

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

Respiration releases energy from glucose. All living organisms respire continuously.

- Aerobic: glucose + oxygen → CO<sub>2</sub> + water (+energy as ATP) — in mitochondria
- Anaerobic (animals): glucose → lactic acid (+small energy)
- Anaerobic (yeast/plants): glucose → ethanol + CO<sub>2</sub> (+small energy) = fermentation
- Aerobic releases FAR more energy than anaerobic
- Oxygen debt: extra O<sub>2</sub> after exercise to break down lactic acid

### Key Terms

<b>Aerobic respiration</b>	Uses oxygen, produces lots of ATP, in mitochondria
<b>Fermentation</b>	Anaerobic respiration in yeast — ethanol + CO <sub>2</sub>
<b>Oxygen debt</b>	Extra oxygen needed after anaerobic exercise to break down lactic acid

■ **Exam Tip:** Aerobic = lots of energy. Anaerobic = little energy. Animals: lactic acid. Yeast: ethanol + CO<sub>2</sub>. Know both equations.