



# Blood, a vital fluid

## Reading Exercises Workbook

# C1

Agosto, 2019



## **INTRODUCTION**

This workbook has been designed to provide extra practice in Reading Comprehension for the Nursing Faculty students who are taking English level C1. It is an easy material to work with since it can be used by students in an independent way at the Self Access Center or by teachers as an activity class.

To use this workbook it is important to have a pre-intermediate English level since the user should have some basic reading competences developed as it is pointed in the English C1 Program such as: understanding the text, summarizing, identifying the main idea, skimming, scanning, etc. The topics included in this workbook reinforce knowledge in some subjects that corresponds to the Bachelor's in Nursing such as physiopathology and Nursing processes.

The reading texts were taken from the *Essential Atlas of Physiology* because it offers a wonderful opportunity to know the workings of the human body.



The main objectives of this material are to help students to develop different reading skills and to bring about a practical and educational work, which is useful, accessible, clear and entertaining.

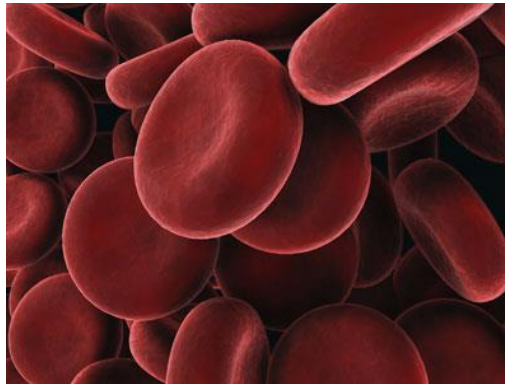


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## BLOOD



### 1.1 Composition and functions of blood.

#### **Blood, a vital fluid**

Blood is a reddish viscous fluid that is pumped by the heart. It travels throughout the whole body constantly, via the circulatory system. It has, among other functions that of transporting many elements to tissue cells to support their activity and also transporting waste products to the organs in charge of their elimination.

Text taken from: Essential Atlas of Physiology.  
Barron's

#### **Understanding the text.**

Instructions: After reading **Blood, a vital fluid**, answer these questions.

a. What is blood?

---

b. By what organ blood is pumped?

---



c. Throughout what system blood travels?

---

d. What are the two main functions of blood?

---

---

### **Blood Composition**

In an adult, there are approximately 5 liters of blood, made up of different components. Approximately 55% of the blood corresponds to plasma, a fluid that carries many dissolved substances. In the plasma, thousands of millions of various cellular elements float; they constitute the other 45% of the blood. There are three types of blood cells, each one with a different function. Red cells are responsible for transporting oxygen and carbon dioxide. There are different varieties of white cells, but their role is to take part in the defense of the body against infections. Platelets take part in the coagulation process, which stops bleeding.

Text taken from: Essential Atlas of Physiology. Barron's

### **Skimming**

Instructions: Skim the text and choose the answer to each question.

**a. How many liters are there more or less in an adult?**

1. three liters

2. four liters

3. five liters

**b. 55% of blood corresponds to:**

1. white cells

2. red cells

3. plasma



**c. What are the blood cells types?**

1. platelets, nutrients and white cells
2. white cells, red cells and platelets
3. red cells, vitamins and white cells

**d. They transport oxygen and carbon dioxide:**

1. red cells
2. white cells
3. platelets

**e. Their main function is to fight against infections.**

1. platelets
2. red cells
3. white cells

**f. They take part in the coagulation process:**

1. white cells
2. platelets
3. red cells

**Blood Plasma**

Plasma is a yellowish fluid mainly made up of water (90%) that transports blood cells and elements, such as nutrients, residues of metabolism, vitamins, hormones, and several products of diverse biological actions. Nutrients, such as sugars, fats, and amino acids; residues of metabolism, such as urea; and some materials travel freely in the plasma. But many are insoluble and form complexes with proteins that secure them to release them in the corresponding place. As a matter of fact, among the main components of plasma, there are several proteins, the main ones being albumins.

