*This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.*

Transpiration drives water transport in plants. Plant hormones control growth responses to environmental stimuli.

Required Practical: Investigating transpiration rate — potometer at different conditions.

- Transpiration: water evaporates from leaves through stomata → pulls water up xylem from roots
- Rate increased by: higher temperature, more light, lower humidity, more wind
- Guard cells: turgid = stomata open (light conditions); flaccid = stomata close (water stress)
- ★ **HT** Auxins: produced in shoot tips, promote elongation, cause phototropism and gravitropism
- ★ **HT** Phototropism: auxin accumulates on shaded side → cells elongate more → shoot curves to light
- ★ **HT** Gibberellins: promote germination and stem elongation. Ethene: promotes fruit ripening
- ★ **HT** Commercial uses: rooting powder (auxins), weedkillers (auxins), gibberellins for fruit size

Key Terms

Transpiration	Evaporation of water from leaves — drives water movement in xylem
Auxin	Plant hormone controlling directional growth responses
Phototropism	Growth response to light direction — shoot bends towards light

■ **Exam Tip:** Auxin in shoots: promotes growth. Auxin in roots: inhibits growth. This is why roots grow DOWN (auxin on lower side = less growth below = root curves down).