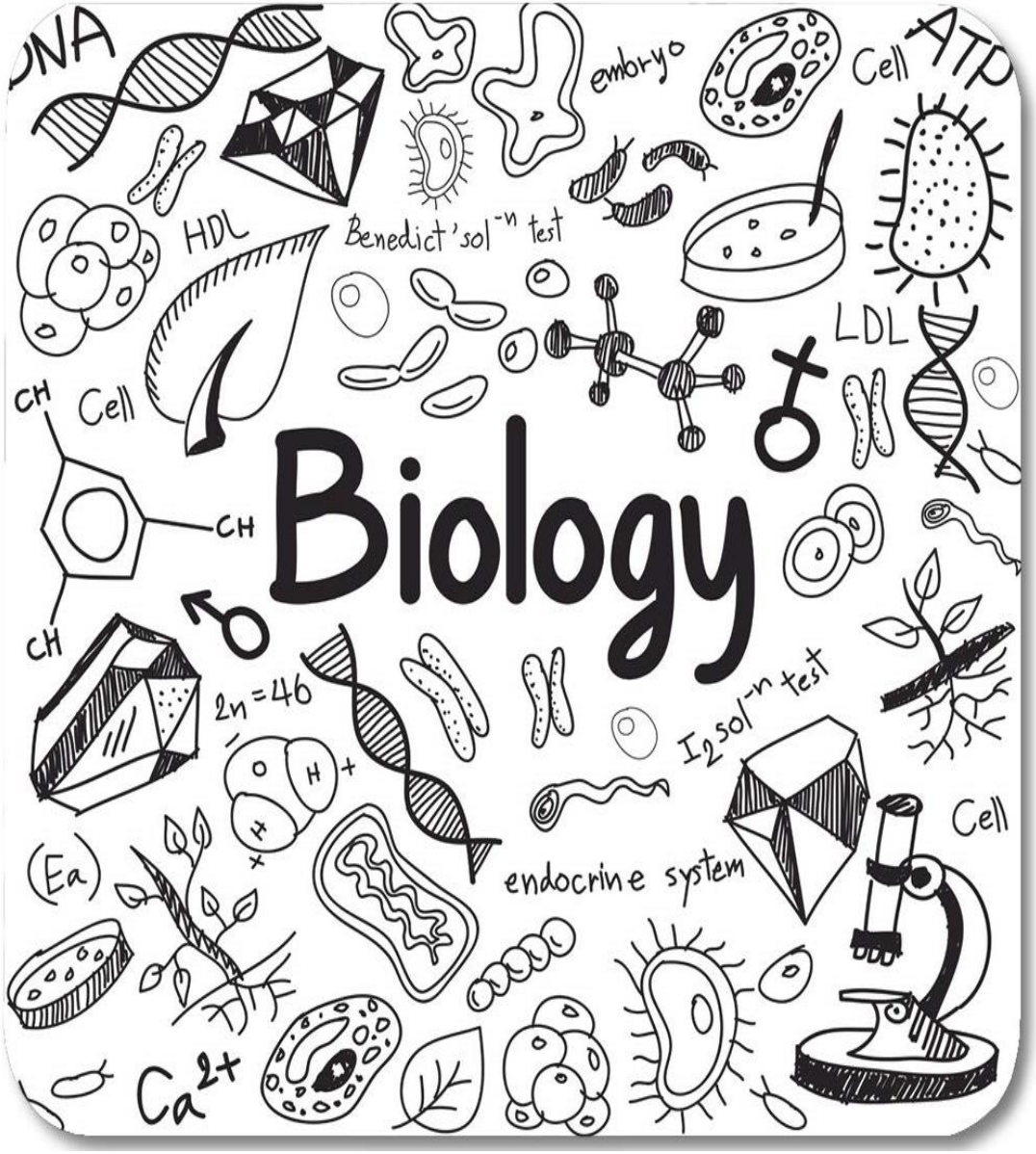
The National Orthodox School Shmaisani



Lesson: The components of the blood

Scholastic Year: 2022-2023

Grade: 7CS

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Objective : - list the components of the blood
- Describe the function of each component

Resources : book pages 112 , 113

https://www.youtube.com/watch?v=73ei6YD0VnM (introduction)

https://www.youtube.com/watch?v=9u4azf206T0 (centrifugation)

https://www.youtube.com/watch?v=71MSBEwMGDA (diffusion)