Text taken from: Essential Atlas of Physiology. Barron's



### Understanding the text

Instructions: Check (√) Yes or No

	Yes	No
a. Plasma is a fluid 80% made up of water	<input type="checkbox"/>	<input type="checkbox"/>
b. Plasma transports nutrients, vitamins, hormones and blood cells.	<input type="checkbox"/>	<input type="checkbox"/>
c. Nutrients and residues of metabolism travel with restraint in the plasma.	<input type="checkbox"/>	<input type="checkbox"/>
d. There aren't any proteins in the components of plasma.	<input type="checkbox"/>	<input type="checkbox"/>

#### The function of blood

Blood has different functions, but above all, it acts as a vehicle for several materials. It transports them inside the body; on the one hand, it delivers to all tissues the oxygen absorbed in the lungs, the nutrients acquired by the digestive system, the hormones produce by endocrine glands, and multiple elements necessary for the healthy performance of cells. On the other hand, it carries the residues of cellular metabolism, whose buildup would be toxic, to the organs in charge of their elimination or neutralization, such as kidneys and lungs. Blood also takes part in thermoregulation of the body, because it acts as a heating system distributing heat and keeping the right temperature for the proper performance of tissues. Finally, it also helps with the defense system that protects against infections.



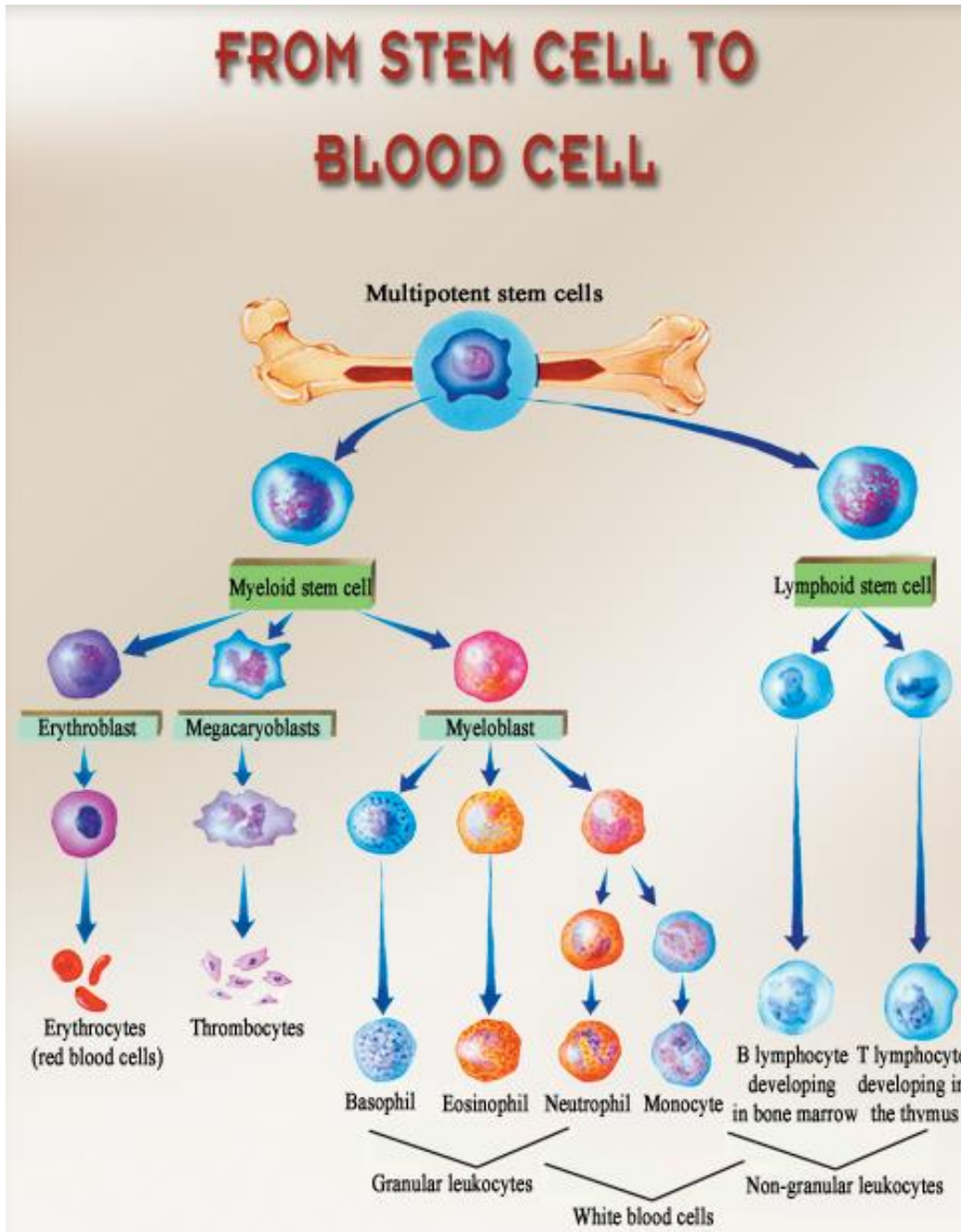


### Summarizing

Instructions: As a summary, complete this map with the information of "**The Function of Blood**".

