TEACHER'S NOTES

JOURNEY OF A RED BLOOD CELL

OVERVIEW

Aimed at key stage 3 pupils.

In this activity, the class will consider the journey of a normal and sickle-shaped red blood cell around the human body.

LEARNING OBJECTIVES

- To understand the journey of a normal red blood cell around the body
- To appreciate how this journey differs when someone has Sickle Cell Anaemia

CURRICULUM LINKS

- KS3: Life processes are supported by the organisation of cells into tissues, organs and body systems

YOU WILL NEED

- Student worksheets
- Red plasticine for making models of red blood cells (alternatively, you could use blue-tac)
- 3 large labels saying LUNGS, HEART, MUSCLES
- 50 green beads (to represent oxygen)

Activity

- Watch the film **Pamela's Story**
- Give the pupils a piece of red plasticine and ask them to make a model of a normal red blood cell.
- Introduce the circulatory system and put 3 signs around the classroom (or outside in the school field) labelled: Lungs, Heart, Muscles.
- Explain that oxygen is carried by red blood cells. Oxygen is picked up in the lungs and used in tissues around the body, such as the muscles. Explain that the beads resemble oxygen.
- Students walk the journey of a normal red blood cell with their plasticine model. They walk from the heart to the lungs and back to the heart and then around to the muscles and back to the heart again. They pick up oxygen (stick a bead to their plasticine model) when they visit the lungs and give up their oxygen when they reach the muscles (take their bead off the model).
- Once they have walked this circuit a couple of times, ask the students to think about what happens when someone has Sickle Cell Anaemia. Explain that the red blood cells change shape when they are carrying less oxygen and can become sickle-shaped.
- Ask the pupils to think about when they will need to change the shape of their plasticine model (after it gives up oxygen at the muscle).
- Pupils then follow the route again, but this time change the shape of their red blood cell after they have travelled to the muscles.
- Discuss how the sickle-shaped cells are rigid and tend to clump together easily, so can get stuck in small blood vessels. Normal red blood cells can bend and flex easily so squeeze through small capillaries. Once small blood vessels are blocked, it can stop oxygen getting to tissues, which can lead to severe pain and damage to organs.
- Consolidate this activity by asking the pupils to complete the worksheet

FURTHER INFORMATION

http://www.dnalc.org/resources/3d/17-sickle-cell.html

This links to a short animated film from the American DNA Learning Centre. The first 30 seconds clearly shows the difference in circulation between normal and sickle-shaped red blood cells. The next 30 seconds goes into the basic detail of how Sickle Cell Anaemia is caused.