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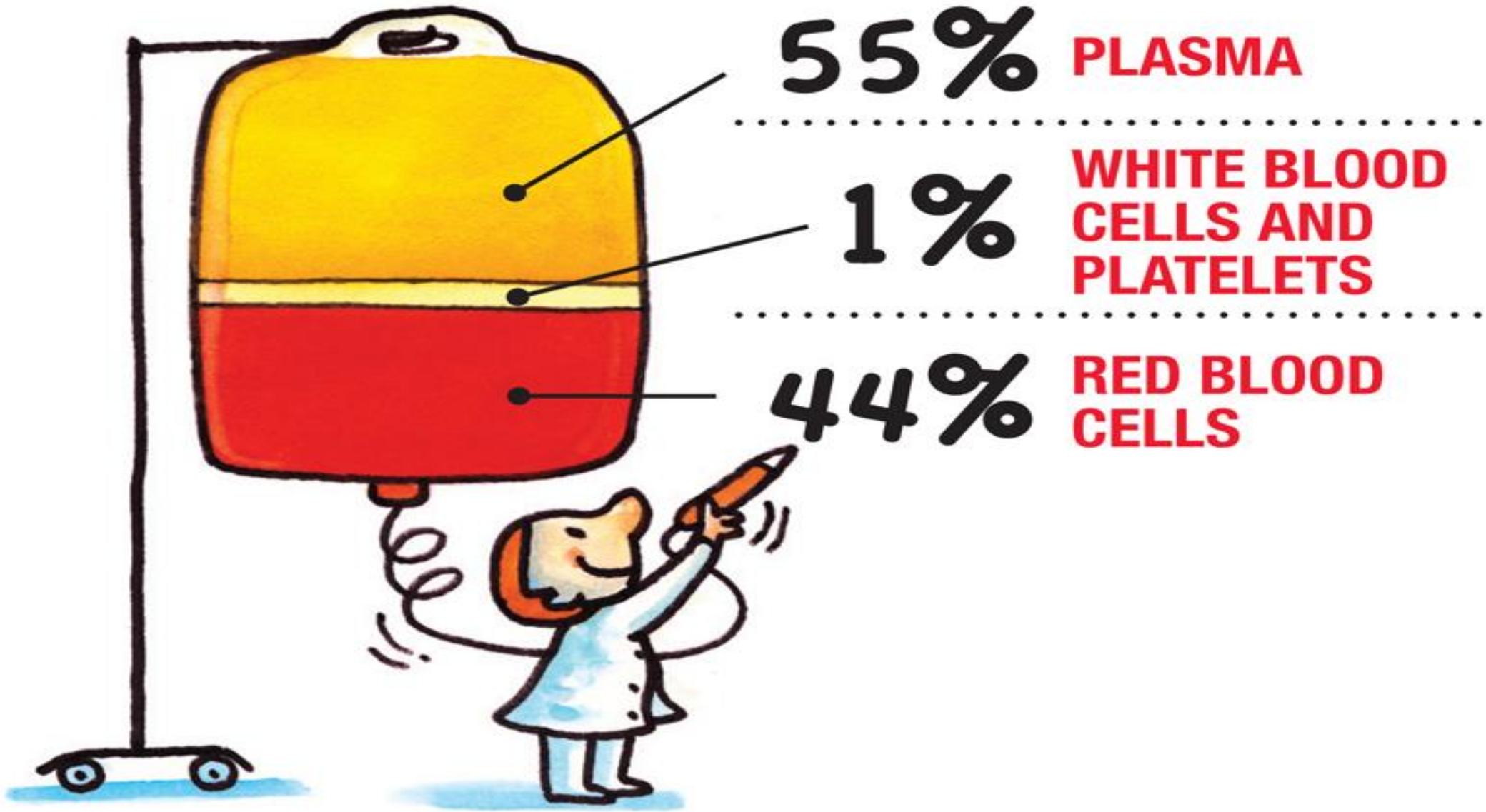
