

DISCOVER THE PLASMA

Middle School Project



PRESENTATION

HELLO ROOKIE!

This exercise book will take you through the process to become a true **“Grifols Expert.”** Throughout these pages, you will find various activities and challenges that will help you learn about how plasma industry helps to improve people’s lives. You will find some exercises to complete on your own and with others. You will learn about Grifols, what they do, how, for whom and why thousands of people work there. Are you up for it? It will be fun!

You’ll discover what plasma is and what it does in our body. You will also learn how we obtain this substance from a donor’s body and how we manufacture different products for the treatment of certain diseases. Finally, you’ll see how all this is possible due a great team of professionals who, through knowledge and constant innovation, make Grifols a pioneering company with a very important goal: to help save thousands of lives around the world.

In order to get your certification as a **“Grifols Expert,”** you must complete all the challenges of this exercise book and earn a badge for each Unit.



GRIFOLS

We are proud certify that

has become a **“Grifols Expert.”**

School



Clear challenges score points solid ones do not. You must transfer your points to blanks provided in the Score Table on page 2.

You must work individually at home on some of these challenges **(RESEARCH)** so you can later work on the group activities **(SHARE)** that we will do in class with the help of your classmates, and finally demonstrate your gained knowledge in the final challenges set up for each Unit **(CONCLUDE)**.

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You will have access to the virtual laboratory resources **(VIRTUAL LAB)** www.discovertheplasma.com, in which you will find, as directed by your teacher, the necessary information to investigate and resolve the various mysteries and challenges in each Unit.

**Are you ready? ...
Let's start!**



SCORE TABLE

Listen carefully to your teacher's instructions to complete the table correctly.

UNIT 1

PLASMA DONATION CAN SAVE LIVES

PART 1
WHAT IS PLASMA?

PART 2
WHAT IS A DONOR?

	CHALLENGE	POINTS	MIN.	MAX.	TOTAL
RESEARCH · PART 1	1				<input type="text"/> POINTS (of 10)* (*) Min.: 5 P
	2		1 P	2 P	
	3				
	4		1 P	2 P	
RESEARCH · PART 2	5				
SHARE · PART 1	6		3 P	6 P	
CONCLUDE · PART 1	7				
SHARE · PART 2	8				
CONCLUDE · PART 2	9	VOTES			

UNIT 2

BENEFITS FROM PLASMA SAFETY

PART 1
WHAT CAUSES A LACK OF PROTEINS?

PART 2
PLASMA SAFETY

	CHALLENGE	POINTS	MIN.	MAX.	TOTAL
RESEARCH · PART 1	10				<input type="text"/> POINTS (of 21)* (*) Min.: 11 P
RESEARCH · PART 2	11				
SHARE · PART 1	12				
	13		3 P	6 P	
	14		3 P	5 P	
SHARE · PART 2	15				
CONCLUDE · PART 2	16		5 P	10 P	
	17				

UNIT 3

OBTAINING PROTEINS

PART 1
LAB TESTING

PART 2
PLASMA FRACTIONATION

	CHALLENGE	POINTS	MIN.	MAX.	TOTAL
RESEARCH · PART 1	18		4 P	8 P	<input type="text"/> POINTS (of 19)* (*) Min.: 10 P
RESEARCH · PART 2	19				
SHARE · PART 1	20				
	21				
	22				
	23		4 P	7 P	
SHARE · PART 2	24				
CONCLUDE · PART 2	25		2 P	4 P	
	26				

UNIT 4

PLASMA-DERIVED MEDICINES

PART 1
MANUFACTURING

PART 2
LIFE-SAVING MEDICINES

	CHALLENGE	POINTS	MIN.	MAX.	TOTAL
RESEARCH · PART 1	27				<input type="text"/> POINTS (of 24)* (*) Min.: 13 P
RESEARCH · PART 2	28				
SHARE · PART 1	29		5 P	10 P	
	30				
	31		2 P	4 P	
CONCLUDE · PART 1	32		3 P	5 P	
SHARE · PART 2	33				
CONCLUDE · PART 2	34		3 P	5 P	

UNIT 5

MEET THE INDUSTRY

PART 1
CAREERS

PART 2
WHO IS GRIFOLS?

	CHALLENGE	POINTS	MIN.	MAX.	TOTAL
RESEARCH · PART 1	35				<input type="text"/> POINTS (of 25)* (*) Min.: 17 P
RESEARCH · PART 2	36				
SHARE · PART 1	37		10 P	10 P	
CONCLUDE · PART 1	38				
SHARE · PART 2	39		7 P	15 P	
	40				
CONCLUDE · PART 2	41				

RESEARCH

SHARE

CONCLUDE

WHAT IS PLASMA?

PART 1

Let's begin our introduction to this exciting adventure!

CHALLENGE 1



Look for the **Comic 1.1** that you will find in the **VIRTUAL LAB**. Read it carefully to learn more about our mission.

CHALLENGE 2



Search information about these two individuals on the **VIRTUAL LAB** and complete each worksheet with a small biographical summary. In order to complete the challenge, your summary should contain the keywords indicated in each case.



