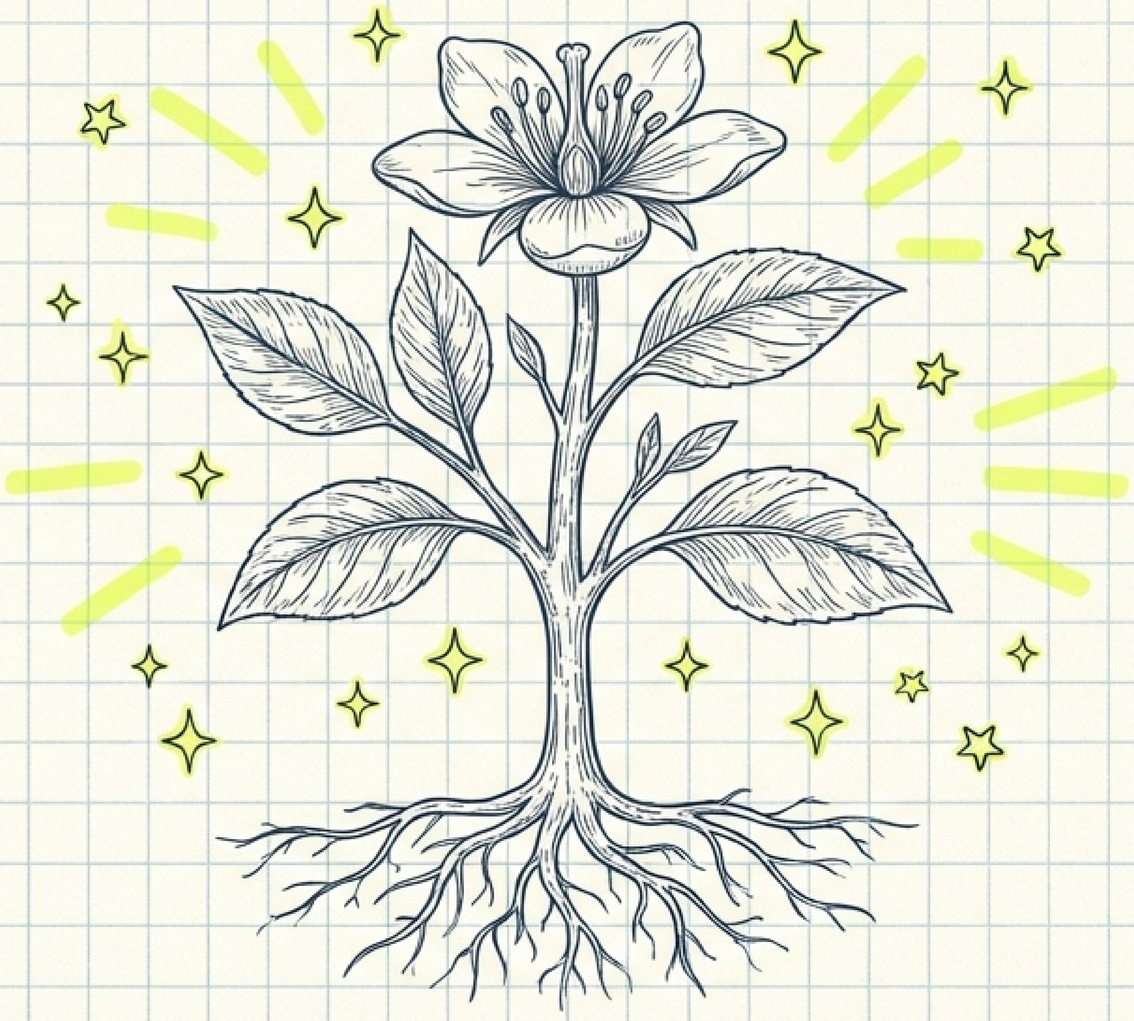
Plant Biology Study Notes

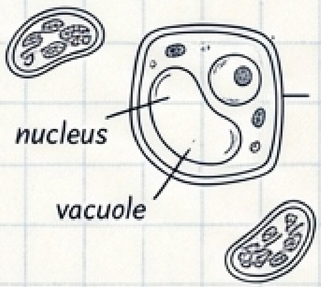
Kingdom Plantae: Structure, Function, & Identity