THE FUNCTION OF BLOOD				
It transports:	It delivers:	It carries:	Thermoregulation acts as:	It helps:
-	- - - -	-	-	-

**1.2 Blood formation.**





### **Blood formation**

Blood cell formation is a continuous process, called hematopoiesis, taking place mainly in the bone marrow, which is inside of some bones. In a lesser degree, it also takes place in the immune system organs, such as the spleen and lymph nodes. There are some pluripotent stem cells (precursor cells of all blood cells) in the bone marrow. They are able to reproduce and to differentiate to create monopotent stem cells, prepared for a specific type of blood cell. From their beginning, blood elements go through a maturation process, receiving different names as they advance in different stages, finally become red cells, white cells, or platelets that will go into the blood stream. Because blood cells have a limited life, each day an amount is produced to replenish the losses. That represents some astronomical figures: 100,000 to 200,000 million red cells, approximately 30,000 million white cells, and between 70,000 and 150,000 million platelets.

Text taken from: Essential Atlas of Physiology. Barron's

### **Skimming**

Instructions: Read **Blood Formation** and use a word from the box to complete the definition.

pluripotent stem cells      Hematopoiesis      maturation process

a. Blood cell formation is a continuous process called:

---

b. Precursor cells of all blood cells:

---

c. Process in which red cells, white cells and platelets are ready to go into the blood stream.

---



### **The life of red cells**

Red cells are incomplete cells, because they lack a nucleus and that means that after some time of circulating throughout the body they lose vitality and are destroyed. They are formed in the bone marrow from pluripotent cells in a process called erythropoiesis that lasts between 5 and eight days. From the bone marrow they go to the blood to play their role. On average, they remain in perfect condition to perform their function for about three months. After that period, once they get old, red cells are destroyed when passing through the spleen.

Text taken from: Essential Atlas of Physiology. Barron's

### ***Understanding the main idea***

Instructions: Answer the following questions.

a. Why are red cells incomplete cells?

---

b. Where are red cells formed?

---

c. How long does the erythropoiesis process last?

---

d. How long do red cells remain in perfect condition?

---

e. What happens when red cells get old?

---



**DONATE BLOOD, DONATE LIFE**

Blood banks need large amounts of blood in order to respond to multiple situations (accidents, surgeries, transplants, etc.). To qualify as a donor and help save lives, a person has to be between 18 and 65 years old, weigh over 80 pounds, and be in good health.

Text taken from: Essential Atlas of Physiology. Barron's

**Summarizing**

Instructions: Complete the requirements chart for becoming a blood donor.

<b>Donate blood, Donate life!!!!</b>	Age:
	Weight:
	Health:



### 1.3 Function of red cells.

#### **Predicting**

Instructions: You are going to read about the function of red cells.

- What do you think red cells are?
- What do you think is their main function?

Instructions: Read the text and check your predictions.

Red cells have a vital function: **they** are in charge of transporting oxygen from the lungs to the tissues, where cells use **it** in their metabolic process. **They** also transport carbon dioxide from the tissues to the lungs to be eliminated and to prevent its buildup. This function is carried out by a pigment, hemoglobin, which is contained in red cells, and is also responsible for giving blood its characteristic coloration. It could be said that red blood cells act simply as hemoglobin “containers”, because their purpose is to travel inside the circulatory system going through the lungs and tissues repeatedly so that the pigment can transport those gases back and forth.

#### **Identifying cohesion**

Instructions: Look again at the text. Find the following phrases and decide what the words in **italics** refer to.

- they** are in charge of transporting oxygen \_\_\_\_\_
- where cells use **it** in their metabolic process \_\_\_\_\_
- they** also transport carbon dioxide \_\_\_\_\_



### **Identifying the main idea**

Instructions: Tick (✓) the main function of red cells.