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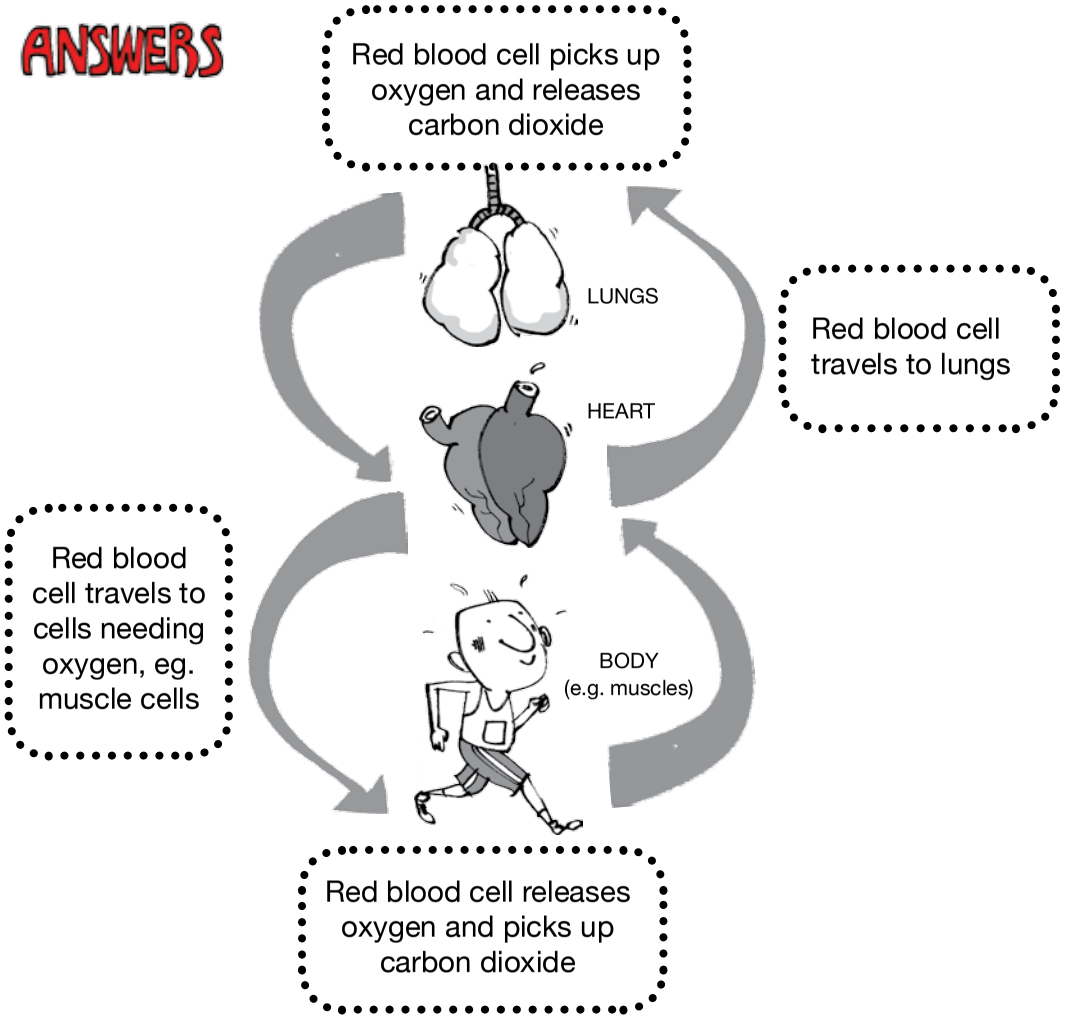
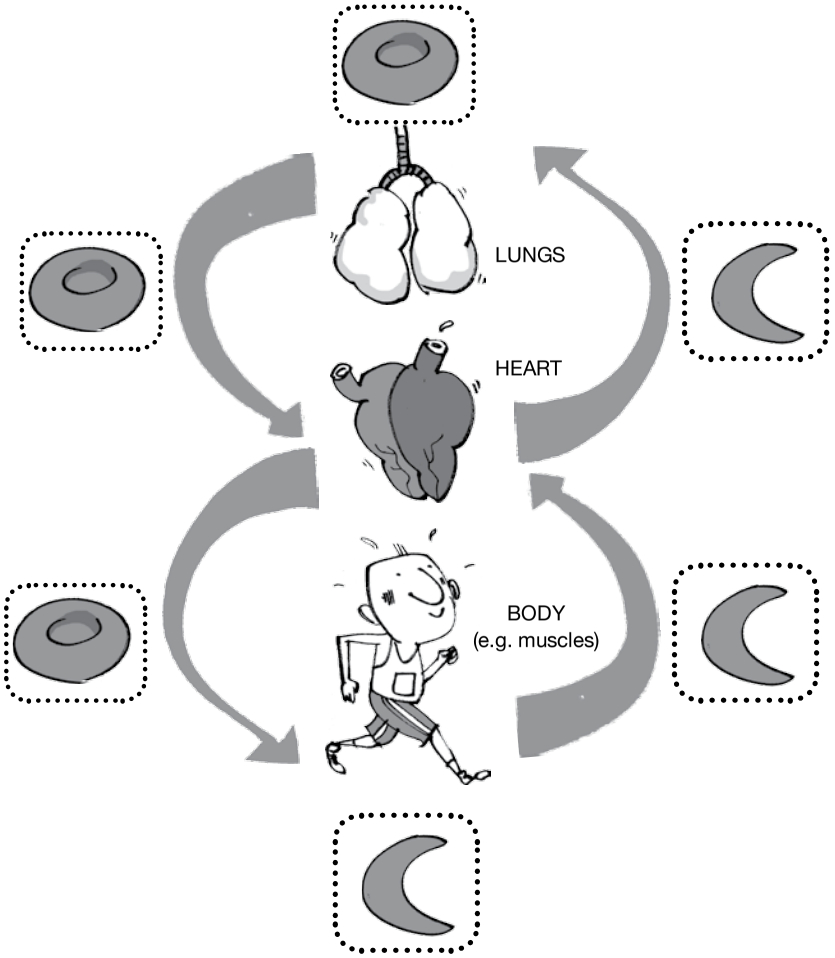
ANSWERS





How can sickle-shaped red blood cells cause problems?