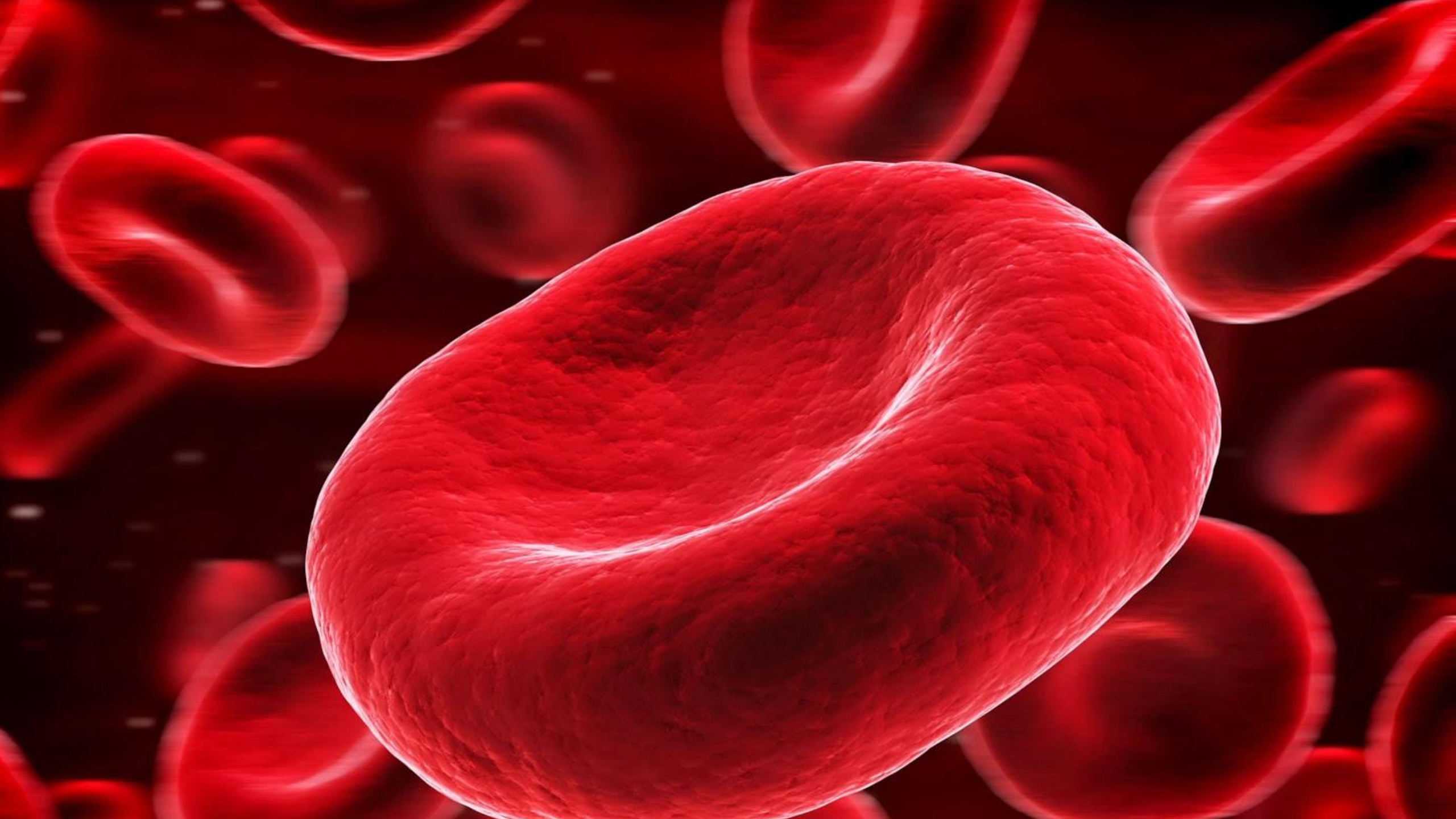
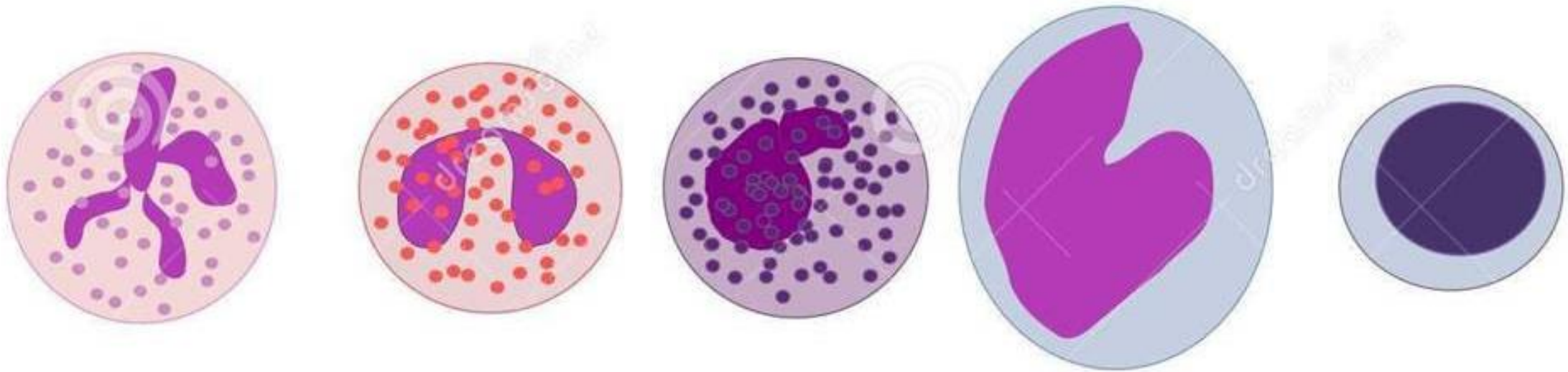
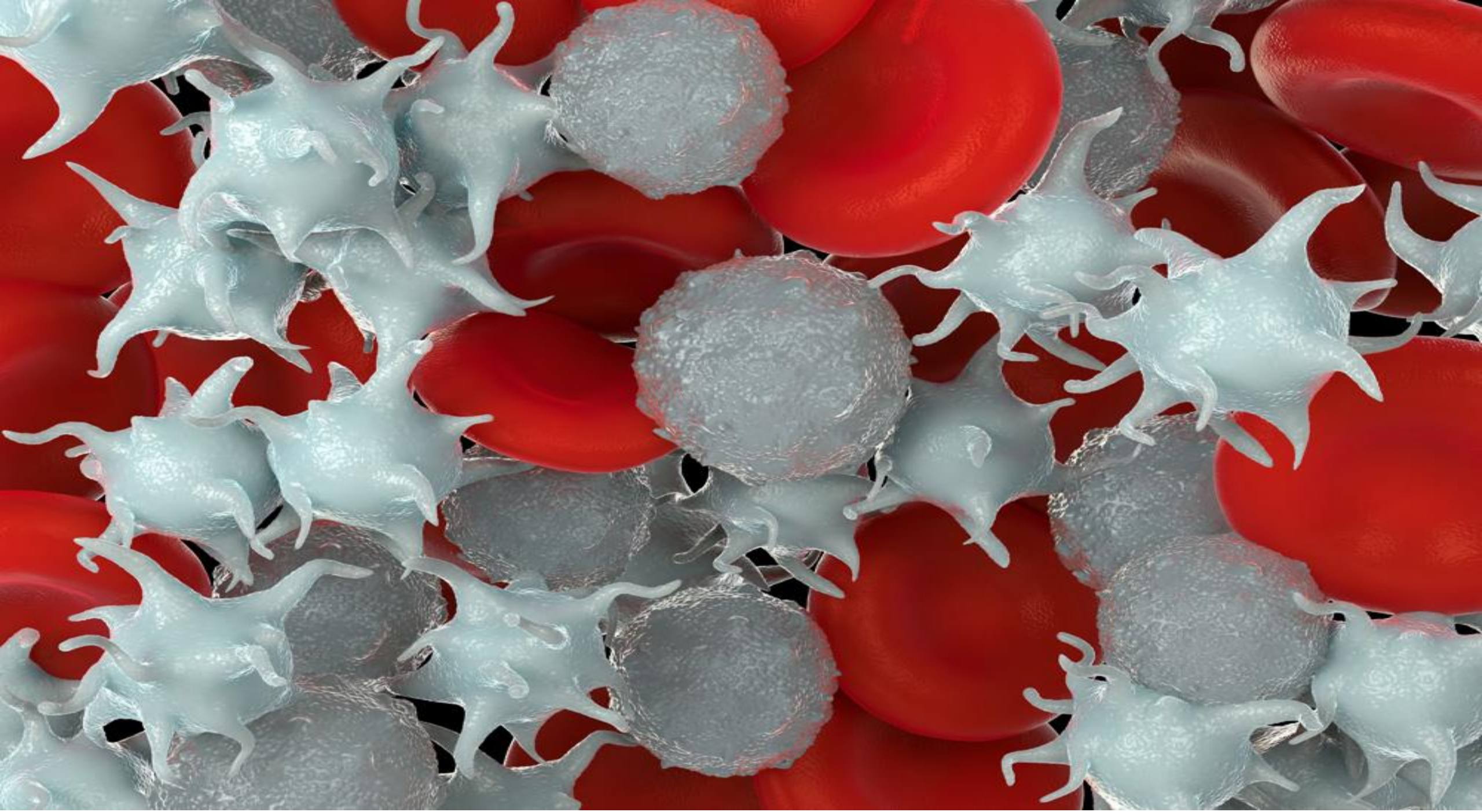

