TEACHER'S NOTES — WHAT'S IN YOUR BLOOD?

OVERVIEW

Aimed at key stage 4 pupils.

In this activity, the class will undertake a simple practical activity to show what the blood would look like if it were centrifuged.

LEARNING OBJECTIVES

- To understand that blood can be separated by centrifugation
- To visualise the composition of the blood
- To estimate and measure volumes carefully
- To calculate proportions accurately

CURRICULUM LINKS

- KS4: Human health is affected by a range of environmental and inherited factors, by the use and misuse of drugs and by medical treatments

YOU WILL NEED

- Red jelly
- Vegetable oil (1 litre)
- Skimmed milk (50ml)
- A variety of sizes of clear tubes (1 per pupil or 1 per pair)
- Clamp and stand (1 per pupil or 1 per pair)
- Measuring cylinders
- Pipettes

PREPARATION

- Make up the jelly
- Pour into the different tubes (making sure that you do not fill more than halfway). If lots of test tubes are used, do not fill to the same level to make it challenging for the pupils.
- Allow time for the jelly to set before the lesson

Activity

- The pupils could start the lesson by watching the film of **Pamela's story** to understand more about the importance of blood and the role of red blood cells.
- The pupils complete this activity as an individual task or in pairs.
- The table below shows what volumes of milk and oil the pupils will need to add to their tubes.

Component of blood	Proportion of blood	Estimated volume in tube							
Red blood cells	44%	5ml	6ml	7ml	8ml	9ml	10ml	11ml	12ml
White blood cells	1%	0.1ml	0.1ml	0.2ml	0.2ml	0.2ml	0.2ml	0.3ml	0.3ml
Plasma	55%	6.3ml	7.5ml	8.8ml	10ml	11.3ml	12.5ml	13.8ml	15ml

FURTHER INFORMATION

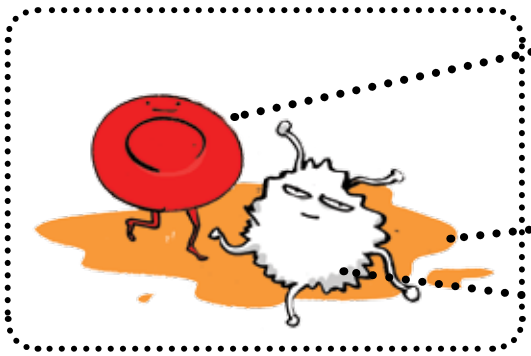
The UK National Blood Service has a comprehensive website that gives more information about the composition of blood and how it can be used to save lives (like giving people with conditions like Sickle Cell Anaemia and Thalassaemia blood transfusions)

www.blood.co.uk/about-blood

WHAT'S IN YOUR BLOOD?

PUPIL WORKSHEET

Blood consists of several components. The main components are:



These components can be separated using a process called centrifugation.

This involves placing the blood in a tube and then spinning it at high speed in a centrifuge machine.

After some time, the blood separates with the most dense components settling at the bottom of the tube and the least dense at the top.

This activity demonstrates the components of blood and how they are separated.

METHOD

- Your teacher will give you a tube with red jelly already set at the bottom of the tube
- Secure your tube in a clamp and stand
- Estimate how much red jelly is in the tube
- Calculate how much milk and vegetable oil you will require and fill in the table below (you need to ensure that you end up with the right proportion of each blood component)

Component of blood	Proportion of blood	Estimated volume in tube
Red blood cells	44%	
White blood cells	1%	
Plasma	55%	

- Measure the volume of milk you need (using a pipette or a measuring cylinder) and carefully pour the milk on top of the jelly
- Measure the volume of oil you need (using a measuring cylinder) and then carefully pour the oil on top of the milk
- The three components in the tube should look similar to the tube on the right.