

GCSE Combined Science: Trilogy

Worksheet: Coronary heart disease: a non-communicable disease

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Coronary heart disease: a non-communicable disease

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Coronary heart disease is a non-communicable disease.

0 1 . 1

Which statement describes what happens in coronary heart disease?

Tick (✓) **one** box.

- Layers of fatty material build up inside the coronary arteries.
- The heart valves become too large.
- Red blood cells stick together in the veins.
- The pacemaker cells stop working.

[1 mark]

0 1 . 2

Name the device that is used to keep a coronary artery open.

.....

.....

.....

[1 mark]

0 1 . 3

Name the type of drug that is used to reduce the concentration of cholesterol in the blood.

.....

.....

.....

.....

[1 mark]

0 1 . 4

Faulty heart valves can be replaced.
Give the **two** types of replacement valve.

.....

.....

.....

.....

[2 marks]

0 2

Coronary heart disease (CHD) is a non-communicable disease.

0 2 . 1

The statements describe how CHD can lead to a heart attack. They are not in the correct order.

- A** Less blood flows through the coronary arteries.
 - B** Layers of fatty material build up inside the coronary arteries.
 - C** The heart muscle does not get enough oxygen.
 - D** The coronary arteries become narrower.
- Write the letters in the correct order.

.....

.....

.....

.....

[2 marks]

0 2 . 2

Which blood vessels become narrower in CHD?

Tick (✓) **one** box.

Aorta

☐

Coronary arteries

☐

Pulmonary veins

☐

Vena cava

☐

[1 mark]

0 2 . 3

Statins are drugs used to reduce the risk of CHD.

Name the substance in the blood that statins reduce.

.....

.....

.....

[1 mark]

0 2 . 4

Give **one** lifestyle factor that increases the risk of CHD.

.....

.....

[1 mark]

0 3

A patient has coronary heart disease. The lumen of a healthy coronary artery has a diameter of 4.5 mm. In the patient's narrowed artery, the diameter of the lumen is 2.7 mm.

0 3 . 1

Calculate the percentage decrease in the diameter of the lumen.

.....

.....

.....

.....

Percentage decrease = %

[2 marks]

0 3 . 2

Explain how the narrowed artery could damage the heart muscle.

.....

.....

.....

.....

.....

.....

[3 marks]

0 3 . 3

Name the device that doctors can put into the artery to keep it open.

.....

.....

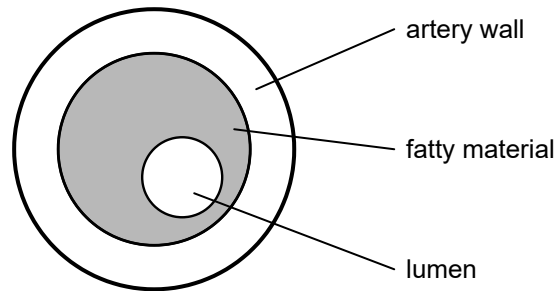
.....

.....
[1 mark]

0 4

Figure 1 shows a cross-section of a coronary artery from a person with coronary heart disease. The lumen of a healthy coronary artery has a diameter of 4.0 mm. The lumen of the artery in Figure 1 has a diameter of 1.6 mm.

Figure 1



0 4 . 1

Calculate the percentage decrease in the diameter of the lumen.

.....

.....

.....

.....

Percentage decrease = %

[2 marks]

0 4 . 2

Calculate the percentage decrease in the cross-sectional area of the lumen.

Area of a circle = πr^2

.....

.....

.....

.....

Percentage decrease = %

[3 marks]

0 4 . 3

Explain why a person with this narrowed artery may get chest pain when they exercise.

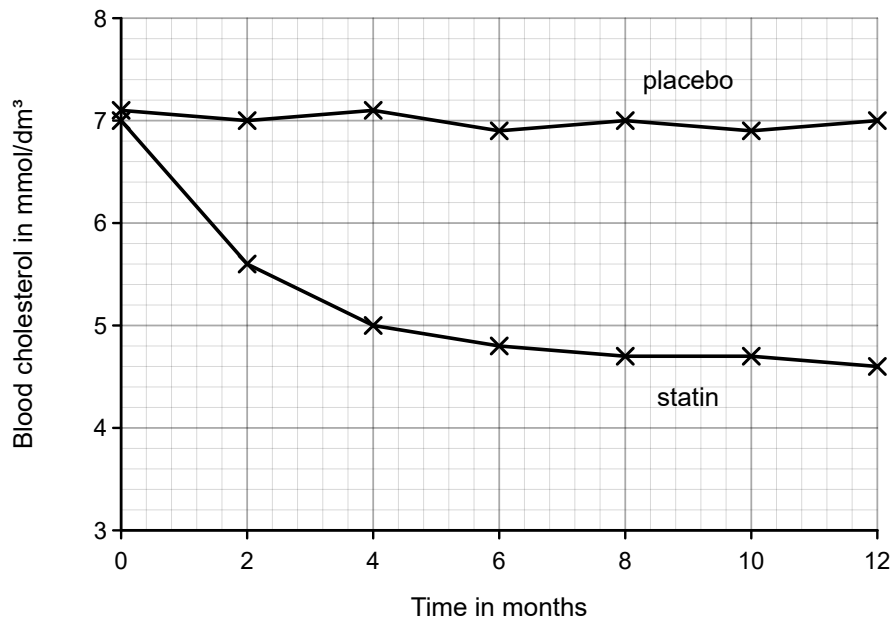
[3 marks]