Keywords: BLOOD SPAIN RESEARCHER PLASMAPHERESIS

José Antonio Grífols

Keywords: DONOR VACCINE WORLD WAR II BIOCHEMIST

Edwin Cohn



CHALLENGE 3



View the **Video “What is Plasma?”** and the **Video “What is Plasmapheresis?”** You will find them in the **VIRTUAL LAB**.

RESEARCH

SHARE

CONCLUDE

CHALLENGE 4



Could you explain in your own words what plasma is? To get past the next challenge, write your own definition in the space below. We will combine the contributions of everyone in the classroom session.

What is plasma? What are the elements that make up plasma?



How is the plasmapheresis process performed? What is the purpose of plasmapheresis?

WHAT IS A DONOR?

PART 2

CHALLENGE 5



Check the rest of the **Unit 1 resources** in the **VIRTUAL LAB** so you will be prepared for the challenges and assignments that you will have to perform in class.

Pay close attention, since they will be key to performing the challenge in the second part of the class. You will find information about the donors and the reasons to donate.

These are the available resources:

- Comic 1.2**
- Video "Blood in the Veins"**
- Video "One Reason to Donate"**

Answer the following question. We will then discuss it in class:

Why do you think it is important to donate plasma?

WHAT IS PLASMA?

PART 1

CHALLENGE 6



Attention Rookie! The teacher will now explain the activity so we can put together the results of your research and elaborate on other important issues that you also need to learn about.

We will answer all these questions. You can refer back to all **VIRTUAL LAB** resources in Unit 1 to find the correct answers:

QUESTIONS

1 - What is the actual percentage of plasma in human blood?

- About 50%
- 90% approximately
- It depends on each person

2 - What is the most abundant protein in the blood?

- Albumin
- Immune Globulin
- They are both present in similar proportions

3 - What molecule present in plasma did Edwin Cohn fractionate in order to cure different diseases?

- Lipids
- Proteins
- Mineral salts

4 - What important body functions do the proteins present in the plasma do?

- Transport, coagulation, and defense functions
- Transport, coagulation, and nutrition functions
- The function of nutrition and defense

5 - What is the role of water in human blood?

- It helps transport substances and dissolves them
- It absorbs and transfers heat into the circulatory system
- Both statements are correct

6 - Which of the following therapeutic uses are NOT related to plasma proteins?

- Blood coagulation
- Defenses of the body
- Destruction of viruses



RESEARCH

SHARE

CONCLUDE

WHAT IS PLASMA?

PART 1

CHALLENGE 7



Think about what we've learned so far. Answer the following question individually:

What have I learned from the challenges of this PART 1?

RESEARCH

SHARE

CONCLUDE

WHAT IS A DONOR?

PART 2

CHALLENGE 8



Now that you've had the chance to share your plasma research and the milestones regarding this substance with your peers, we will focus on the donor and the reasons to donate. **Go rookie! Create an awareness campaign about donating plasma with your team, targeting potential donors.**

Some suggestions to consider

You can design your campaign using the format you prefer (poster, flyer...). Include some image (photo, drawing, or illustration). Create a slogan for your campaign. Use motivating, clear, and direct language. Be sure to include messages that you consider important, such as:

- Why it is important to donate plasma.
- What are the benefits of donating and whom are they beneficial for.
- Who can be a donor and how many times a year can someone donate.
- Quality of plasma.



RESEARCH

SHARE

CONCLUDE

WHAT IS A DONOR?

PART 2

CHALLENGE 9



Now it's time to vote, Rookie! Follow your teacher's instructions to choose the 3 awareness campaigns that you liked the most.

How many votes did your campaign earn? votes.

RESEARCH

SHARE

CONCLUDE

WHAT CAUSES A LACK OF PROTEINS?

PART 1

CHALLENGE 10



Access the available resources in the first part of Unit 2, you'll find them in the **VIRTUAL LAB**. Pay attention... you'll find information about patients and rare diseases that can be treated thanks to plasma donation. The resources are:

Comic 2.1

Disease Guide

Video "Alpha's Patients"

PLASMA SAFETY

PART 2

CHALLENGE 11



Access the available resources in the second part of Unit 2, you'll find them in the **VIRTUAL LAB**. The resources are:

Comic 2.2

Poster: Blood Components

RESEARCH

SHARE

CONCLUDE

WHAT CAUSES A LACK OF PROTEINS?

PART 1

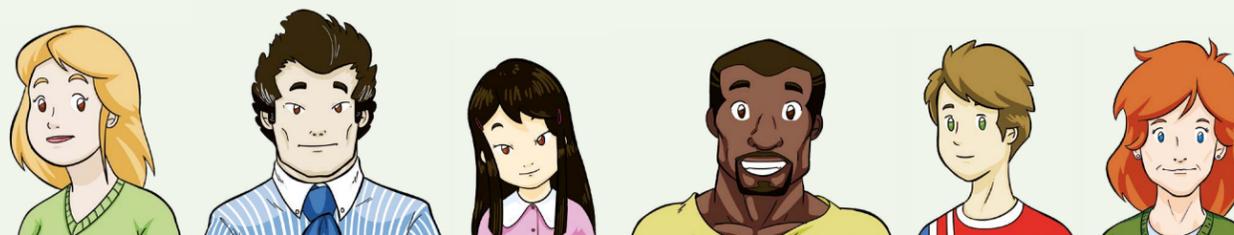
CHALLENGE 12



Let's play a game! Ready to be a detective? Let's go! Listen carefully to the teacher's instructions.

