

GCSE Combined Science: Trilogy

Worksheet: The heart and blood vessels

TIME 30 min	TOTAL 29 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: The heart and blood vessels

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

Kofi counted the number of pulse beats in 15 seconds three times while resting. The counts were 17, 16 and 18.

0 1 . 1

Calculate Kofi’s mean resting heart rate in beats per minute.

.....

.....

.....

.....

Heart rate = beats per minute

[2 marks]

0 1 . 2

A doctor recorded the heartbeat of a different person. The time between one heartbeat and the next was 0.6 s.
Calculate this person's heart rate in beats per minute.

.....

.....

.....

.....

Heart rate = beats per minute

[2 marks]

0 2

The heart pumps blood around the body.

0 2 . 1

Which chamber of the heart pumps blood to the lungs?
Tick (✓) **one** box.

- | | |
|-----------------|--------------------------|
| Left atrium | ☐ |
| Left ventricle | ☐ |
| Right atrium | ☐ |
| Right ventricle | ☐ |

[1 mark]

0 2 . 2

Name the blood vessel that carries blood from the heart to the rest of the body.

.....

.....

.....

.....

[1 mark]

0 2 . 3

Name the blood vessel that carries blood from the body back to the heart.

.....

.....

.....

.....

[1 mark]

0 2 . 4

Name the blood vessels that supply the heart muscle with oxygen.

.....

.....

.....

.....

[1 mark]

0 2 . 5

Humans have a double circulatory system.
What does this mean?

.....

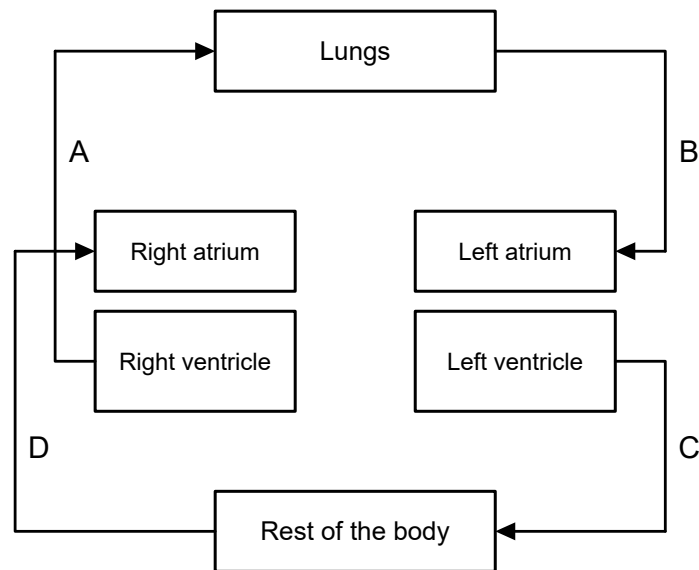
.....

[1 mark]

0 3

Figure 1 shows the double circulatory system in a human.

Figure 1



0 3 . 1

Name blood vessels **A** and **C**.

.....

.....

.....

.....

[2 marks]

0 3 . 2

Which blood vessel, **A**, **B**, **C** or **D**, carries oxygenated blood from the lungs to the heart?

.....

.....

.....

.....

[1 mark]

0 3 . 3

Which chamber of the heart has the thickest muscular wall?

Tick (✓) **one** box.

Left atrium

☐

Left ventricle

☐

Right atrium

☐

Right ventricle

☐

[1 mark]

0 3 . 4

Name the structures in the heart that stop blood flowing backwards from the ventricles into the atria.

.....

.....

.....

.....

[1 mark]

0 3 . 5

Give **one** advantage of a double circulatory system.

.....

.....

[1 mark]

0 4

Table 1 shows information about three types of blood vessel, **X**, **Y** and **Z**.

Table 1

Blood vessel	Wall	Size of lumen	Valves
X	thick, with muscle and elastic fibres	narrow	none
Y	thin	wide	present
Z	one cell thick	very narrow	none

0 4 . 1

Name blood vessels **X**, **Y** and **Z**.