55%
PLASMA
1%
WHITE BLOOD CELLS AND PLATELETS
44%
RED BLOOD CELLS



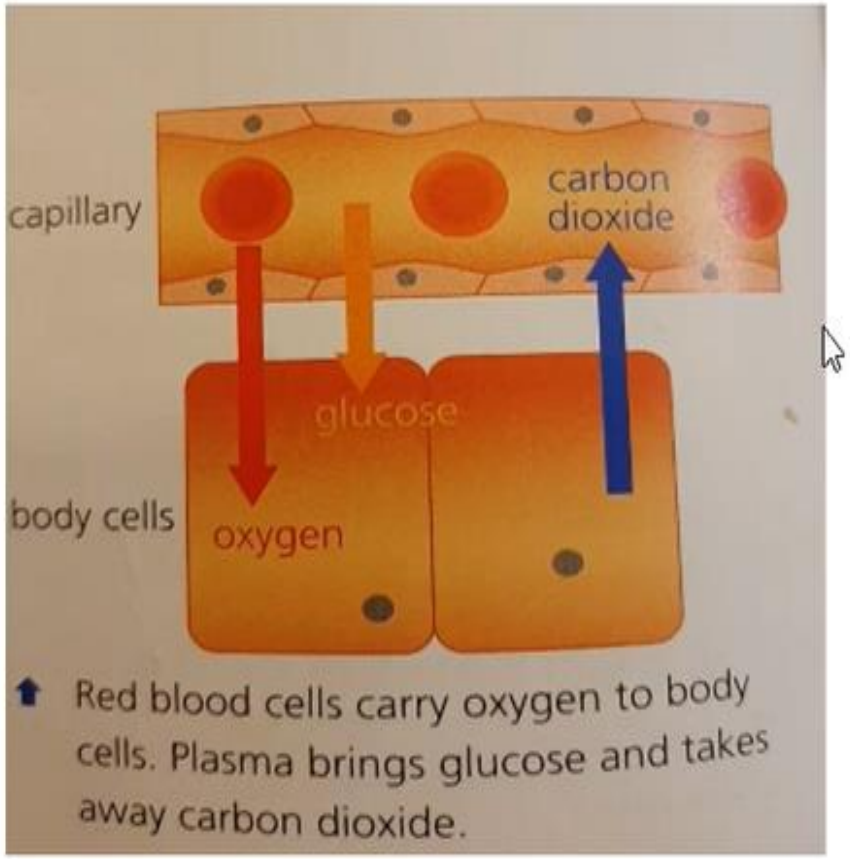


neutrophil eosinophil basophil monocyte lymphocyte



Page 112 / student book

The figure attached represents the diffusion of **oxygen and glucose** from the capillary into the cell where respiration takes place. **Carbon dioxide** is produced and then diffuses from the cell into the capillary to be transported in the blood back to your lungs .



Red blood cells carry oxygen to body cells. Plasma brings glucose and takes away carbon dioxide.

