**Circulatory system role-play**

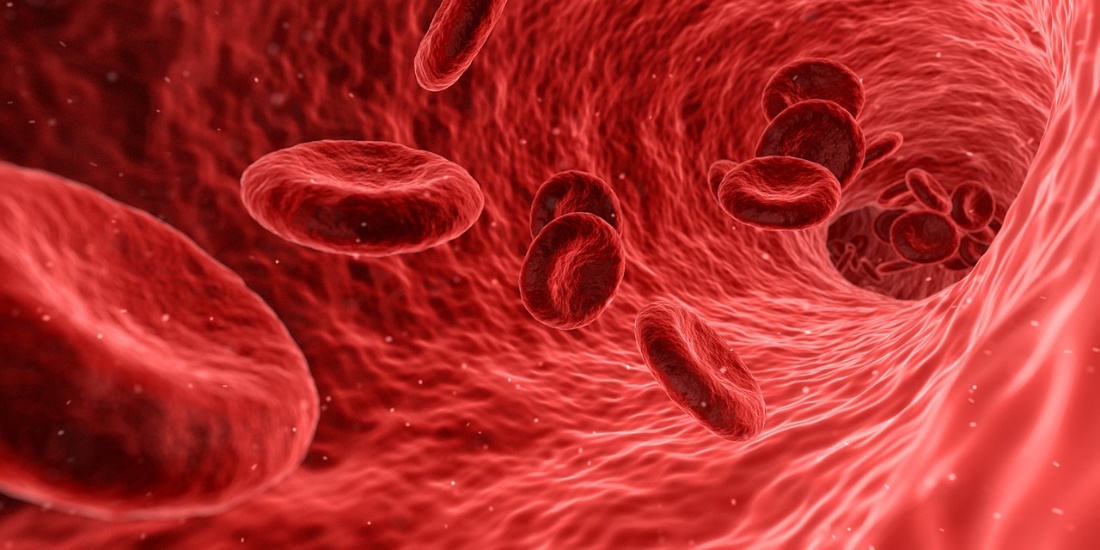


Image that you and the rest of the students in your class are the blood in the human body.

Move around the ‘body stations’ to role-play the circulation of blood around the cells, tissues, organs and organ systems of the body.

**To talk about**

1. Which substances are carried by the blood?
2. Which substances are absorbed into the blood at each station?
3. Which substances move out of the blood at each station?
4. How many times does the blood pass through the heart each time it circulates once around the body?

*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*

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| **Response activity** |
| **Circulatory system role-play** |

**Overview**

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| 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. |
| Activity type: | Role-play |
| Key words: | circulatory system |

This role-play activity can help students overcome misunderstandings about how the human circulatory, digestive and gas exchange systems work together to keep cells alive, and about the human circulatory system and the path taken by blood around the body. It can be used in response to the following diagnostic questions:

* Diagnostic question: Brain cell
* Diagnostic question: Circulation

**What does the research say?**

From age 11, students could begin to explore some basic ideas that introduce a systems view of life (Capra and Luisi, 2014), including the idea that living systems are organised at different levels (molecules, cells, tissues, organs, organs systems and whole organisms) and that life is a property that emerges from the interactions between the parts that make up these different levels (Skinner, 2011).

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 activity**

In this whole class role-play activity, students act as the blood (or as blood cells) and circulate around the classroom or playground to simulate the circulatory system.

* They should pass through various stations set up around the classroom or playground to represent organs of the circulatory, digestive and gas exchange systems, including for example the heart, intestines and lungs.
* They should also pass through at least one other station representing a tissue, organ or body cell that will take in substances from the blood and release waste products into it, for example a muscle or the brain.
* Students should move from the heart to the lungs and then back to the heart before moving around the rest of the body stations, to represent the double circulation.
* Students should role-play the exchange of substances at each station, including for example: oxygen, carbon dioxide, glucose/substances from food, water and possibly also urea.

**Acknowledgments**

Developed by Alistair Moore (UYSEG), from an idea described by Allen (2014).

Images: pixabay.com/qimono (1813410)

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