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

Carbon cycles continuously between the atmosphere, living organisms, soil and oceans. The same carbon atoms have been recycled for billions of years.

- ONLY photosynthesis removes CO■ from the atmosphere (fixes carbon into organic molecules).
- Respiration (all organisms): releases CO■ back into the atmosphere.
- Decomposition: decomposers (bacteria and fungi) break down dead organisms → release CO■ by respiration.
- Combustion (burning): releases stored carbon rapidly as CO■ (wood, fossil fuels).
- Feeding: carbon passes along food chain as organisms eat one another.
- Fossil fuels: formed over millions of years from dead organisms. Burning releases ancient carbon not recently in the cycle.

★ **HT** Ocean absorption: CO■ dissolves in seawater → absorbed by marine organisms → shells form calcium carbonate (limestone) → carbon locked in rock.

★ **HT** Carbon is stored in: atmosphere (CO■), living organisms, soil, oceans, fossil fuels, limestone rock.

Key Terms

Photosynthesis	The ONLY process that removes CO■ from the atmosphere — converts it to glucose
Respiration	Chemical process releasing CO■ from organic molecules — in all living organisms
Decomposition	Breakdown of dead organic matter by decomposers — releases CO■ and mineral ions
Combustion	Burning of organic material — rapidly releases stored carbon as CO■
Carbon sink	A reservoir that absorbs more carbon than it releases — e.g. forests, oceans

■ **Exam Tip:** The most common mistake: saying that plants remove CO■ from the atmosphere by respiration. NO — respiration ADDS CO■. Only PHOTOSYNTHESIS removes it. Also: decomposition and combustion are separate processes — both release CO■.