The word equation of respiration is :

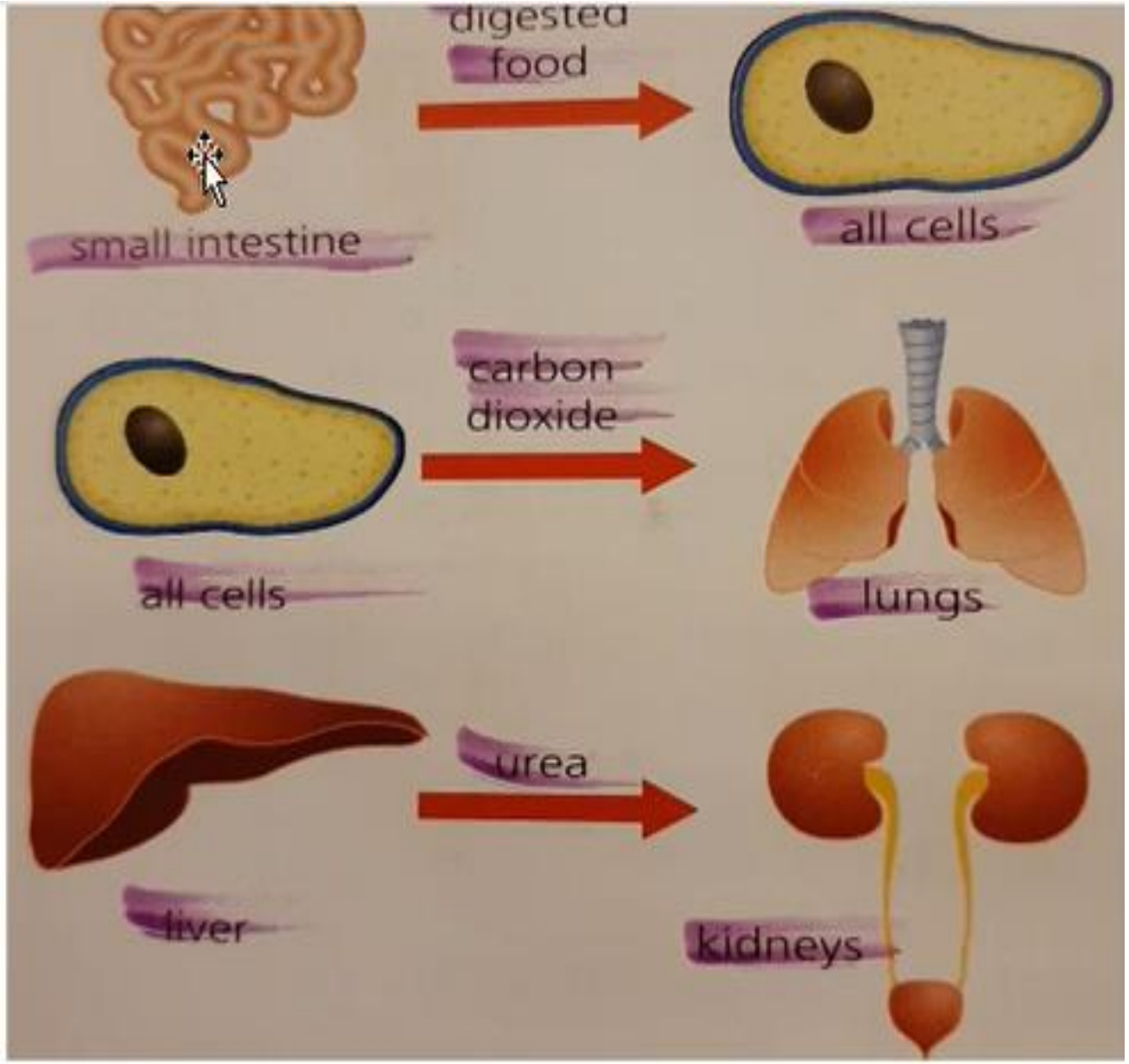
Oxygen + glucose ⟶ carbon dioxide + water + energy

Page 112 / student book

The figure shows the pathway of some substances in the blood ,for example after digestion in the small intestine, **nutrients** are absorbed into the blood stream to be transported to the cells .

Carbon dioxide (produced in every cell in the body after respiration) is also transported in the blood to the lungs .

Urea which is a substance that is produced when protein is digested into amino acids. In the small intestine these amino acids are absorbed into the blood and transported to the liver , the liver turns the amino acids to **urea** which is then transported in the blood to the kidneys .

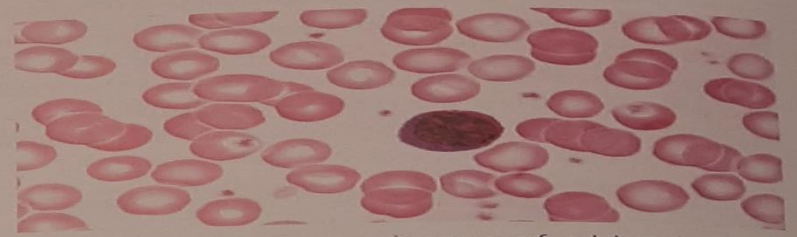


9.1 Blood

Objectives
- List the components of blood
- Describe the function of each component

Blood cells

Under a microscope you can see that blood isn't completely red. It is a watery liquid called **plasma** full of tiny cells. The largest cell in this microscope image is a **white blood cell**. It is stained purple to make it stand out. Cells like this help to destroy the micro-organisms that cause infectious diseases.

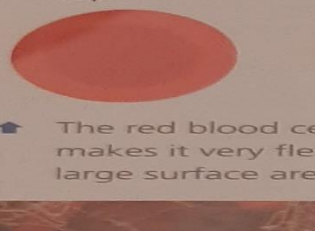


Light microscope image of a blood smear (magnified 1150 times).

The other cells are **red blood cells**. There are about 5000 million in each cubic centimetre of your blood. The SEM image on the left shows their 3D shape more clearly.

A light microscope makes the red cells look flat and hollow. In reality they are biconcave, which means both their sides curve inwards.

