



Observing

Talk about what blood consists of, look at a model of blood (prepared by you earlier) and a model of its only liquid component – plasma.

The two features of blood that we can observe “with the naked eye” are its red color and its liquid form. We need a special microscope to see the different components of blood.

Show the students **the model of blood** prepared earlier (you will find instructions on how to make it in the Get Ready section) and ask them what they think they can see in the blood components model? The blood model takes into account the proportions of different components. Point out the fact that the model is only symbolic and that in reality the components of blood are microscopic in size.

After observing the blood model each student observes **the plasma model** up close (instructions on how to make models of all the blood components can be found in the Get Ready section). While the students are passing around the model, ask them the following questions:

What color is this component?

How is it similar to and how is it different from blood?

How is it that blood is red and yet blood’s only liquid component is yellow?

What function do you think it performs?

What does it do for the human body?



Movement game

The students pretend to be red blood cells and take part in a game to show them how these cells function

**Materials:**

black and blue paper (several sheets), or, alternatively, plasticine (black, blue).

Before the lesson prepare models of oxygen and carbon dioxide molecules. Cut out circles approximately 3 cm/1 in in diameter from the blue and black sheets of paper – the blue circle represents the oxygen molecule, the black circle the carbon dioxide molecule. Each student should receive at least one circle from each color. You can also prepare twice as many circles from each color than there are students in class – thanks to which the game will take longer.

Optionally, you can use black and blue balls made from plasticine.

**The classroom:**

Scatter the oxygen models on one of the desks at the front of the class. During the game this desk will perform the role of the lungs containing oxygen. Scatter the carbon dioxide models on the chairs at the back of the classroom. The chairs represent the cells in the human body, which contain carbon dioxide.



In addition, you can put sheets of paper on the desk and chairs with the following inscriptions:  
LUNGS – on the desk at the front, and CELLS – on the chairs at the back of the classroom.

**Instructions:**

The students pretend to be red blood cells. Show them an outline of the route along which blood cells should move – from the LUNGS to the CELLS and back again to the LUNGS.

The students form a line, one after another, by the LUNGS desk. At your command each student in turn takes one molecule of oxygen and brings it to the chairs – the CELLS. There, after leaving their oxygen, each student takes one carbon dioxide molecule and brings it to the LUNGS. He or she then takes another oxygen cell and repeats the action of the blood cell. The students perform the work of the blood cells until all the oxygen cells are in the CELLS and all the carbon dioxide cells are in the LUNGS.

**At the end of the game, ask the students:**

Do the red blood cells have a little or a lot of work to do?

How long do you think they live for? (The life span of red blood cells is approximately 3 months)

Are red blood cells important for the human body?

What would happen if we had no such cells in our bodies?



Movement game

The students take part in a game of scouts and commandos, thanks to which learn and consolidate their knowledge about the functions of white blood cells.

### **Preparation**

Materials:

Tags - template (pdf) – print out and cut out  
construction paper (several sheets)

The pdf tag-template includes 3 kinds of badges (shapes). Draw the outlines of the **badges for the scouts** (for around half the class) on the construction paper and cut them out. Simply print and cut out the **tags for the viruses** (do not write the name of the viruses) for half the class as well as **empty tags** – at least 10. Spread out the virus tags and the other tags (except for the badges) on the floor. Hand out the badges to the scouts. Have some trash bags ready.

### **Execution:**

Half of the class are scouts and half are commandos. The scouts go up to the jumbled up tags and press their badges onto the paper figures scattered before them. Their task is to find one that has a protrusion that perfectly fits the recess in their badge. The students leave the “viruses” marked in this way (together with the badges) on the floor and return to their places.

The commandos then begin the second part of the game. They go up to the jumbled up tags and collect viruses from all the pieces on the floor. Their task is to tear up the viruses and discard them together with the scouts’ badges in the trash bags.

### **Conclusions:**

After the game you can ask the students: How were the tasks you performed in this exercise similar to the tasks performed by white blood cells? What function do white blood cells perform? Do all white blood cells perform the same tasks? Are there always the same number of white blood cells in the human body? When might they increase in number?

The game shows the specialized roles performed by white blood cells. Some of them circulate in the blood and check whether or not there are any viruses present that are dangerous to our health. If they find any, a second group of white blood cells appears whose task is to eliminate any toxic viruses.