- help fight infection
- carry oxygen to tissues
- help form blood clots that control bleeding

### **1.4 Hemoglobin**

Hemoglobin is made up of two essential elements from which its name derives: one compound called heme group and some proteins of a globin type. Each hemoglobin molecule has four heme groups combined in four chains of globins. The heme group has one iron atom that is capable of binding oxygen to transport it in the blood. When it becomes exposed to a high concentration of oxygen, as when it passes through the lungs, each hemoglobin molecule can affix four molecules of oxygen, which join the corresponding iron atoms; thus oxyhemoglobin occurs, having a bright red color. When the concentration of oxygen decreases and carbon dioxide concentration increases, hemoglobin releases oxygen to give it to the tissues. At the same time, hemoglobin incorporates a molecule of carbon dioxide to transport it to the lungs, becoming carboxyhemoglobin, which has a bluish color. Hemoglobin passes the carbon dioxide to the lungs to be eliminated through breathing and one more time it incorporates oxygen, beginning anew the continuous cycle that ensures the gas exchange between the body and the outside.

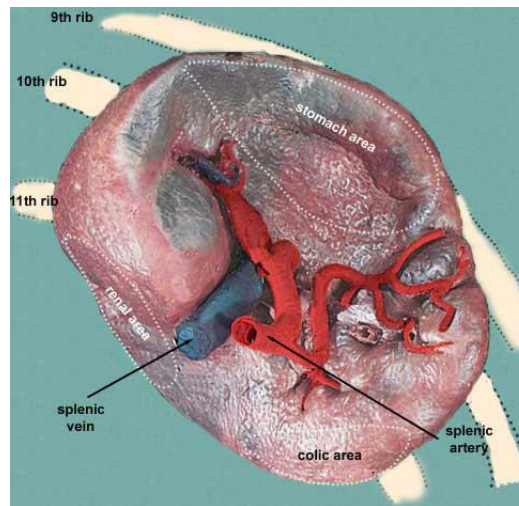
### **Scanning**

Instructions: Read these questions. Then scan the text below to find the answers. Underline them. ⌚ 3 minutes.

1. How many main elements does hemoglobin have?
2. How many heme groups does a hemoglobin molecule have?
3. What is the iron atom able to do?
4. What does it happen when the concentration of oxygen decreases and the carbon dioxide increases?

5. What is carboxyhemoglobin?
6. Through what is carbon dioxide eliminated?

### 1.5 Functions of the spleen.



The spleen is a spongy organ, which under normal conditions, is full of blood. One of its functions is to provide a blood reservoir that empties into the blood stream in any emergency situation, such as when there is a severe bleeding. But the main function of spleen is to destroy worn out red cells. When the red cells lose their vitality and their walls get deformed, they stay trapped in the spleen and are destroyed, although their components go to the blood to be recycled, especially the iron in hemoglobin.

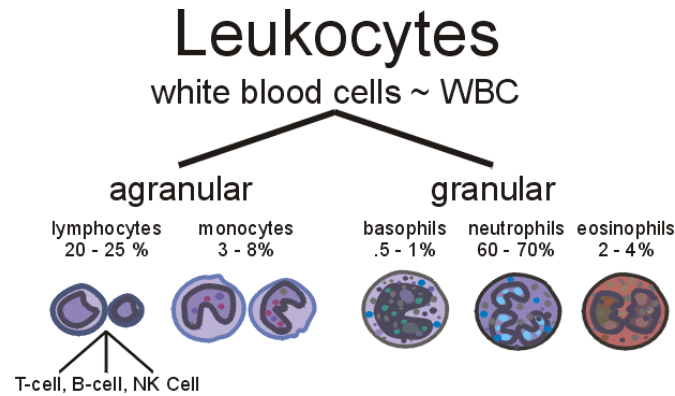
#### Summarizing

Instructions: What are the main two functions of spleen? Fill in the blanks according to the text above.