This shape is useful. It makes red blood cells flexible so they can squeeze through **capillaries** – your narrowest blood vessels. It also gives the cells a **large surface area**, which helps them pick up oxygen quickly as they pass through your lungs.



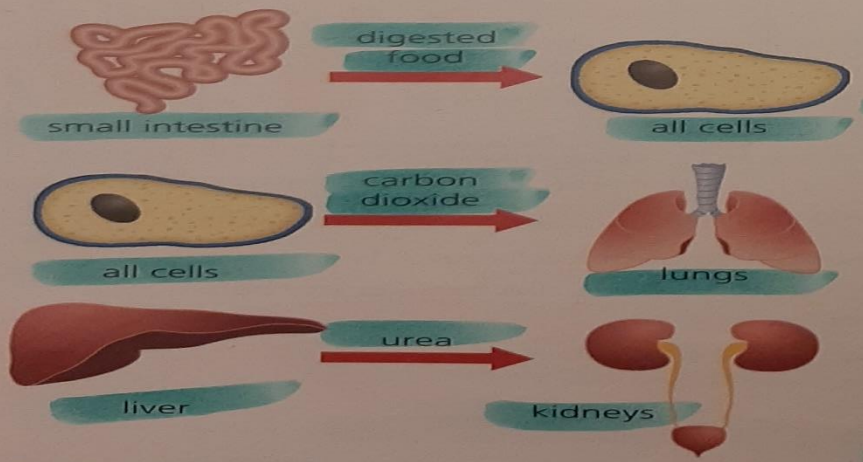
The red blood cell's biconcave shape makes it very flexible and provides a large surface area to take in oxygen.

The smaller purple objects in the light microscope image are **platelets**. If you cut a blood vessel the platelets gather around the damaged area to stop blood leaking out. At the same time proteins in the plasma form a tangle of fine strands. These trap red blood cells and seal the wound.

Plasma

Your blood transports lots of substances, and plasma carries them all except oxygen. Plasma transports digested food from the small intestine, carbon dioxide from respiring cells, and **urea**.

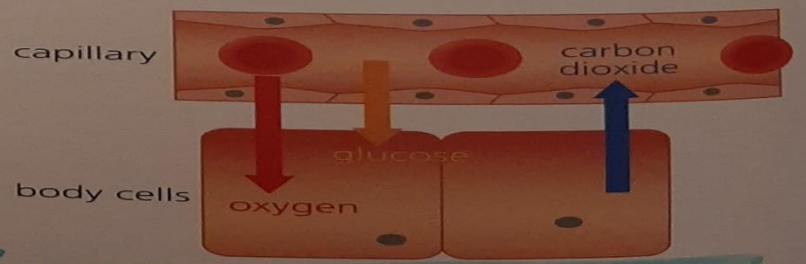
Urea is a waste product made in your liver. Your blood plasma carries urea to your **kidneys** to be excreted in your **urine**.



Blood plasma transports substances around your body.

Capillaries

Every cell in your body is close to a capillary so it can collect oxygen from passing red blood cells. Dissolved substances always move from where they are concentrated to where their molecules are more spread out. This is **diffusion**. So oxygen and glucose **diffuse** into cells and carbon dioxide diffuses into blood.



Red blood cells carry oxygen to body cells. Plasma brings glucose and takes away carbon dioxide.

Blood tests

Not included

The protozoa invading these red cells cause malaria

The protozoa in this blood cause sleeping sickness

This blood is from a child with sickle cell anaemia

1. Copy and complete this table to show the function of each component of blood.

Blood component	Main function
red blood cell	
white blood cell	
platelet	
plasma	

2. Draw a side view of a red blood cell to show its biconcave shape.
3. Give three reasons why red blood cells are good at carrying oxygen.
4. Copy and complete this table to show what blood transports.