Key Concepts: Structure & Function

Profile: Kingdom Plantae

IDENTITY CARD



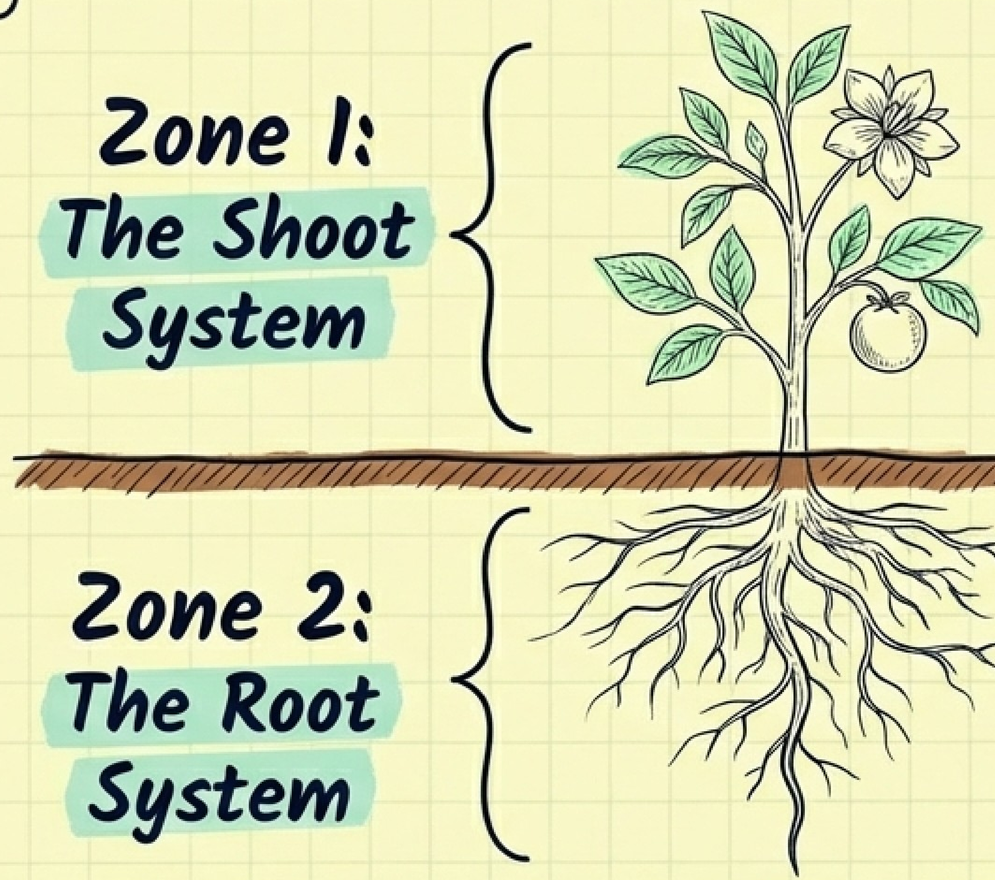
- ☑ **Type:** Multicellular Organisms
- ☑ **Diet:** Autotrophic (Prepare their own food)
- ☑ **Key Feature:** Contain Chlorophyll (Green pigment)
- ☑ **Structure:** Have a rigid Cell Wall

Summary: Essential for life on Earth; providers of Oxygen and Food.

Anatomy: The Two Main Systems

Zone 1: The Shoot System

- Grows above the soil
- Parts: Stem, Leaves, Flower, Fruit



Soil Level

Zone 2: The Root System

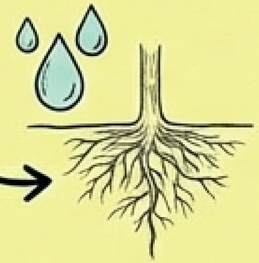
- Grows **below** the soil
- **Parts:** Primary & secondary roots

Patrick Hand: System Functions

ROOT System

Kalam

- **Anchorage:** Holds the plant firmly in the ground.
- **Absorption:** Intakes water and minerals.

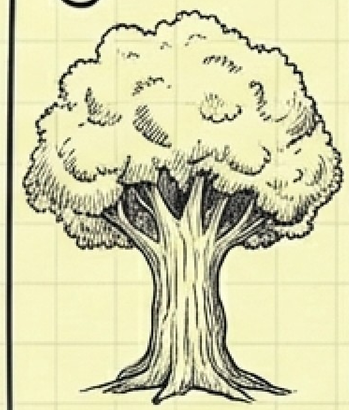


SHOOT System

Kalam

- **Photosynthesis:** Making food.
- **Reproduction:** Producing flowers and seeds.