Organ	Functions
spleen	



## 1.6 White cells.



White cells are also called leukocytes. They are the least numerous blood cells and are of different types. They all have a nucleus, and some of them have a multilobed nucleus that, when seen under the microscope, appears to be more than one. There are two groups of white cells: multinuclear and mononuclear. Multinuclear leukocytes are also called granulocytes, because when they are studied under the microscope, they show granules inside. These granules contain needed materials for their leukocyte activity. There are three different subgroups: neutrophils, eosinophils, and basophils. Mononuclear leukocytes are of two kinds: monocytes, the largest blood cells, and lymphocytes, which are much smaller but more numerous. These lymphocytes are classified according to their activity into B-lymphocytes and T-lymphocytes. All white cells take part in the immune system and although some stay in the blood during a large part of their active life, others leave the circulatory system to penetrate different organic tissues and defend against foreign objects.

### **Understanding the main idea**

Instructions: Read the questions and write your answers

1. How are white cells called?

2. How many groups of white cells are? What are their names?

3. Why are multinuclear leukocytes called granulocytes?

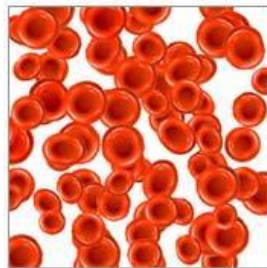
4. What are de granulocytes subgroups?

5. What are the two mononuclear leukocytes kinds?

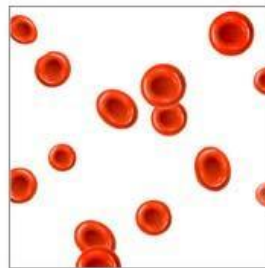
6. What are some of the white cells functions?

### Anemia

Normal amount of  
red blood cells



Anemic amount of  
red blood cells



### Predicting

Instructions: Look at the images and describe the differences between them.

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Instructions: You are going to read a short paragraph about anemia. Before you read, guess true (T) or false (F) for each of these statements.

- \_\_\_ Anemia is a very dangerous illness.
- \_\_\_ Anemia is characterized by an increase of hemoglobin.
- \_\_\_ Fatigue is one of the anemia's manifestations.



Anemia is a very common disorder, characterized by a decrease in the levels of hemoglobin and a decrease in red cells concentration. Consequently anemia manifests as paleness and fatigue, because the tissues cannot receive all the oxygen needed for their proper performance. Causes of anemia can be extremely varied: some times it is bleeding that causes an exaggerated or repeated loss of red cells and the hemoglobin in them; other times, it is a failure in the formation of hemoglobin or red cells, either because of genetic reasons or cause by a depletion of needed elements, such as iron, folic acid, or vitamin B12.

### ***Understanding the text***

Instructions: Answer the following questions.

1. Anemia is a disorder characterized by:

\_\_\_\_\_

2. What are two of the main anemia's manifestations?

\_\_\_\_\_

3. Why do people who suffer from anemia are pale and fatigued?

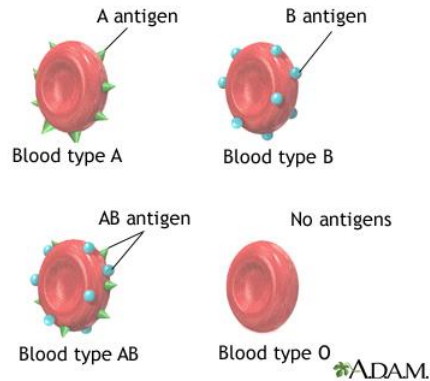
\_\_\_\_\_

4. What are some of the causes of anemia?

\_\_\_\_\_

\_\_\_\_\_

## 1.7 Blood groups.



In humans, blood is classified in different groups, depending on the presence or the absence of certain antigens on the surface of red cells. Their existence is determined genetically and is subjected to hereditary laws. This classification determines the degree of blood compatibility, that is, the possibility of using blood from one individual to give transfusions to another one without resulting problems. When you give blood from one person with a particular blood type, to another person with a different blood type, the donor's red cells introduced in the recipient's bloodstream may be attacked and destroyed by the antibodies present in the plasma. That would cause an incompatibility reaction, which could be slight and temporary, but in other cases, it could be so severe that could be fatal. Several antigens have been identified on the surface of the red cells, but the most important ones that are taken into consideration when giving blood are the ones corresponding to ABO system and Rh factor.

### **Understanding the text**

Instructions: Answer the following questions.