.....

.....

.....

.....

.....

.....

[3 marks]

0 4 . 2

Explain why vessel **X** has a thick wall containing muscle and elastic fibres.

.....

.....

.....

.....

[2 marks]

0 4 . 3

Give the function of the valves in vessel **Y**.

.....

.....

[1 mark]

0 4 . 4

Explain how vessel **Z** is adapted for the exchange of substances with body cells.

.....

.....

.....

.....

[2 marks]

0 5

The natural resting heart rate is controlled by a group of cells called the pacemaker.

0 5 . 1

Where in the heart is the pacemaker found?

.....

.....

.....

[1 mark]

0 5 . 2

Some people have an irregular heart rate.

Explain how an artificial pacemaker can help these people.

.....

.....

.....

.....

[2 marks]

0 5 . 3

A trace of a patient's heartbeat shows that the time between one beat and the next is 0.8 s.
Calculate the patient's heart rate in beats per minute.

.....

.....

.....

.....

Heart rate = beats per minute
[2 marks]

0 5 . 4

Give **one** disadvantage of having an artificial pacemaker fitted.

.....

.....

[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: The heart and blood vessels · 29 marks

Question 1 (4 marks)

01.1 [2 marks]

Answer: 68 beats per minute

- mean = $(17 + 16 + 18) \div 3 = 17$ (1)
 - $(17 \times 4 =) 68$ (beats per minute) (1)
-

01.2 [2 marks]

Answer: 100 beats per minute

- $60 \div 0.6$ (1)
 - 100 (beats per minute) (1)
-

Question 2 (5 marks)

02.1 [1 mark]

Correct: Right ventricle

02.2 [1 mark]

Answer: aorta

- aorta (1)
-

02.3 [1 mark]

Answer: vena cava

- vena cava (1)
-

02.4 [1 mark]

Answer: coronary arteries

- coronary arteries (1)
-

02.5 [1 mark]

- blood passes through the heart twice for each complete circuit of the body / one circuit goes to the lungs and one to the rest of the body (1)
-

Question 3 (6 marks)

03.1 [2 marks]

Answer: A: pulmonary artery; C: aorta

- A – pulmonary artery (1)
 - C – aorta (1)
-

03.2 [1 mark]

Answer: B (pulmonary vein)

- B (1)
-

03.3 [1 mark]

Correct: Left ventricle

03.4 [1 mark]

Answer: valves

- valves (1)
-

03.5 [1 mark]

- blood returning from the lungs is pumped again, so it reaches the rest of the body at high pressure / oxygenated and deoxygenated blood are kept separate (1)
-

Question 4 (8 marks)

04.1 [3 marks]

Answer: X artery; Y vein; Z capillary

- X – artery (1)
- Y – vein (1)
- Z – capillary (1)

04.2 [2 marks]

- it carries blood (away from the heart) at high pressure (1)
- the thick wall withstands the pressure / the elastic fibres stretch and recoil (1)

04.3 [1 mark]

- to prevent the backflow of blood (1)

Notes: Allow 'keep blood flowing towards the heart'.

04.4 [2 marks]

- the wall is one cell thick, giving a short diffusion distance (1)
- there are many of them / they are narrow and close to cells, giving a large surface area (1)

Question 5 (6 marks)

05.1 [1 mark]

Answer: right atrium

- (wall of the) right atrium (1)

05.2 [2 marks]

- an artificial pacemaker is an electrical device (fitted in the chest) (1)
- it corrects irregularities in the heart rate / makes the heart beat at a regular rate (1)

05.3 [2 marks]

Answer: 75 beats per minute

- $60 \div 0.8$ (1)
- 75 (beats per minute) (1)

05.4 [1 mark]

- surgery is needed (to fit it or replace the battery) / risk of infection / may be affected by strong magnetic fields (1)
-