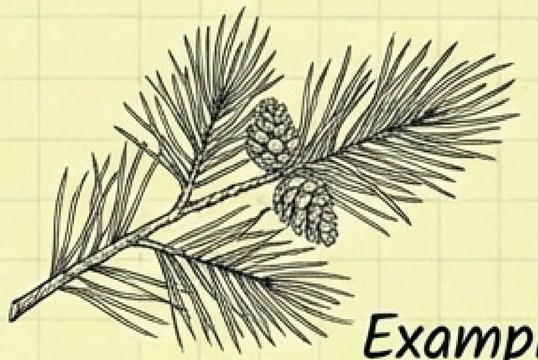
Growth Habits: Shapes & Stems

				
Trees	**Shrubs**	**Herbs**	**Climbers**	**Creepers**
Tall, strong trunk. (e.g., Mango, Neem)	Medium height, bushy. (e.g., Rose)	Small, soft stem. (e.g., Mint)	Weak stem, needs support. (e.g., Money plant)	Spread on ground. (e.g., Pumpkin)

Shape helps plants survive in their specific habitat!

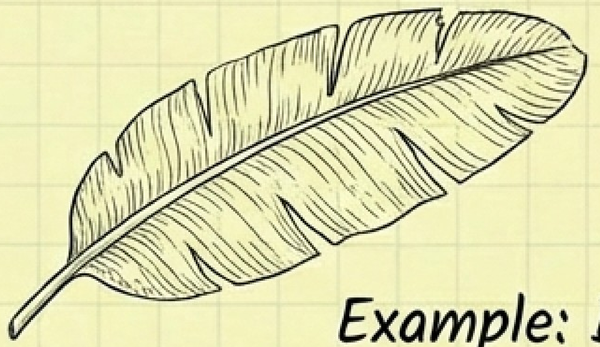
Patrick Hand: Leaf Morphology

Needle-like



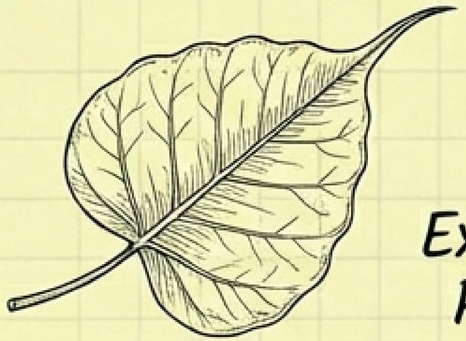
Example: Pine

Broad Leaves



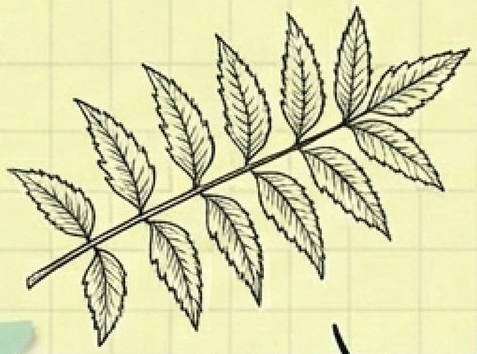
Example: Banana

Heart-shaped



Example: Peepal

Compound Leaves

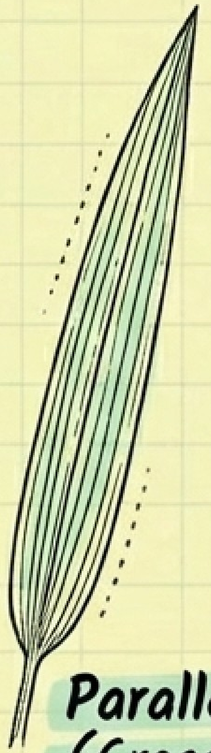


Example: Neem

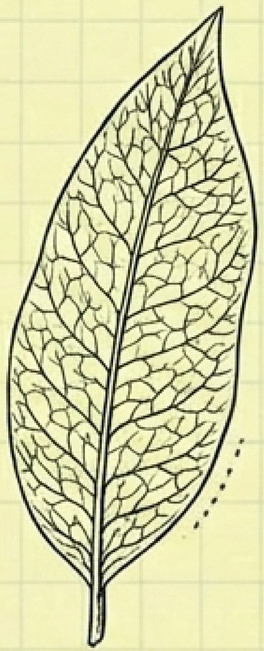
Leaf shape affects sunlight absorption and water loss.