1. What is taken into consideration to classify blood in different groups?

---

2. What does this blood classification determine?

---

3. Why is it important to check blood compatibility?

---

---

4. What happens if you give blood to a person with different blood type?

---





---

5. What are the most important antigens taken into consideration when giving blood?

---

---

### 1.8 ABO system

The ABO Blood System				
Blood Type (genotype)	Type A (AA, AO)	Type B (BB, BO)	Type AB (AB)	Type O (OO)
Red Blood Cell Surface Proteins (phenotype)	 A agglutinogens only	 B agglutinogens only	 A and B agglutinogens	 No agglutinogens

The ABO system is based on the existence of two antigens in the surface of red cells, named A and B. depending on the presence or the absence of one or both antigens, four different blood types can be distinguished. In type A blood, only the A antigen is present. In type B blood, only the B antigen is present. In type AB blood, both antigens are present, and in the O group, neither is present. At the same time the absence of a particular antigen on the surface of the red cells is associated with the presence in the plasma of specific antibodies against that antigen responsible for incompatibility reactions. Thus, in type A blood there are anti-B antibodies and in type B blood, there are anti-A antibodies. In type O blood, there are anti-A and anti-B antigens; however blood type AB has neither one.

### Summarizing

Instructions: According to the text, complete the ABO Blood System table.

Blood type	Type A	Type B	Type AB	Type O
ANTIGENS				

### 1.9 Blood compatibility.

Blood Type	Antigen (RBC membrane)	Antibody (plasma)	Can receive blood from	Can donate blood to
A (40%)	A antigen	Anti-B antibodies	A, O	A, AB
B (10%)	B antigen	Anti-A antibodies	B, O	B, AB
AB (4%)	A antigen B antigen	No antibodies	A, B, AB, O	AB
O (46%)	No antigen	Both Anti-A and Anti-B antibodies	O	O, A, B, AB

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If someone group A were to have a type B blood transfusion, the anti-B antibodies present in the plasma of the recipient would react against the donor's red cells containing B antigen and they would destroyed them. The same would happen if type A blood were used to transfuse a type B blood individual, because the anti-A antibodies in the plasma would destroy the red cells of the blood received. However if a type AB person were given a different type blood, there would be hardly any problems, because there are no anti-A or anti-B antigens present and therefore and the red cells would not be attacked. A person with a type AB blood is considered a universal recipient. However an individual with a type O blood cannot be given blood from any other blood type, because the plasma contains antibodies that would destroy the red cells given. Type O red cells do not have any surface antigen, so they can be given to people from other groups without any risks: people with type O blood are considered universal donors.

### Summarizing

Instructions: Complete the table with information from the text.

Blood type	ANTIGEN	ANTIBODY (PLASMA)	CAN RECEIVE BLOOD FROM	CAN DONATE BLOOD TO
A				
B				
AB				
O				



### 1.10 Rh factor.

Rh factor is an antigen on the surface of red cells present in approximately 85% of people considered Rh positive (Rh+). Rh factor is absent in the rest, who are considered Rh negative (Rh-). If blood from a person with Rh+ is given to an individual with Rh-, the recipient generates anti-Rh antibodies that destroy the transfused red cells. Therefore, blood from an individual with Rh- can be given to people with Rh+ but not the other way around. In cases of incompatibility between mother and child (mother Rh negative and baby Rh positive) anti-Rh immunoglobulin must be administered to the pregnant woman to prevent hemolytic disease of newborn (HDN).

#### **Understanding the text**

Instructions: After reading the text, provide the information required.

1. What happens if blood from a person with Rh+ is given to a person with Rh-

---

2. Can blood from an individual with Rh- be given to a person with Rh +?

---

3. What can be done when there is a blood incompatibility between mother and child?

---





### 1.11 Function of platelets: coagulation.

Platelets are the smallest corpuscles in the blood. They participate actively in the coagulation (clotting) mechanism whose purpose is to stop bleeding caused by wounds in blood vessels and to prevent blood loss. Coagulation is a very complex process, where not only the platelets take part but also other materials present in plasma called coagulation factors are involved. When a vessel tears, the platelets clump upon each other in the hole and release one of those clotting factors, which activates the others. The final objective of those reactions is to take a material dissolved in the plasma, fibrinogen, and turn it into a solid material, fibrin. This material adheres to the platelets and other blood elements, forming a solid clot that seals the opening.

#### **Understanding the text**

Instructions: Read the text and answer the question.

