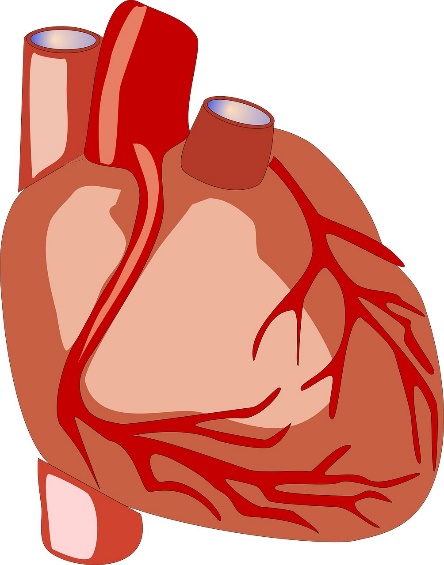
**Circulation**



The heart pumps blood around the human body.

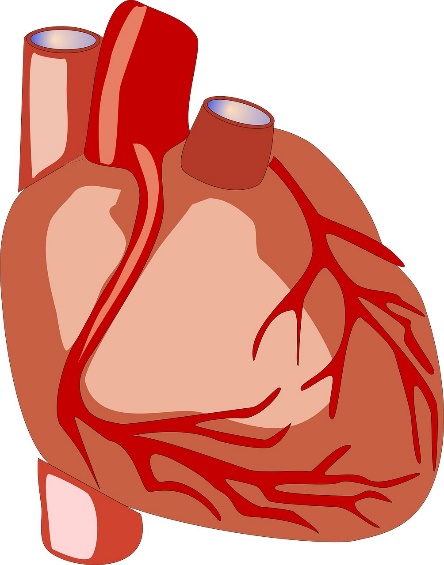
**Part 1**

Read the statements in the table. Some are **right** and some are **wrong**.

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** | When blood leaves the heart it moves around the body in one big loop. |  |  |  |  |
| **2** | Blood is pumped to the lungs and then returns to the heart to be pumped around the rest of the body. |  |  |  |  |
| **3** | The heart stores blood until it is needed. |  |  |  |  |
| **4** | The heart filters and cleans blood from the body before it is pumped round again. |  |  |  |  |

**Circulation**



The heart pumps blood around the human body.

**Part 2**

Read the statements in the table. Some are **right** and some are **wrong**.

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** | The walls of the heart are made of muscle. |  |  |  |  |
| **2** | The inside of the heart is one hollow chamber. |  |  |  |  |
| **3** | Oxygenated blood and deoxygenated blood mix together in the heart. |  |  |  |  |
| **4** | The heart pumps air around the body as well as blood. |  |  |  |  |

*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** |
| **Circulation** |

**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: | Explain how the human circulatory, digestive and gas exchange systems work together to keep cells alive. |
| Question type: | Confidence grid |
| Key words: | circulatory system |

**What does the research say?**

Various authors (Arnaudin and Mintzes, 1985; 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 produces, stores, filters or cleans the blood;
* the heart pumps air around the body instead of, or in addition to, blood (perhaps because they believe air to be synonymous with oxygen, that muscles need ‘air’ to work, and have observed heart rate and breathing rate increasing when they exercise);
* the heart is a muscular bag without chambers (i.e. is a single pump);
* humans have a single (rather than double) circulatory system, in which blood is pumped from the heart to the lungs and then to the rest of the body before returning to the heart.

**Ways to use this question**

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

*Differentiation*

You may choose to read the 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**

*Part 1*

1. When blood leaves the heart it moves around the body in one big loop – **wrong**
2. Blood is pumped to the lungs and then returns to the heart to be pumped around the rest of the body – **right**
3. The heart stores blood until it is needed – **wrong**
4. The heart filters and cleans blood from the body before it is pumped round again – **wrong**

*Part 2*

1. The walls of the heart are made of muscle – **right**
2. The inside of the heart is one hollow chamber – **wrong**
3. Oxygenated blood and deoxygenated blood mix together in the heart – **wrong**
4. The heart pumps air around the body as well as blood – **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 human circulatory system and the path taken by blood around the body, the following BEST ‘response activity’ describes a role-play that could be used in follow-up to this diagnostic question to build understanding:

* Response activity: Circulatory system role-play

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: pixabay.com/OpenClipart-Vectors (2028154)

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