Higher Tier — Separate Science

Full Higher Separate content. ★ = Higher Tier. ◆ = Separate Science only.

Q1. Explain why heart rate and breathing rate increase during exercise.

[3 marks]

Q2. A sprinter finishes a 100m race and continues breathing heavily for several minutes. Explain this using the term oxygen debt.

[3 marks]

★ HIGHER TIER

Q3. ★ Explain why a fitter person recovers faster after exercise than an unfit person.

[2 marks]

Total: 8 marks

Q1 (3 marks)

Explain why heart rate and breathing rate increase during exercise.

- Muscles need more O■ for increased aerobic respiration [1]
- More CO■ is produced as a waste product of respiration — must be removed [1]
- Increased heart rate and breathing rate deliver more O■ and remove CO■ more quickly [1]

Q2 (3 marks)

A sprinter finishes a 100m race and continues breathing heavily for several minutes. Expla…

- During sprint, muscles switched to anaerobic respiration — lactic acid accumulated [1]
- Extra oxygen needed after the race to break down lactic acid (convert to glucose in liver) [1]
- This extra O■ requirement = oxygen debt; continued heavy breathing supplies the extra O■ [1]

Q3 (2 marks) [★ HT]

★ Explain why a fitter person recovers faster after exercise than an unfit person.

- Fitter person has more efficient cardiovascular and respiratory systems [1]
- Can deliver more O■ more quickly to repay oxygen debt faster / lower resting heart rate / larger stroke volume [1]