Substance	From	To
oxygen		
carbon dioxide		
digested food		
urea		

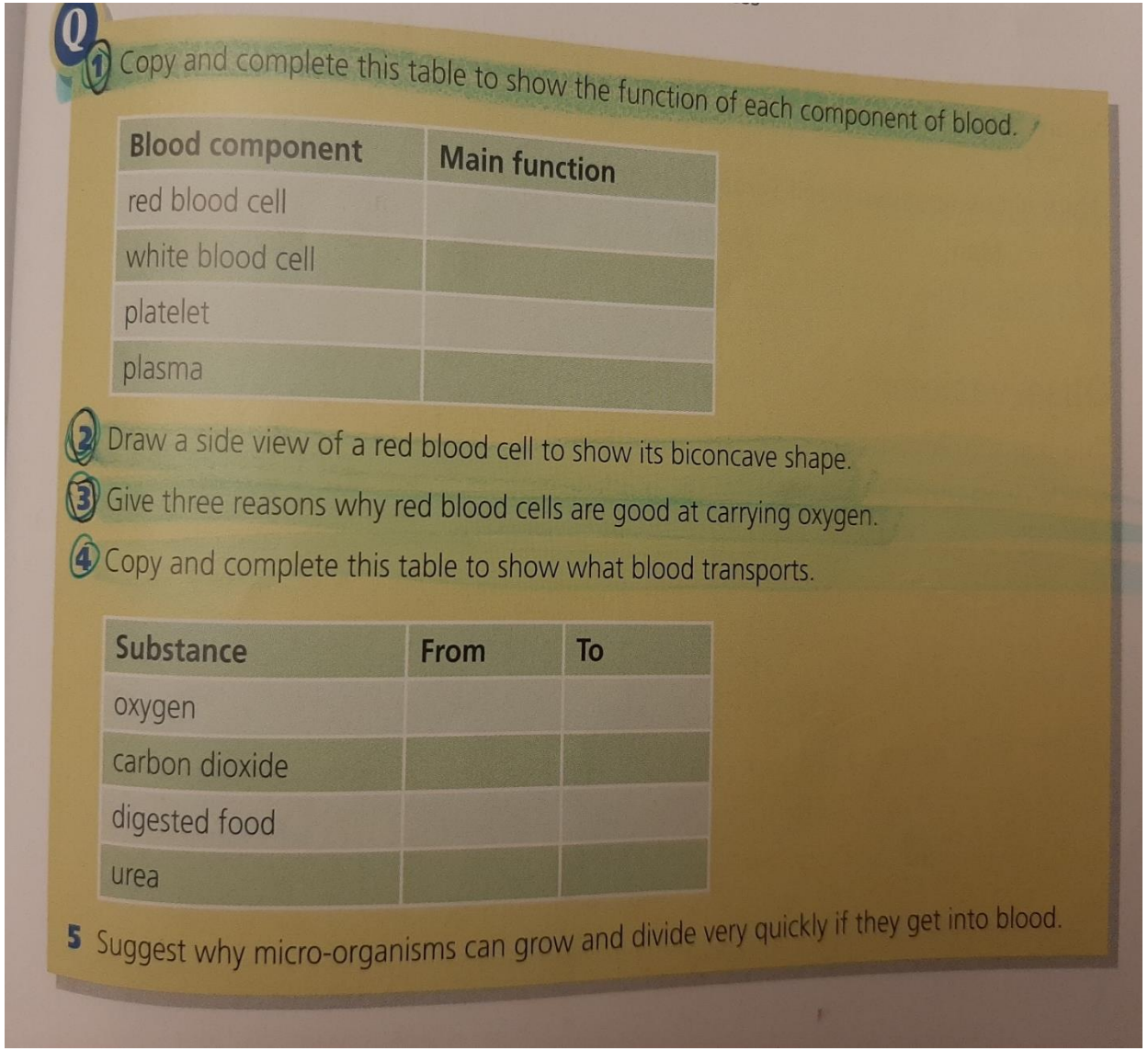
5. Suggest why micro-organisms can grow and divide very quickly if they get into blood.

- Blood contains liquid plasma, platelets, and red and white blood cells.
- Digested food, carbon dioxide, and urea are carried in the plasma.
- Oxygen is carried in red blood cells bound to haemoglobin.

Page 113 questions 1

Q1.

Blood component	Main function
red blood cell	Picks up oxygen in the lungs and transports it to every other part of the body. /Or carries oxygen.
white blood cell	Helps to destroy micro-organisms. /Or fights diseases.
platelet	Stops bleeding / or wound healing
plasma	Carries nutrients, carbon dioxide, and waste products in your blood.



Q

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5 Suggest why micro-organisms can grow and divide very quickly if they get into blood.

Page 113 questions 3,4

Q1.

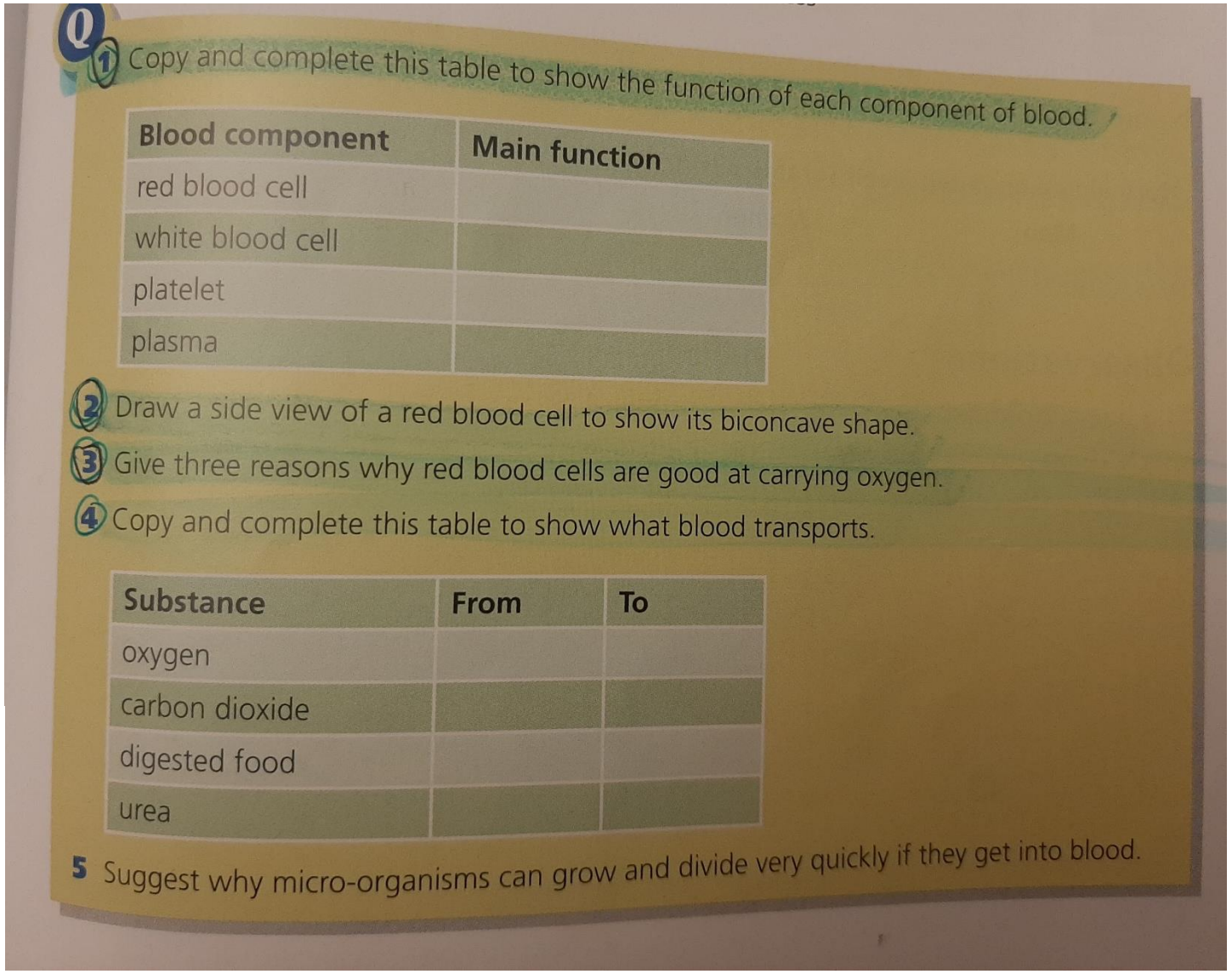
1. Their biconcave shape makes them flexible and lets them squeeze through tiny capillaries.

