

Task

A GCSE student called Donald was given a test about the circulatory system. Below are his answers. Read the questions and his answers carefully.

Mark Donald's answers and annotate the paper to show where and why you have awarded marks. Add notes to show how Donald could improve his answers.

Examiner's notes

Circulatory system test

1. Name the main organ in the circulatory system. (1)

The heart.

2. There are three types of blood vessel. Tick the type of blood vessel that is correct for each statement. (6)

Statement	Arteries	Veins	Capillaries
Has valves inside to prevent back flow of blood.	✓	✓	
Has a thick muscular wall.	✓		
Has a large lumen.	✓	✓	
Is in close contact with cells.	✓	✗	✗ ✓
Substances can diffuse through its walls.			
Carry blood towards the heart.		✓	

3. Where are valves found in the circulatory system? Describe their function. (4)

valves are found in the heart, where they stop blood flowing in the wrong direction. They are also found in blood vessels. In blood vessels, they do exactly the same job - they stop the backflow of blood!

4. Describe the direction of blood flow through the right hand side of the heart. (3)

Blood goes into the right atrium and then out from the right ventricle.

5. How does a molecule of oxygen get from the capillaries in the lungs to a muscle cell in your big toe? (4)

It's quite easy. The oxygen gets into the blood in the lungs and then it travels along the arteries to the big toe before going into a capillary and escaping through its thin walls into a nearby muscle cell!

*6. Compare the structure and function of veins and arteries. (4)

Veins take blood into the heart, but arteries take blood away from the heart. Veins have a big lumen and a thin wall, and the blood travels through them at low pressure. Arteries have a thicker wall because they carry blood at much higher pressures.

7. Compare and contrast the structures and functions of the two sides of the heart. (6)

Both sides of the heart have two chambers. Each side has an atrium at the top and a ventricle at the bottom. In the left atrium, blood enters from the lungs through the pulmonary vein and then passes through the left ventricle and out through the aorta. The left side of the heart pumps blood to the body. The right side of the heart has a very similar job, but it gets its blood from the body through the vena cava and sends it to the lungs via the pulmonary artery. Basically, both sides are pumps but they go to different places.

Total mark ____/28

Positive comments

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Targets for improvement

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Teaching notes

This resource is designed to engage and challenge students whilst also specifically targeting exam preparation.

This 'peer-assessment' task was designed to be used by students after they had studied both the heart and the structure and function of blood vessels. It should be used to consolidate learning.

The * in the final question is to indicate that spelling, punctuation, grammar and use of scientific terminology will be assessed. Instructions relating to this type of question may be different depending on exam board, these could be added to the resource before printing.

Students take delight in noticing Donald's errors, misconceptions and lack of exam technique. Sometimes however, Donald surprises the students with a great answer!

To stimulate discussion, Donald's work has been most successfully used in pair or small group work, followed by targeted whole class questioning.

The following marks and comments are expected from students:

- 1) Donald would score 1 mark.
- 2) Donald would score 3 marks.

Statement	Arteries	Veins	Capillaries	
Has valves inside to prevent back flow of blood.	✗	✗ ✓		He scores no marks because he has crossed both of his answers out.
Has a thick muscular wall.	✓(1) ✓			correct
Has a large lumen.	✓	✓ ✓		Donald has not followed the instructions. It says tick 'the type' not 'the types'.
Is in close contact with cells.	✗	✗	✗ ✓ (1) ✓	Despite Donald's excessive crossing out and changing of his answer, he has got this correct. Remind students that it is ok to change answers – just do it clearly.
Substances can diffuse through its walls.			✓	Donald hasn't selected an answer – this is very silly – an opportunity to remind students that there is nothing to be lost by answering the question.
Carry blood towards the heart.		✓ (1) ✓		correct

- 3) Donald hasn't written enough for this question. He would at most score 2 marks.

He may score one mark for mentioning that they are found in the heart and that they stop blood flowing in the wrong direction. Although he has correctly said that they are found in blood vessels, he has not said which type of blood vessel (veins) they are found in. Also, just saying they do the same job is not sufficient. He again needs to refer to their function, saying that they stop the backflow of blood.

4) Although Donald's answer is brief, he would score 2 marks.

He has correctly identified that blood enters at the right atrium. His answer would be better if he described this as being at the top of the heart and that blood then flows downwards before being pumped out from the right ventricle. He could gain an extra mark for mentioning passing valves, or for mentioning the blood vessels that take the blood in (vena cava) and out (pulmonary artery) of this side.

5) A lot of Donald's answer repeats what was in the question. He would be lucky to score even one mark.

Donald needs to recognise that the red blood cells carrying the oxygen go back to the left hand side of the heart where they are pumped through the aorta into arteries. They enter capillaries (he may score a mark here) and the oxygen diffuses out to the muscle cells.

6) Quite a good answer! Donald would likely score three marks.

Donald scores marks for correctly comparing the function of arteries and veins. It is good to see that Donald has used techniques that he has been taught to remember the function – it doesn't matter if the examiners see this! Donald has also correctly compared much of their structure (e.g. thickness of wall). He could improve the answer by mentioning that veins have valves. He could also compare the size of the artery lumen to that of the vein.

7) The content of Donald's answer is reasonable. He would score 4 marks.

In 6-mark questions, the responses are marked in bands of 1-2, 3-4, 5-6. In each band, literacy is also considered.

He does give some similarities between the structure of each side (e.g. atria, ventricles), so he fulfils the requirements for band 1-2.

To get 3-4 marks, differences in structure and function would be expected. Donald has correctly given detail of each associated blood vessel that supplies the heart or takes its blood away (e.g. aorta, pulmonary vessels). He has also stated the function of the left hand side of the heart. However, he does not give the function of the right hand side, simply stating that it pumps blood elsewhere.

Although Donald does not use capital letters properly, his spelling is very good and he makes good use of a range of scientific words. Hence, he is awarded 4 marks.

To get 5-6 marks, a full and logical comparison would be expected. For this, the omission already identified would be expected. Also, the inclusion of oxygenated and deoxygenated blood would be expected as well as the presence of valves as being a similar structure in both sides.

Overall, Donald would score (at most) 16 marks.

Positive comments, e.g.

- Donald's spelling is very good
- he often starts his answers well
- good knowledge.

Targets for improvement, e.g.

- give more detail in answers
- follow instructions carefully
- remember not to just repeat the content of the question
- use capital letters in exam answers.