

## KEY FACTS

- During exercise: heart rate + breathing rate increase → deliver O<sub>2</sub>, remove CO<sub>2</sub>
- Vasodilation: blood vessels to muscles widen → increased blood flow
- Intense exercise: anaerobic respiration → lactic acid accumulates
- After exercise: elevated breathing repays OXYGEN DEBT (breaks down lactic acid in liver)
- ★ Fitter people: recover faster, lower resting heart rate, larger stroke volume

## EQUATIONS / FORMULAS

**Cardiac output** ★:  $\text{Heart rate} \times \text{Stroke volume (cm}^3/\text{min)}$

## KEY TERMS

<b>Vasodilation</b>	Widening of blood vessels — increases blood flow to muscles during exercise
<b>Oxygen debt</b>	Extra O <sub>2</sub> needed after anaerobic exercise to break down lactic acid
<b>Cardiac output</b>	Volume of blood pumped per minute = heart rate × stroke volume

■ EXAM TIP: Post-exercise heavy breathing ≠ "muscles still need oxygen." It is specifically to repay the oxygen debt — to remove lactic acid. Use this terminology.