

Look at a diagram of the circulatory system and use it to help you answer the following questions.

1) State the three types of blood vessels that make up the circulatory system.

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2) State the name of the space which blood flows in a blood vessel.

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3) Complete the table to compare the relative sizes and structures of the three types of blood vessels. Choose from the options in brackets.

Blood Vessel	Size of lumen (very narrow/narrow/wide)	Thickness of wall (thin/ thick/ very thin)	Do they contain valves? (yes / no)
Arteries			
Veins			
Capillaries			

4) Compare the function of arteries and veins.

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* Suggest a simple way of remembering the difference in function.

5) Choose the correct words for these sentences. Underline your choice in each bracket.

- Most arteries carry (oxygenated/deoxygenated) blood.
- Most veins carry (oxygenated/deoxygenated) blood.
- In most networks of capillaries, the blood becomes more (oxygenated/deoxygenated) as it travels through.

* Identify and explain examples that do not fit this pattern.

6) Explain how the structure of a capillary allows it to carry out its function effectively.

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7) Describe what happens to blood as it passes through the lung capillaries.

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8) * Describe and explain the journey of blood from a capillary just after your leg muscles until its return to the same place.

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9) * Summarise the structure and function of the circulatory system in no more than 100 words.

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Teaching notes

These questions were designed to be used with the diagram 'The circulatory system jigsaw' (20000). However, they could be used with other diagrams of the circulatory system. Some modification of the questions may be necessary in this case.

Questions with a * are designed to provide more challenge.

Suggested answers:

- 1) Artery, vein, capillary
- 2) Lumen
- 3) Complete table:

Blood vessel	Size of lumen (very narrow/narrow/wide)	Thickness of wall (thin/ thick/ very thin)	Do they contain valves? (yes / no)
artery	narrow	thick	no
vein	wide	thin	yes
capillary	very narrow	very thin	no

- 4) Veins take blood towards the heart. Arteries take blood away from the heart.

* This can be remembered because 'arteries' begins with an 'a', and so does 'away', whereas 'vein' ends in 'in' and they take blood 'in' to the heart.

Note: pupils may try to compare the structure of the vessels here. If so, this is an opportunity to remind them of the meaning of the word 'function'.

- 5) Choosing the correct words.

- oxygenated
- deoxygenated
- deoxygenated

* The (pulmonary) artery which takes blood away from the heart to the lungs carries deoxygenated blood. It takes this blood to the lungs so that it can be oxygenated. As this blood vessel is taking blood away from the heart, it is called an artery.

The (pulmonary) vein which takes blood into the heart from the lungs carries oxygenated blood. It takes this blood to the heart so that it can be pumped around the body. As this blood vessel it taking blood into the heart, it is called a vein.

- 6) They have a very thin wall (just one cell thick) and so materials such as oxygen, glucose, carbon dioxide can easily diffuse in and out of them.

Note: It is also worth noting that capillaries are tiny compared to other blood vessels and so they can easily access cells.

- 7 As blood is passing through lung capillaries, it becomes oxygenated.

Note: this is a basic answer. Pupils should be able to pick from the diagram that that this is a gradual process. They are likely to have already studied the blood, and so will be able to describe this in more detail i.e. each red blood cell contains haemoglobin. As the blood cell passes through the capillaries, more and more haemoglobin combines with oxygen to become oxyhaemoglobin.

- 8) * The haemoglobin in the red blood cells is likely to have given up most of its oxygen when it passed through the leg capillaries.

- The blood is deoxygenated.
- The blood now travels back towards the heart in veins.
- The valves in the veins help to stop the backflow of blood.
- The blood will enter the heart via the vena cava.
- Blood will pass through the right atrium into the right ventricle.
- It will leave and go to the lungs in the pulmonary artery.
- In the lung capillaries, the haemoglobin in the red blood cells becomes oxygenated again.
- The oxygenated blood enters the other side (left-side) of the heart through a vein (the pulmonary vein) and leaves in an artery (the aorta).
- The blood travels in this artery at high pressure to all areas of the body (including the leg muscle capillaries)
- The oxyhaemoglobin in the red blood cells will lose oxygen so that the cells in the tissues can respire.

- 9) * A suggested full description in 100 words.

- The circulatory system transports blood around the body.
- The heart is the muscular organ that pumps the blood.
- Three types of blood vessels carry the blood.
- Arteries take blood at high pressure away from the heart and so have thick walls, but small lumens.
- Veins take blood at lower pressure towards the heart.
- They have larger lumens, but thinner walls.
- Veins have valves to stop blood flowing in the wrong direction.
- Capillaries are the smallest.
- They have walls that are only one cell thick.
- These features allow capillaries to easily exchange materials such as oxygen with nearby cells.
- Note: It is quite challenging to include everything in 100 words. You may wish to suggest bullet points or extend the word limit!