Based on the clues provided, match the following diseases with the correct character: alpha-1 antitrypsin deficiency, primary immunodeficiency, and hemophilia. Also, determine the relationships between the characters, if any. **Remember, only by sharing information with your colleagues will you find the right solutions.**

These are the characters of the game:



RESEARCH

SHARE

CONCLUDE

RESEARCH

SHARE

CONCLUDE

Deducing from the clues, complete the worksheets with each character's personal information:

Worksheet 1 (Female):
 Name: Is she sick? yes no
 If so, what are her symptoms?
 ■ Shortness of breath at rest or upon exertion. ■ Frequent lung infections.
 ■ Frequent cough. ■ Wheezing.
 What is her disease?
 What is her treatment?

1 item, 943,13 GB available

Worksheet 2 (Male):
 Name: Is he sick? yes no
 If so, what are his symptoms?

 What is his disease?
 What is his treatment?

Worksheet 3 (Female):
 Name: Is she sick? yes no
 If so, what are her symptoms?

 What is her disease?
 What is her treatment?

1 item, 943,13 GB available

Worksheet 4 (Male):
 Name: Is he sick? yes no
 If so, what are his symptoms?
 ■ Impaired blood clotting.
 ■ Danger in minor operations.
 What is his disease?
 What is his treatment?

Worksheet 5 (Male):
 Name: Is he sick? yes no
 If so, what are his symptoms?

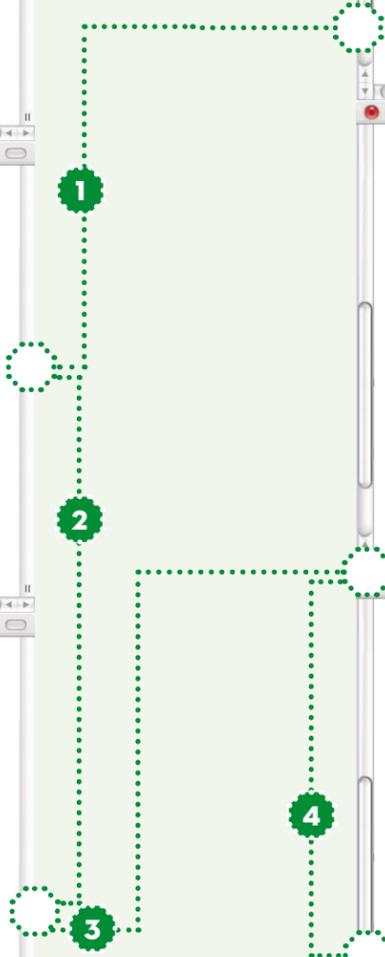
 What is his disease?
 What is his treatment?

1 item, 943,13 GB available

Worksheet 6 (Female):
 Name: Is she sick? yes no
 If so, what are her symptoms?

 What is her disease?
 What is her treatment?

1 item, 943,13 GB available



Relationships:

- 1** They are neighbors.
- 2** _____
- 3** They are classmates.
- 4** _____

CHALLENGE 13



How many worksheets has your team successfully completed? out of 6.

RESEARCH

SHARE

CONCLUDE

WHAT CAUSES A LACK OF PROTEINS?

PART 1

CHALLENGE 14



Let's test your knowledge. Answer the following questions. You can refer back to the **VIRTUAL LAB** resources from the first part of Unit 2 to get the correct answers. **Let's go!!**

QUESTIONS

1 - Hemophilia is an inherited disease that...

- ... is linked to the X chromosome
- ... is related to the Y chromosome
- ... only men can suffer

2 - Alpha-1's deficit, known as AAT, is a disease that can cause:

- Lung, liver, and skin disorders
- Heart disorders

3 - Match each possible symptom with its disease (Type the letter that matches the description):

- | | |
|--------------------------------|-----------------------------------|
| Prolonged spontaneous bleeding | A Alpha-1 |
| Frequent cough and/or jaundice | B Hemophilia |
| Antibiotic resistance | C Primary Immunodeficiency |
| Breathing Difficulty | D COPD |

4 - One of the game's characters had primary immunodeficiency, so he had to go to the hospital to receive blood after having had a tooth extraction.

- True
- False

5 - Match each treatment with its disease (type the letter of disease that matches the treatment):

- | | |
|--------------------------|-----------------------------------|
| Immunoglobulin therapy | A Alpha-1 |
| AAT augmentation therapy | B Hemophilia A |
| Factor VIII | C Primary Immunodeficiency |



RESEARCH

SHARE

CONCLUDE

PLASMA SAFETY

PART 2

CHALLENGE 15



Now we will watch the **Video "Plasma Safety"** together.

Pay close attention to the explanations, since they'll help you complete the challenge of section CONCLUDE – PART 2.