Sickle-shaped cells can get stuck in small blood vessels. Once small blood vessels are blocked, it can stop oxygen getting to tissues, which can lead to severe pain and damage to organs.

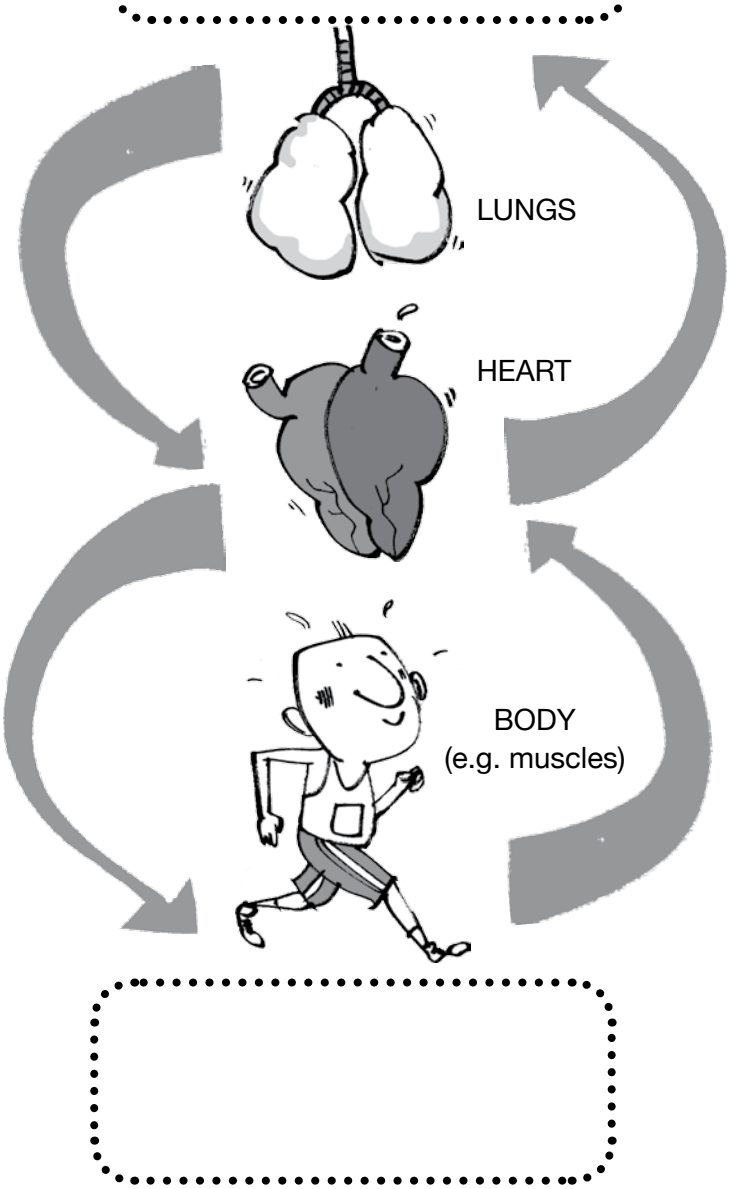
JOURNEY OF A RED BLOOD CELL

PUPIL WORKSHEET

The billions of red bloods cells flowing around your body are doing an amazing job.
The diagram below summarises the route that your blood takes around your circulatory system.
Fill in the four boxes of the diagram using the labels below:

- Red blood cell travels to cells needing oxygen, eg. muscle cells
- Red blood cell travels to lungs
- Red blood cell picks up oxygen and releases carbon dioxide
- Red blood cell releases oxygen and picks up carbon dioxide

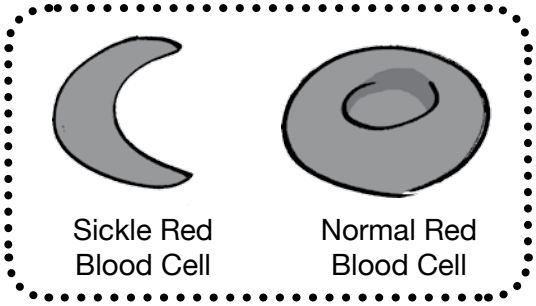
It takes approximately 20 seconds for your red blood cells to go round your circulatory system once