2. Their shape also gives them a large surface area so they can pick up oxygen quickly.

3. They are full of haemoglobin which binds oxygen in the lungs and releases it in other tissues.

Q4.

Substance	From	To
oxygen	lungs	every cell
carbon dioxide	every cell	lungs
digested food	small intestine	every cell
urea	liver	kidneys



Q

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Blood component	Main function
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3 Give three reasons why red blood cells are good at carrying oxygen.

4 Copy and complete this table to show what blood transports.

Substance	From	To
oxygen		
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digested food		
urea		

5 Suggest why micro-organisms can grow and divide very quickly if they get into blood.

Workbook page 50

Circulation

9.1 Blood

1 The diagram shows part of a blood smear.

a Label the four main components of blood.

b Explain why most cells in a blood smear look paler in the centre.

Most cells look paler in the centre because red blood cells are biconcave – thinner in the middle.

2 Statements a-f refer to the four main components of blood.
Write the name of the correct component next to each statement.

a Carries oxygen around the body ..... red blood cells

b Needed to fight infections ..... white blood cells

c Packed full of haemoglobin ..... red blood cells

d The largest cells in your blood ..... white blood cells

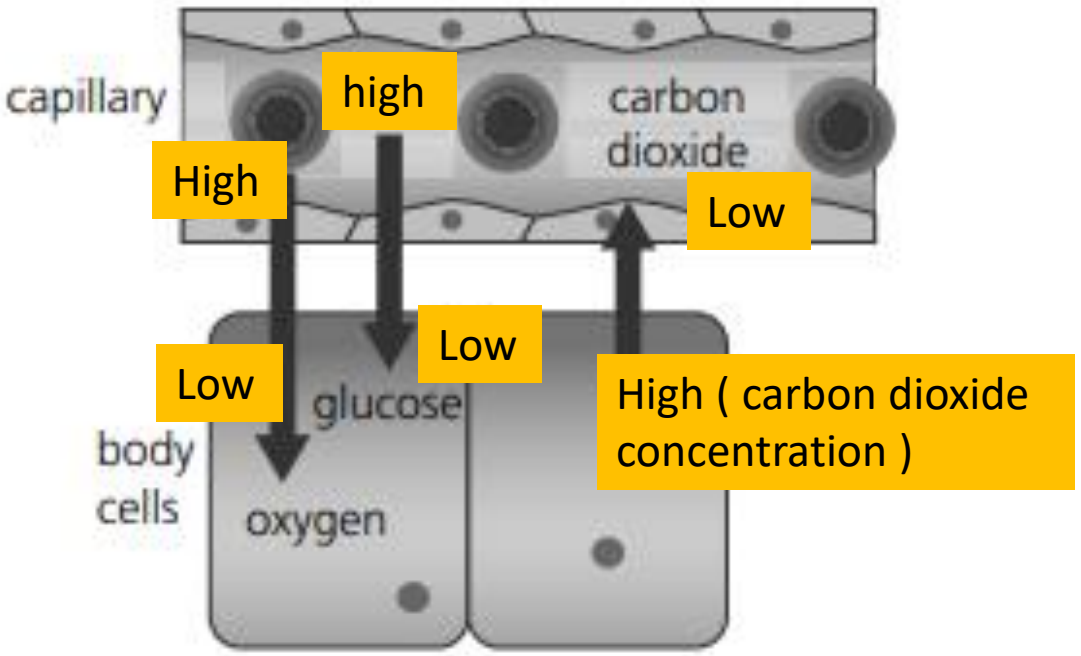
e A pale yellow liquid ..... plasma

f Carries dissolved substances around your body ..... plasma

g Helps to form a clot when a blood vessel is damaged ..... platelets

h Has a biconcave shape to increase its surface area ..... red blood cells

3a Labels should be added to the diagram as shown below.



Q3. b. Molecules move in and out of the blood by diffusion. They move from an area of high concentration to an area of low concentration of the particles