RESEARCH

SHARE

CONCLUDE

PLASMA SAFETY

PART 2

CHALLENGE 16



After watching the video, complete the challenge:

We've received this information to give to donors, but some words were not printed. Your mission is to fill in the blanks with the correct information. **Let's do it!**

To be a qualified donor, you must:

- Be between the ages of 18 and (except in Alabama, where the minimum age to donate is 19).
- Weigh at least 110 pounds and be in good .
- Provide a valid picture ID and a document with your Social Security .



As a qualified donor, you can donate multiple times; in fact, donors can donate times every seven days with a day in between donations, as your body replenishes the plasma within 24 to 48 hours. Remember to drink plenty of and eat a well-balanced meal the day before you donate.

Medical testing of donors ensures not only the and safety of plasma, but also helps donors to keep track of their health. Each qualified donor must undergo periodic tests at the center.

And remember: Your will be transferred to the lab for processing and tested as a safeguard to the patients who need the medicines produced from plasma donations. The preservation of proteins in the plasma depends, among other factors, on the . Plasma must be stored at low temperatures, around degrees Celsius, so it can last more than 1 year.

CHALLENGE 17



How many points did you get in this Unit? points.

RESEARCH

SHARE

CONCLUDE

RESEARCH

SHARE

CONCLUDE

LAB TESTING

PART 1

Let's begin our investigation by understanding new terminology.

Check the **Comic 3.1** and the document **"Understanding Terminology,"** which you'll find in the **VIRTUAL LAB**.

CHALLENGE 18



Next, download and complete the document **"Terminology Challenge"** from the **VIRTUAL LAB**.

Save the document in your files, and then email it as an attachment to your teacher.

PLASMA FRACTIONATION

PART 2

CHALLENGE 19



Let's take a closer look at fractionation and precipitation!

Check out the resources of the second part of Unit 3:

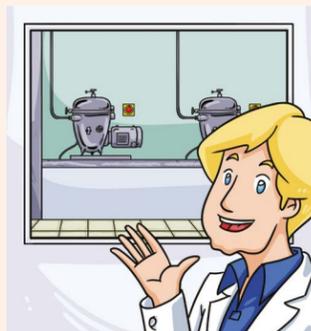
- Comic 3.2**
- Video "Plasma Fractionation"**
- Video "Precipitation Reactions"**

Once you have reviewed the resources, answer the following questions:

Describe the fractionation process and its purpose in your own words. To complete the next challenge, write your own description in the space below. Don't worry, we will combine the contributions of everyone in the classroom session.

Fractionation is:

Why does a precipitation reaction cause the separation of one substance from another in a solution during low speed centrifugation?



LAB TESTING

PART 1

CHALLENGE 20



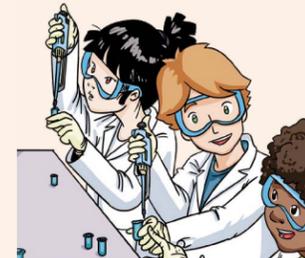
Rookie, go to the VIRTUAL LAB and read the document, "What is a Micropipette." Then perform the following activities.

In this assignment we'll learn how to measure and dispense small volumes of liquid and the proper use of a micropipette.

Imagine that you must use three micropipettes: P-10: It measures volumes of 1-10 μL . P-100: It measures volumes of 10-100 μL . P-1000: It measures volumes of 200-1000 μL . You should use the appropriate pipette for the intended volume.

Which pipette would you use if you wanted to measure the following volumes?

- a. 250 μL
- c. 200 μL
- b. 100 μL
- d. 5 μL



CHALLENGE 21



Now, while following the teacher's directions, we will learn a practical way to use micropipettes. Then you can complete the follow up reflection of the CONCLUDE section below. **Here we go!**

Complete the activity "Experimenting with Micropipettes" that you will find on the VIRTUAL LAB.

CHALLENGE 22



Rookie, do you know what a spectrophotometer is?

Go to the **VIRTUAL LAB** and check the document that explains what a Spectrophotometer is before performing the next task.

Your teacher will explain this second group activity, where you will learn how to properly use a spectrophotometer, what the instrument is used for and its units of measurement. Wear safety glasses at all times and avoid wearing nice clothes, **because they could get ruined during the experiments.**



Complete the activity "Experimenting with Spectrophotometer" that you will find in the VIRTUAL LAB.

Complete the following table with your team results. **Let's get started!!**

	Sample A	Sample B	Sample C
Observed Color Intensity			
Absorbance (O.D.U)			

RESEARCH

SHARE

CONCLUDE

RESEARCH

SHARE

CONCLUDE

LAB TESTING

PART 1

CHALLENGE 23



After completing both individual and group activities at the beginning of unit 3, you're already an expert on laboratory equipment. **Prove it now by completing the follow up reflection below.**

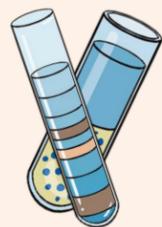
Regarding the micropipette activity.

QUESTIONS

1 - How did your dried samples compare to your partner's for the same volume of food coloring?

2 - If two students get different diameters for the same volume of food coloring, what are some possible explanations?

3 - How does the diameter of the 500 μL drop compare to the diameter of the 1000 μL drop?



Regarding the spectrophotometer activity.