0 5

In a trial, 400 people with high blood cholesterol were split into two groups of 200. One group took a statin every day. The other group took a placebo, a tablet containing no drug.

Figure 2 shows the mean blood cholesterol concentration of each group over 12 months.

Figure 2



0 5 . 1

Describe the effect of the statin on the mean blood cholesterol concentration. Use data from Figure 2 in your answer.

.....

.....

.....

.....

[2 marks]

0 5 . 2

Calculate the percentage decrease in the mean cholesterol concentration of the statin group over the 12 months.

.....

.....

.....

.....

Percentage decrease = %

[2 marks]

0 5 . 3

Explain why one group was given a placebo.

.....

.....

[1 mark]

0 5 . 4

Suggest why the trial lasted for 12 months rather than 1 month.

.....

.....

[1 mark]

0 5 . 5

Suggest why the trial used a large number of people.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Coronary heart disease: a non-communicable disease · 31 marks

Question 1 (5 marks)

01.1 [1 mark]

Correct: Layers of fatty material build up inside the coronary arteries.

01.2 [1 mark]

Answer: stent

- stent (1)
-

01.3 [1 mark]

Answer: statins

- statin(s) (1)
-

01.4 [2 marks]

- biological (valve) (1)
 - mechanical (valve) (1)
-

Question 2 (5 marks)

02.1 [2 marks]

Answer: B, D, A, C

- B, D (in this order) first (1)
 - A, C (in this order) last (1)
-

02.2 [1 mark]

Correct: Coronary arteries

02.3 [1 mark]

Answer: cholesterol

- cholesterol (1)
-

02.4 [1 mark]

- smoking / a diet high in (saturated) fat / lack of exercise / obesity (1)

Notes: Allow high blood pressure / high blood cholesterol.

Question 3 (6 marks)

03.1 [2 marks]

Answer: 40%

- $(4.5 - 2.7) \div 4.5 \times 100$ (1)
 - 40 (%) (1)
-

03.2 [3 marks]

- less blood flows through the artery to the heart muscle (1)
 - so the heart muscle receives less oxygen (1)
 - so less aerobic respiration takes place and the muscle cells may be damaged / die (heart attack) (1)
-

03.3 [1 mark]

Answer: stent

- stent (1)
-

Question 4 (8 marks)

04.1 [2 marks]

Answer: 60%

- $(4.0 - 1.6) \div 4.0 \times 100$ (1)
 - 60 (%) (1)
-

04.2 [3 marks]

Answer: 84%

- healthy lumen: $\pi \times 2.0^2 = 12.6$ (mm²) (1)
- narrowed lumen: $\pi \times 0.8^2 = 2.0$ (mm²) (1)
- $(12.6 - 2.0) \div 12.6 \times 100 = 84$ (%) (1)

Notes: Using diameters instead of radii gives the same percentage and scores 3 marks if the working is correct otherwise.

04.3 [3 marks]

- less blood / oxygen flows to the heart muscle (1)
 - during exercise the heart beats faster, so the heart muscle needs more oxygen for aerobic respiration (1)
 - so the heart muscle does not get enough oxygen (and respire anaerobically / may be damaged) (1)
-

Question 5 (7 marks)

05.1 [2 marks]

- the concentration fell from 7.0 to 4.6 mmol/dm³ (in the statin group), while the placebo group stayed at about 7.0 mmol/dm³ (1)
- most of the fall happened in the first 4 months / it then levelled off (1)

05.2 [2 marks]

Answer: 34%

- $(7.0 - 4.6) \div 7.0 \times 100$ (1)
- 34 (%) (1)

05.3 [1 mark]

- as a control, to show that the fall in cholesterol was caused by the statin (and not by other factors) (1)

05.4 [1 mark]

- the cholesterol concentration took several months to fall / to find out whether the effect lasts / to detect side effects that take time to appear (1)

05.5 [1 mark]

- to reduce the effect of variation between individuals / so the results are more representative / so that rare side effects are more likely to be found (1)
-