These notes explain the **why** behind every concept, not just the what. They include **analogies**, **real-life examples**, and explanations of **common mistakes**. Use these alongside your revision notes for full understanding.

Topic 6 Plant Structures — Marvels of Engineering

Plants are extraordinarily sophisticated organisms. They cannot move to find food, water or mates — yet they have evolved ingenious structural and chemical solutions to every challenge they face.

The Leaf — A Solar Panel and Chemical Factory Combined

The leaf's cross-section reveals how perfectly it is designed for photosynthesis. The transparent epidermis lets light through. The palisade cells just below, packed with chloroplasts, catch as much light as possible. The spongy mesophyll has air spaces for CO■ to diffuse to the palisade cells. The stomata in the lower epidermis allow gas exchange.

■ **Why does this happen?** Why are stomata mainly on the underside of leaves? The upper surface receives direct sunlight and gets hot — if stomata were on top, water would evaporate much faster. On the cooler underside, water loss is reduced. Some desert plants have stomata sunk into pits, with hairs above them — further reducing water loss.

Plant Hormones — Invisible Directors of Growth

Auxin is produced at the very tip of shoots. It moves away from bright light to the shaded side. On the shaded side, high auxin concentration causes cells to elongate more than on the light side. This differential elongation causes the shoot to bend towards the light — phototropism.

■ ***Think of it like this:*** *Auxin is like a promoter for cell elongation. More auxin = more elongation. If you have more promoter on the left side of the shoot, the left side grows longer, bending the whole shoot to the right.*

Photosynthesis	Light energy + CO■ + H■O → glucose + O■ — occurs in chloroplasts
Limiting factor	The factor in shortest supply that controls the rate of photosynthesis
Transpiration	Evaporation of water from leaf stomata — drives water up xylem
Translocation	Transport of sugars in phloem from leaves to rest of plant
Auxin	Plant hormone controlling directional growth responses (tropisms)
Tropism	Growth response to a directional stimulus (light = phototropism, gravity = gravitropism)