1. What is the synonym of coagulation?

---

2. What's the purpose of coagulation?

---

3. Describe the coagulation process.

---

---

---



## ANSWER KEY

### 1.1 Composition and functions of blood.

#### Understanding the text.

Instructions: After reading **Blood, a vital fluid**, answer these questions.

- What is blood? A reddish viscous fluid that is pumped by the heart
- By what organ blood is pumped? The heart
- Throughout what system blood travels? The circulatory system
- What are the two main functions of blood? To transport many elements to tissue cells to support their activity and to transport waste products to the organs in charge of elimination.

#### Skimming

Instructions: Skim the text and choose the answer to each question.

- How many liters are there more or less in an adult?**  
3. five liters
- 55% of blood corresponds to:**  
3. plasma
- What are the blood cells types?**  
2. white cells, red cells and platelets
- They transport oxygen and carbon dioxide:**  
1. red cells
- Their main function is to fight against infections.**  
3. white cells
- They take part in the coagulation process:**  
2. platelets

#### Understanding the text

Instructions: Check (√) Yes or No

- |   | Yes                      | No                                  |
|---|--------------------------|-------------------------------------|
| a. Plasma is a fluid 80% made up of water | <input type="checkbox"/> | <input checked="" type="checkbox"/> |



b. Plasma transports nutrients, vitamins, hormones and blood cells.	X	
c. Nutrients and residues of metabolism travel with restraint in the plasma.		X
d. There aren't any proteins in the components of plasma.		X

### Summarizing

Instructions: As a summary, complete this map with the information of "**The Function of Blood**".

THE FUNCTION OF BLOOD				
It transports:	It delivers:	It carries:	Thermoregulation acts as:	It helps:
-several materials inside the body	-oxygen -hormones -nutrients	- the residues of cellular metabolism, whose buildup would be toxic, to the organs in charge of their elimination or neutralization	- a heating system distributing heat and keeping the right temperature for the proper performance of tissues	- with the defense system that protects against infections.

## 1.2 Blood formation.

### Skimming

Instructions: Read **Blood Formation** and use a word from the box to complete the definition.

- Blood cell formation is a continuous process called: hematopoiesis
- Precursor cells of all blood cells: pluripotent stem cells
- Process in which red cells, white cells and platelets are ready to go into the blood stream. Maturation process



### **Understanding the main idea**

Instructions: Answer the following questions.

- a. Why are red cells incomplete cells? because they lack a nucleus
- b. Where are red cells formed? They are formed in the bone marrow from pluripotent cells
- c. How long does the erythropoiesis process last? between 5 and eight days
- d. How long do red cells remain in perfect condition? three months
- e. What happen when red cells get old? They are destroyed when passing through the spleen

### **Summarizing**

Instructions: Complete the requirements chart for becoming a blood donor.

<b>Donate blood, Donate life!!!!</b>	Age: 18-65
	Weight: 80 pounds
	Health: good

### **1.3 Function of red cells.**

#### **Predicting**

Instructions: You are going to read about the function of red cells.

- a. What do you think red cells are? Answers may vary
- b. What do you think is their main function? Answers may vary

Instructions: Read the text and check your predictions.



### Identifying cohesion

Instructions: Look again at the text. Find the following phrases and decide what the words in **italics** refer to.

- they** are in charge of transporting oxygen red cells
- where cells use **it** in their metabolic process oxygen
- they** also transport carbon dioxide red cells

### Identifying the main idea

Instructions: Tick (✓) the main function of red cells.

**Answers may vary.**

- help fight infection
- carry oxygen to tissues
- help form blood clots that control bleeding

## 1.4 Hemoglobin

### Scanning

Instructions: Read these questions. Then scan the text below to find the answers. Underline them. ⌚ 3 minutes.

- How many main elements does hemoglobin have? two
- How many heme groups does a hemoglobin molecule have? four
- What is the iron atom able to do? To bind oxygen to transport it in the blood
- What happen when the concentration of oxygen decreases and the carbon dioxide increases? hemoglobin releases oxygen
- What is carboxyhemoglobin? When hemoglobin incorporates a molecule of carbon dioxide
- Through what is carbon dioxide eliminated? The lungs, breathing



### 1.5 Functions of the spleen.

#### Summarizing

Instructions: What are the main two functions of spleen? Fill in the blanks according to the text above.