QUESTIONS

1 - What is the relationship between observed color intensity and absorbance?

2 - What would you deduce about two samples if one had higher absorbance than the other?

3 - What is the purpose of the cuvette with water (blank) and why do we use a blank between each reading?

4 - Spectrophotometers can be used to measure cell density (the number of cells per unit of volume). How would the absorbance readings on the spectrophotometer compare if you had two samples, one with very little cell growth and one with a lot of cell growth?



PLASMA FRACTIONATION

PART 2

CHALLENGE 24



Before performing the next task, rewatch the **"Precipitation Reactions" video**, which you'll find in the **VIRTUAL LAB**. **Let's do it Rookie!**

Now observe the class experiment on Precipitation Activity lead by your teacher, where you will see and understand the process of protein precipitation and how certain substances react with others in the precipitation process. Don't forget to have the **"Precipitation Activity,"** which you will also find in the **VIRTUAL LAB**. The observation of this experiment will allow you to perform the challenge of the CONCLUDE section below.

RESEARCH

SHARE

CONCLUDE

PLASMA FRACTIONATION

PART 2

CHALLENGE 25



Regarding the precipitation activity, as your teacher conducts this activity record your findings:

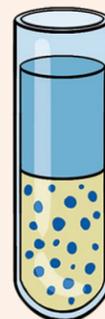
QUESTIONS

1 - Describe the milk after being heated.

2 - Describe the milk after introducing the vinegar.

3 - What caused the lumps to form in the milk?

4 - Refer back to the description of Precipitation in the "Understanding Terminology - Unit 3" pre-activity and describe how this experiment demonstrates the precipitation process as it relates to proteins in plasma.



CHALLENGE 26



How many points did you get in this Unit? points.

RESEARCH

SHARE

CONCLUDE

MANUFACTURING

PART 1

CHALLENGE 27



Rookie, check out the following resources. You'll find them in the **VIRTUAL LAB**:

Comic 4.1

What is Lyophilization?

What is a Centrifuge?

Video "Plasma Freeze Drying"

LIFE-SAVING MEDICINES

PART 2

CHALLENGE 28



In the second part of this Unit, we are going to review the different steps the plasma goes through, from donation until the moment it becomes a medicine. See the following resources available on the **VIRTUAL LAB**:

Comic 4.2

Plasma Process

How many Donations are Needed

RESEARCH

SHARE

CONCLUDE

MANUFACTURING

PART 1

CHALLENGE 29

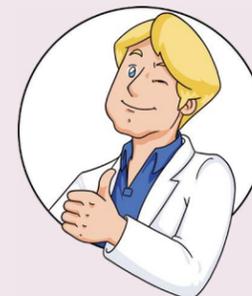


Check the "**Centrifugation Interactive Site**" link at the **VIRTUAL LAB** and complete the interactive lab on centrifugation, following the steps detailed below:

1. Click on the center of the screen after the centrifugation picture comes up
2. Follow the directions
3. You may enter your first name



Important: When you have completed the experiment, answer the questions that you will find in the next page.



RESEARCH

SHARE

CONCLUDE

Good job, Rookie! Now that you have succeeded in making the simulated Centrifugation experiment, **answer the following questions:**

QUESTIONS

1 - What is the term used to describe the liquid phase on top post-centrifugation?

- Superliquid Supersolid Supernatant Liquified

2 - What is the most important part of loading a centrifuge?

- Lid position Balance Time Rotor speed

3 - What force is responsible for separating the liquid and solid phases?

- Gravitational Centrifugal Rotational Centripetal

4 - All of the following are good measures to ensure your centrifuge is balanced, except?

- Place tubes opposing one another Make sure the tubes are the same size Place tubes next to each other Make sure the volumes are identical

5 - What is the basis of centrifugation?

- The effect of gravity on particles in suspension Temperature effects on a solution mixture The effect of heat on particles in suspension The effect of viscosity on a solution mixture

6 - RPM stands for what?

- Rotation per meter Rotated particle mixture Revolutions per minute Reaction particle metric

7 - Which of the following was not required PPE?

- Gloves Chemical apron Lab coat Safety glasses

8 - Which component in the mixture would be found at the bottom of a centrifuged tube?

- Lipid phase Supernatant Solid phase Aqueous phase

9 - How is centrifugal force separating the components of the mixture?

- Gravitational force on particle density Density of liquid phase Gravity and viscosity Based on gravity alone

10 - What term can be used for separated cells from a mixture?

- Pellet Clot Pod Supernatant

RESEARCH

SHARE

CONCLUDE

CHALLENGE 30

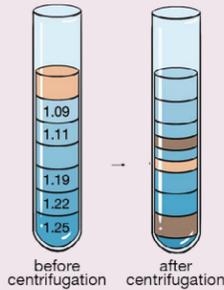


About centrifugation...

Have you ever wondered what makes you move toward the outside of a ride at the Fair when it is spinning in circles?

Watch as your teacher conducts a demonstration on centrifugation. Observe the whole class's centrifugation experiment led by your teacher. You will learn about how centrifugal force helps separate small particles suspended in fluids by spinning the test tubes containing the suspensions at very high speeds.