JOURNEY OF A RED BLOOD CELL

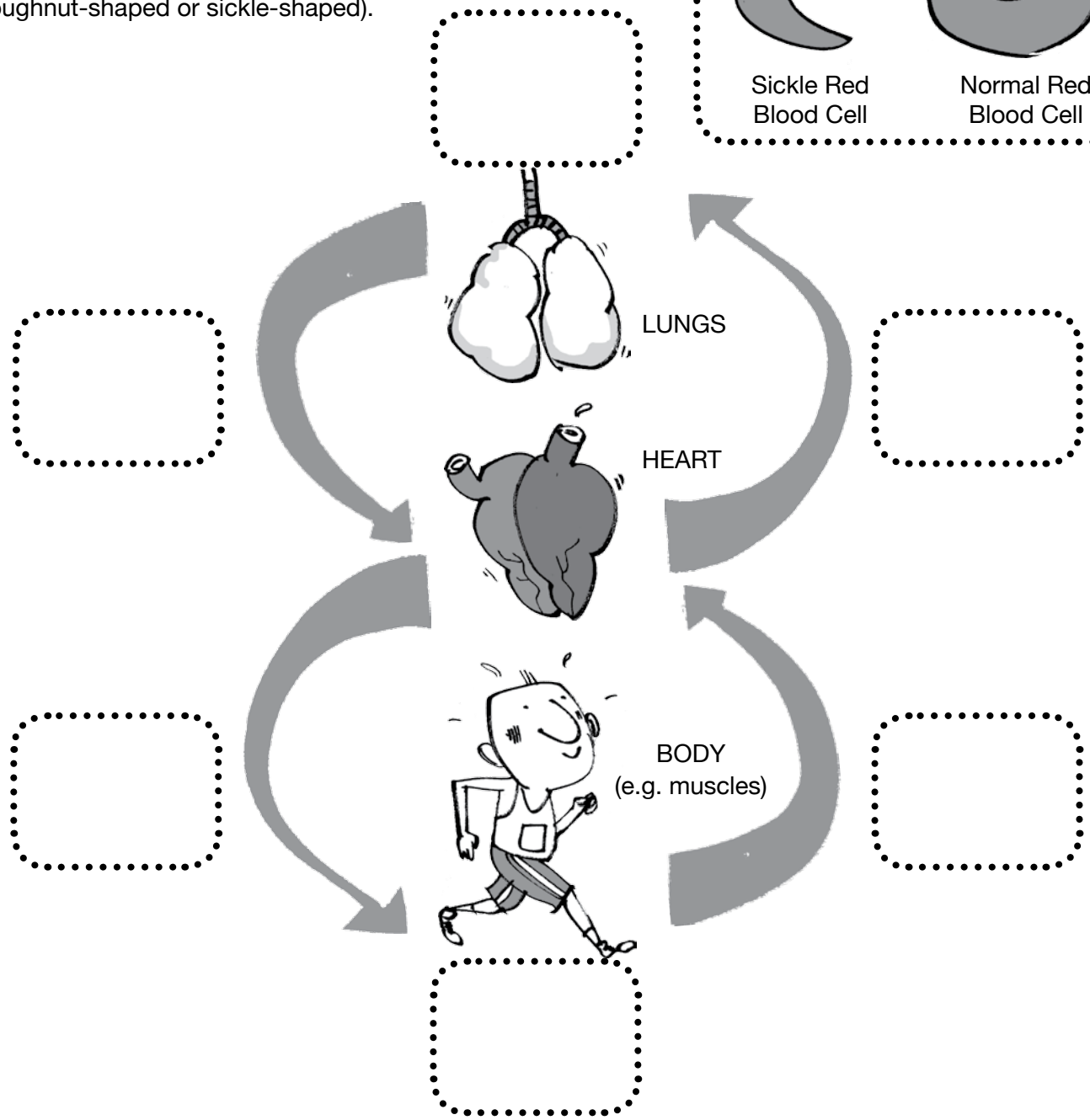
Pamela has Sickle Cell Anaemia. This means that her red blood cells can become sickle-shaped. This happens when her red blood cells are carrying less oxygen. Her red blood cells will return to being the normal shape when they return to the lungs to pick up more oxygen.

Draw a diagram of the red blood cell into each of the six boxes below. You will need to decide what shape her red blood cells are most likely to be (doughnut-shaped or sickle-shaped).



Sickle Red Blood Cell

Normal Red Blood Cell



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