Organ	Functions
spleen	Provide a blood reservoir that empties into the blood stream in an emergency situation.
	To destroy worn out red cells

### 1.6 White cells.

#### Understanding the main idea

Instructions: Read the questions and write your answers

1. How are white cells called? leukocytes
2. How many groups of white cells are? What are their names? There are two groups of white cells: multinuclear and mononuclear
3. Why are multinuclear leukocytes called granulocytes? because when they are studied under the microscope, they show granules inside
4. What are de granulocytes subgroups? neutrophils, eosinophils, and basophils
5. What are the two mononuclear leukocytes kinds? monocytes, the largest blood cells, and lymphocytes, which are much smaller but more numerous
6. What are some of the white cells functions? All white cells take part in the immune system and although some stay in the blood during a large part of their active life, others leave the circulatory system to penetrate different organic tissues and defend against foreign objects



## Anemia

### Predicting

Instructions: Look at the images and describe the differences between them.

Answers may vary

Instructions: You are going to read a short paragraph about anemia. Before you read, guess true (T) or false (F) for each of these statements.

- F Anemia is a very dangerous illness.
- F Anemia is characterized by an increase of hemoglobin.
- T Fatigue is one of the anemia's manifestations.

### Understanding the text

Instructions: Answer the following questions.

- Anemia is a disorder characterized by: a decrease in the levels of hemoglobin and a decrease in red cells concentration
- What are two of the main anemia's manifestations? paleness and fatigue
- Why do people who suffer from anemia are pale and fatigued? because the tissues cannot receive all the oxygen needed for their proper performance
- What are some of the causes of anemia? Bleeding, a failure in the formation of hemoglobin or red cells, a depletion of needed elements, such as iron, folic acid, or vitamin B12.



## 1.7 Blood groups.

### Understanding the text





Instructions: Answer the following questions.

1. What is taken into consideration to classify blood in different groups? the presence or the absence of certain antigens on the surface of red cells
2. What does this blood classification determine? the degree of blood compatibility
3. Why is it important to check blood compatibility? Because it shows the possibility of using blood from one individual to give transfusions to another one without resulting problems
4. What happens if you give blood to a person with different blood type? the donors red cells introduced in the recipient's bloodstream may be attacked and destroyed by the antibodies present in the plasma
5. What are the most important antigens taken into consideration when giving blood? the ones corresponding to ABO system and Rh factor

## 1.8 ABO system

### Summarizing

Instructions: According to the text, complete the ABO Blood System table.

Blood type	Blood Type A	Blood Type B	Blood Type AB	Blood Type O
ANTIGENS	 A	 B	 A and B	 No antigens





### 1.9 Blood compatibility.

#### Summarizing

Instructions: Complete the table with information from the text.

Blood type	ANTIGEN	ANTIBODY (PLASMA)	CAN RECEIVE BLOOD FROM	CAN DONATE BLOOD TO
A	A	B	A,O	A,AB
B	B	A	B,O	B,AB
AB	AB	No antibodies	A,B,AB,O	AB
O	No antigen	A and B antibodies	O	O,A,B,AB

### 1.10 Rh factor.

#### Understanding the text

Instructions: after reading the text, provide the information required.

1. What happens if blood from a person with Rh+ is given to a person with Rh-? the recipient generates anti-Rh antibodies that destroy the transfused red cells
2. Can blood from an individual with Rh- be given to a person with Rh +? Yes it can
3. What can be done when there is a blood incompatibility between mother and child? anti-Rh immunoglobulin must be administer to the pregnant woman to prevent hemolytic disease of newborn (HDN)



### 1.11 Function of platelets: coagulation.

#### **Understanding the text**

Instructions: Read the text and answer the question.

1. What is the synonym of coagulation? clotting
2. What's the purpose of coagulation? to stop bleeding caused by wounds in blood vessels and to prevent blood loss
3. Describe the coagulation process. Coagulation is a very complex process, where not only the platelets take part but also other materials present in plasma called coagulation factors are involved. When a vessel tears, the platelets clump upon each other in the hole and release one of those clotting factors, which activates the others. The final objective of those reactions is to take a material dissolved in the plasma, fibrinogen, and turn it into a solid material, fibrin. This material adheres to the platelets and other blood elements, forming a solid clot that seals the opening.



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