This will allow you to complete the challenge you'll find in the CONCLUDE section referring to the process of spinning. **Let's get started!**



About lyophilization...

Hey Rookie! Now, to complete the explanations related to the manufacturing processes that take place in Grifols, we will learn what lyophilization is and why is it important. You will also learn how we rehydrate a substance and observe changes with the increase of liquid.

Access the document **“What is Lyophilization?”** that you'll find in the **VIRTUAL LAB**.

Now, based on the example that we discussed on milk powder, perform the experiment that you will find in the document **“Rehydrating Experiment”** so you can answer the questions of the CONCLUDE section regarding such process.

RESEARCH

SHARE

CONCLUDE

MANUFACTURING

PART 1

CHALLENGE 31



Answer the following questions related to each of the previously performed tasks.

Regarding the centrifugation activity

Complete the reflections below.

QUESTIONS

1 - Describe what happened to the smaller particles during the spinning motion.

RESEARCH

SHARE

CONCLUDE

2 - Describe what happened to the larger particles.

3 - Explain the difference in what happened to each. Why did they separate?

4 - Refer back to the “Understanding Terminology” pre-activity (Unit 3) and explain how centrifugation aids in the process of separating different proteins in plasma.

CHALLENGE 32



Regarding lyophilization, dehydration and rehydration

After reading the explanation about dehydrated foods, **compare and describe what you see in the four beakers.**

QUESTIONS

1 - Describe the appearance of the milk in each beaker.
(Example: runny, pasty, thick, gooey)

Beaker 1: _____

Beaker 2: _____

Beaker 3: _____

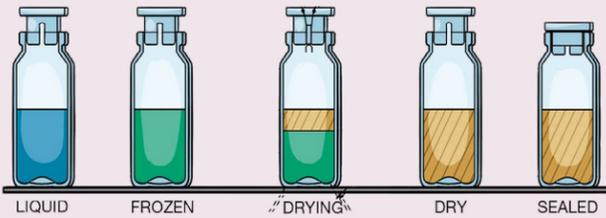
Beaker 4: _____

2 - What do you think is the reason for the consistency difference?

RESEARCH

SHARE

CONCLUDE



3 - Is the amount of water an important detail? Why?

4 - Provide at least two purposes of lyophilizing any substance.

5 - Refer back to the "Understanding Terminology" pre-activity (Unit 3) and provide at least two purposes of lyophilization and rehydration in relation to the use of plasma, proteins, and the production of medicines.

RESEARCH

SHARE

CONCLUDE

LIFE-SAVING MEDICINES

PART 2

CHALLENGE 33



We present one of our products: a vial of factor VIII.

Before reviewing what steps have been carried out to obtain this medication, complete the directions for use of factor VIII. **Select the right answer:**

Vial of factor VIII

Whom does it help?

This drug is used for the treatment and prophylaxis of bleeding in patients with...

- Hemophilia A
 3rd degree burns
 Primary Immunodeficiency

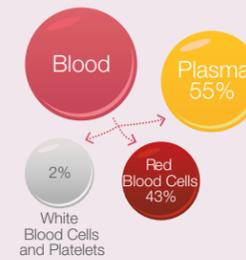
It has taken several months and thousands of people and resources for this vial of medicine to reach the patients who need it. **Let's review the most important steps in this process.**



LIFE-SAVING MEDICINES

PART 2

CHALLENGE 34



As a review of Units 1-4, please answer the following questions:

Before reviewing what steps have been carried out to obtain this medication, complete the outline below. **Select the right answer, in each case:**

1 COLLECTION

What blood component becomes a medicine?

- Plasma
 Platelets
 Red cells

2 PLASMA DONATION

What type of donor is suitable for having safe plasma?

- An occasional donor
 A repetitive donor

3 MANUFACTURING

What is the process of separating, purifying, and recovering specific "fractions" or proteins from human blood plasma?

- Lyophilization
 Precipitation
 Fractionation

4 PRODUCT

What are the proteins resulting from this process?

- Factor VIII

5 RESULT

The ultimate goal of all these steps is to produce medicines that **SAVE LIVES.**

RESEARCH

SHARE

CONCLUDE

RESEARCH

SHARE

CONCLUDE

CAREERS

PART 1

CHALLENGE 35



Rookie, let's learn about the job profiles of the people who work at Grifols. **Are you ready?** Carefully check the resources in PART 1 of this Unit in the **VIRTUAL LAB**. You'll need them for the classroom activity:

- Comic 5.1**
- Video "Working at Grifols"**
- Grifols Job Profiles**

WHO IS GRIFOLS?

PART 2

CHALLENGE 36



Now it's time to learn different aspects about Grifols around the world. Access the resources of the second part of Unit 5 that you'll find in the **VIRTUAL LAB**. You will need them later for the team game we'll play in class.

- Comic 5.2**
- Corporate Links**
- Geography and History Worksheet**
- Science and Technology Worksheet**
- Social Responsibility Worksheet**
- Language and Culture Worksheet**

RESEARCH

SHARE

CONCLUDE

CAREERS

PART 1

CHALLENGE 37



Let's play a collaborative game! During this activity, you can refer back to Grifols job profiles worksheets in the **VIRTUAL LAB**. Now, listen carefully to your teacher's instructions to perform the activity correctly.

