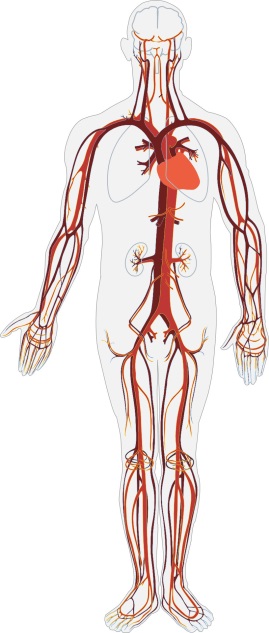
**Arteries and veins**



**Arteries**

Arteries are a type of blood vessel.

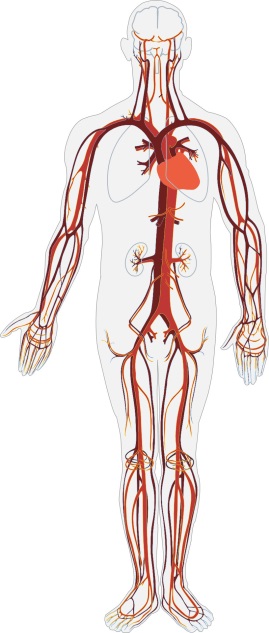
They are part of the human circulatory system.

Read the statements in the table.

Tick **one** box for each statement.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Statements** | | I am **sure** this is right | I **think** this is right | I **think** this is wrong | I am **sure** this is wrong |
| **1** | Arteries only carry blood away from the heart. |  |  |  |  |
| **2** | Arteries only carry oxygenated blood. |  |  |  |  |
| **3** | Arteries carry blood that has been cleaned by the heart. |  |  |  |  |
| **4** | The blood in arteries is red in colour. |  |  |  |  |

**Arteries and veins**



**Veins**

Veins are a type of blood vessel.

They are part of the human circulatory system.

Read the statements in the table.

Tick **one** box for each statement.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Statements** | | I am **sure** this is right | I **think** this is right | I **think** this is wrong | I am **sure** this is wrong |
| **1** | Veins only carry blood back to the heart. |  |  |  |  |
| **2** | Veins only carry deoxygenated blood. |  |  |  |  |
| **3** | Veins carry dirty blood. |  |  |  |  |
| **4** | The blood in veins is blue in colour. |  |  |  |  |

*Biology> Big idea BCL: The cellular basis of life > Topic BCL2: From cells to organ systems > Key concept BCL2.2: Supplying cells – the human circulatory, digestive and gas exchange systems*

|  |
| --- |
| **Diagnostic question** |
| **Arteries and veins** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Human life depends upon the tissues and organs of the circulatory, digestive and gas exchange systems working together to support the life processes of the cells from which we are made. |
| Observable learning outcome: | Describe simply the structures and functions of the human circulatory system. |
| Question type: | Confidence grid |
| Key words: | circulatory system |

|  |  |
| --- | --- |
| **P** | **PRIOR UNDERSTANDING**  This diagnostic question probes understanding of ideas that are usually taught at age 5-11, to aid transition from earlier stages of learning. |

**What does the research say?**

Various authors (e.g. Arnaudin and Mintzes, 1985; Schoon and Boone, 1998; Bartoszeck, Machado and Amann-Gainotti, 2011; Winterbottom, 2011; Özgür, 2013; Allen, 2014) have described misunderstandings about the human circulatory system that are commonly observed in school science classrooms (and can persist in students up to undergraduate level), including that:

* the heart filters or cleans the blood;
* arteries carry ‘clean’ blood, while veins carry ‘dirty’ blood;
* arteries only carry oxygenated blood, while veins only carry deoxygenated blood (applying a ‘rule of thumb’ that ignores the direction of blood flow relative to the heart, and also ignores arteries and veins carrying blood to and from the lungs);
* deoxygenated/venous blood is blue in colour (in contrast to the red colour of oxygenated/arterial blood).

The misconception about the blue colour of deoxygenated/venous blood may be introduced or reinforced by the common depictions in textbooks. In reality, deoxygenated blood is deep red while the oxygenated blood appears brighter red. Veins under the skin sometimes look blue due to scattering of light by the skin.

**Ways to use this question**

Students should complete the confidence grid individually. This could be a pencil and paper exercise, or you could use the presentation with an electronic voting system or mini white boards.

*Differentiation*

You may choose to read the question and statements to the class, so that everyone can focus on the science. In some situations it may be more appropriate for a teaching assistant to read for one or two students.

**Expected answers**

*Arteries*

1. Arteries only carry blood away from the heart – **right**
2. Arteries only carry oxygenated blood – **wrong** (while most arteries carry oxygenated blood from the heart to the body, the arteries that carry blood from the heart to the lungs are carrying deoxygenated blood)
3. Arteries carry blood that has been cleaned by the heart – **wrong**
4. The blood in arteries is red in colour – **right**

*Veins*

1. Veins only carry blood back to the heart – **right**
2. Veins only carry deoxygenated blood – **wrong** (while most veins carry deoxygenated blood from the body back to the body, the veins that carry blood from the lungs to the heart are carrying oxygenated blood)
3. Veins carry dirty blood – **wrong**
4. The blood in veins is blue in colour – **wrong**

**How to respond - what next?**

If there is a range of answers, you may choose to respond through structured class discussion. Ask one student to explain why they gave the answer they did; ask another student to explain why they agree with them; ask another to explain why they disagree, and so on. This sort of discussion gives students the opportunity to explore their thinking and for you to really understand their learning needs. Responses often work best when the activities involve paired or small group discussions, which encourage social construction of new ideas through dialogue.

If students have misunderstandings about the colour of the blood carried in arteries and veins, their thinking could be challenged by watching a video of a doctor drawing deep red blood from a vein – however, care must be taken as this will not be comfortable or appropriate for some students.

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: pixabay.com/Clker-Free-Vector-Images (311864)

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