Patrick Hand: Patterns in Nature

Venation (Veins)



Parallel (Grass)



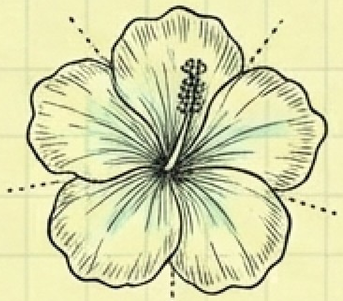
Reticulate (Mango)

Arrangement (On Stem)

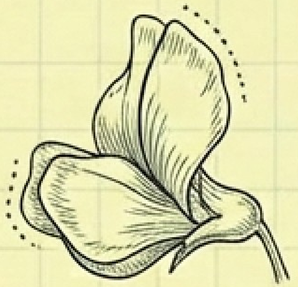
Alternate

Opposite

Flower Symmetry



Radial (Symmetrical)

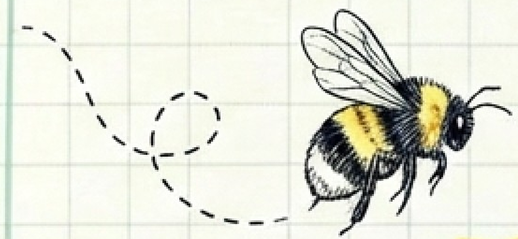


Bilateral (Mirror Image)

The Palette of Plants

Why so colorful?

Most plants are green due to Chlorophyll. However, flowers use color to attract insects for pollination.



Red: Rose

Yellow: Sunflower

Purple: Lavender

Orange: Marigold

Photosynthesis: The Food Recipe

The process by which plants make food.
Location: Leaves (inside Chloroplasts).

Recipe Equation

Ingredients

Carbon Dioxide (CO_2)

+

Water (H_2O)

Sunlight

Chlorophyll

Product

Glucose (Food)

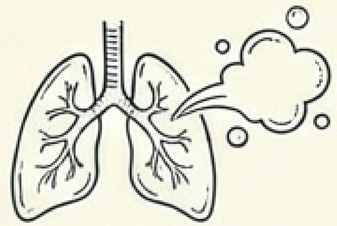
+

Oxygen (O_2)

Why We Need Plants

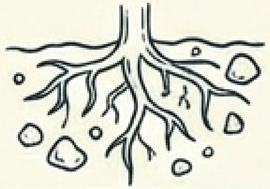
Ecological Balance

Provide Oxygen



Medicine & Wood

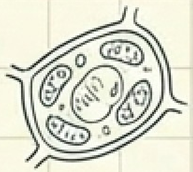
Prevent Soil Erosion



Provide Food

Test Yourself (Part 1)

1. Which pigment gives green color to plants?
   a) Hemoglobin c) Melanin
   b) Chlorophyll d) Starch



b) Chlorophyll ✓

2. Which plant is a climber?
   a) Mango c) Money plant
   b) Rose d) Neem

c) Money plant ✓

3. Which type of venation is found in grass?
   a) Reticulate c) Net
   b) Parallel d) Spiral

✓ b) Parallel

Test Yourself (Part 2)

4. Photosynthesis occurs in:
   a) Root
   b) Stem
   c) Leaf
   d) Flower

c) Leaf ✓

5. Which plant has needle-like leaves?
   a) Pine
   b) Banana
   c) Mango
   d) Peepal

a) Pine ✓

Quick Revision Summary

Category	Key Concepts
Identity	Kingdom Plantae, Autotrophic, Cell Walls.
Systems	Root (Anchorage/Absorption) vs. Shoot (Photosynthesis/Reproduction).
Shapes	Herbs (Mint), Shrubs (Rose), Trees (Mango), Climbers (Money Plant), Creepers (Pumpkin).
Leaves	Pine (Needle), Banana (Broad). Venation: Parallel (Grass) vs. Reticulate (Mango).
Process	Photosynthesis: CO2 + Water + Sun = Food + Oxygen. Occurs in Chloroplasts.