What is the mysterious phrase? We'll work in teams to find out ... **Let's start!**

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CAREERS

PART 1

CHALLENGE 38



In PART 1 of this Unit, we have seen the importance of teamwork to achieve a common goal. In addition, collaboration between multidisciplinary teams has proven to be very beneficial as well.

In the space below explain how the SHARE activity phrase inspires you and why you think a company like Grifols fully identifies with it:

RESEARCH

SHARE

CONCLUDE

WHO IS GRIFOLS?

PART 2

CHALLENGE 39



Are you ready to prove your knowledge on various aspects regarding Grifols? Get on with the challenge!

Let's play Trivia. Listen carefully to the teacher's instructions and get ready to help your team to correctly answer the questions about each topic.

Ready, set ... go!



1 - Where does the name Grifols come from?

2 - What year was Grifols founded?

RESEARCH

SHARE

CONCLUDE



3 - Grifols headquarters are in Barcelona, which is in what country?



4 - What kind of diet is characteristic of Spain?



5 - In how many countries does Grifols operate?



6 - According to the map on page 23, put a checkmark in the South American countries where Grifols has a presence. Can you name the countries?



7 - What is the function of a plasmapheresis machine?



8 - In what part of the blood are proteins found?



9 - What does "Buenos días" mean in Spanish?



10 - Imagine we have to call our headquarters in Barcelona. How would you introduce yourself in Spanish?



11 - Name at least one of the proteins present in human plasma.



12 - What do we call people who donate plasma?



13 - What process do we use to separate plasma components?



14 - Which word describes the discipline dedicated to studying ethics in life sciences?



15 - Name at least one Grifols foundation.

CHALLENGE 40



How many points did you get in this game? points.

RESEARCH

SHARE

CONCLUDE

WHO IS GRIFOLS?

PART 2

CHALLENGE 41



To end this Unit and the exercise book, review all the scores earned on the challenges of each unit.

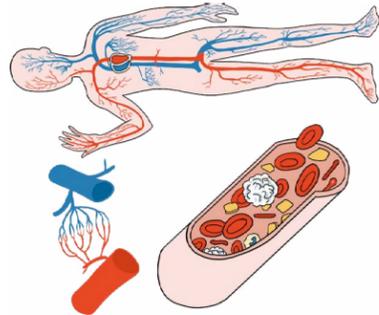
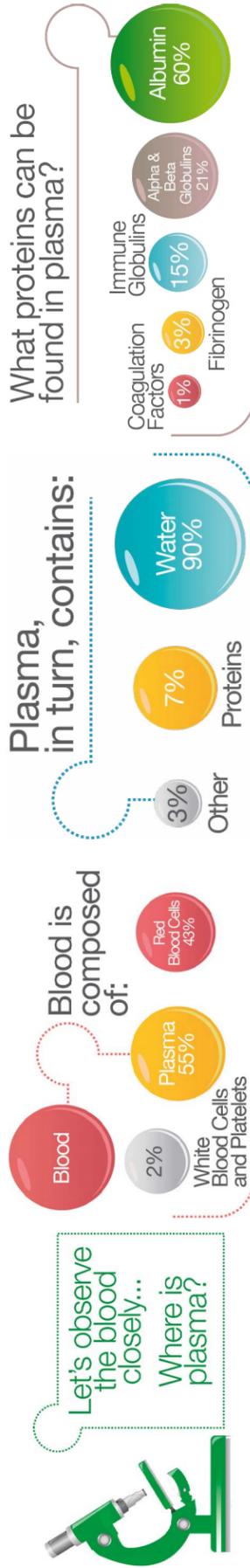
Fill in the scoreboard on page 2.

Your teacher will explain how to get your **Grifols Expert Diploma**.



UNIT 1

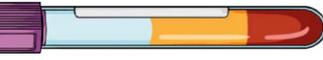
PLASMA, THE SOURCE OF LIFE



Circulatory System

Blood flows only through the ducts that form the circulatory system. Every component that leaves or enters it does so through the thin walls of the capillaries.

Plasma: 55% of blood



Water (90% of plasma): dissolves and transports substances. Absorbs and transfers heat.

Mineral salts: regulate the entry and exit of water to and from the body cells, as well as plasma acidity, among many other functions.

Proteins: involved in the coagulation process and as a carrier for other molecules.

Red blood cells: approximately 43%.

White blood cells and platelets: approximately 2%.



What if the body does not produce certain proteins?

Lack or scarcity of some plasma proteins can cause illness. That's why the proteins from healthy donors are essential for these patients.

The body, a great pharmacy

Donated plasma is used to make medicines to help patients who may have certain protein deficiencies or proteins that may not work properly. Many of these patients are born with these diseases. The plasma is processed to take out the specific protein and purify it into a medication.

PLASMAPHERESIS AND ITS HISTORY

Plasmapheresis is a method of separating plasma from other blood components, such as red blood cells, platelets, and other cells. Once separated, the cells are transfused back to the donor as the plasma collection process is taking place. Because the donor is only providing plasma and not whole blood, the recovery process is faster and better tolerated, and as a result, the donor is able to make more frequent donations.

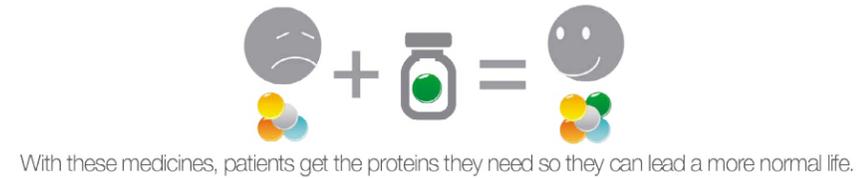
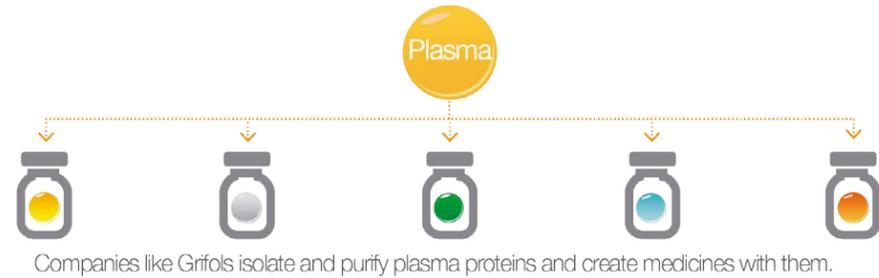
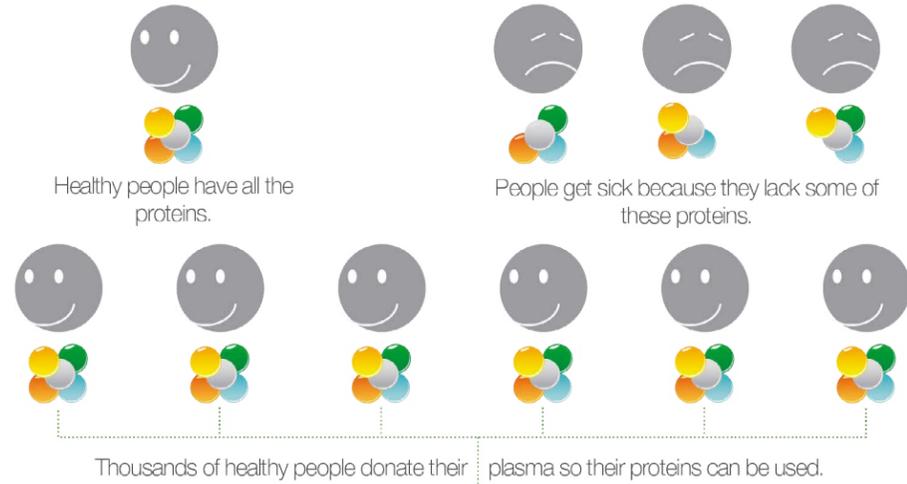
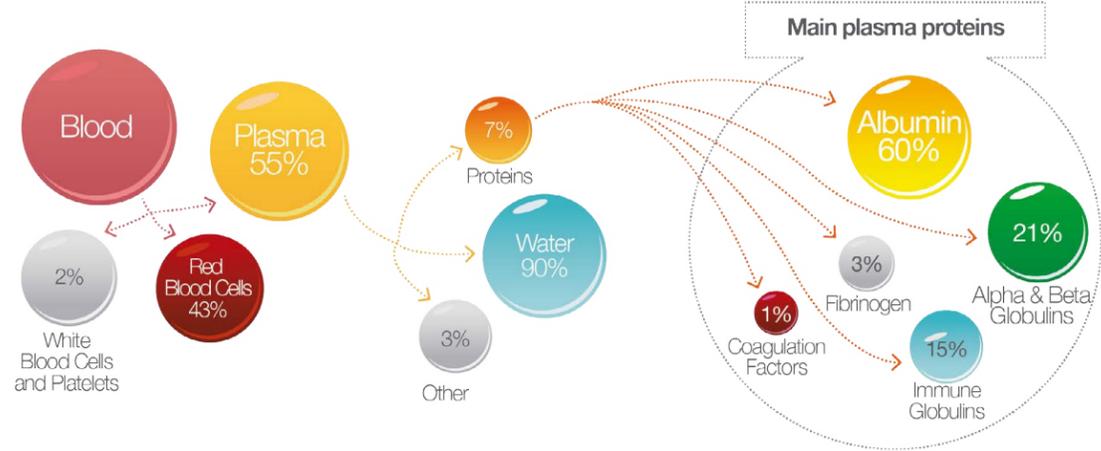


1818	British obstetrician, James Blundell, performs the first successful transfusion of human blood to a patient for the treatment of postpartum hemorrhage.
1900	
1901	Karl Landsteiner, an Austrian physician, discovers the first three human blood groups.
1940	Edwin Cohn develops cold ethanol fractionation, the process of breaking down plasma into components and proteins such as gamma globulin or albumin.
1940	
1950	
1951	José Antonio Grifols develops the technique of plasmapheresis, separating plasma from red blood cells and transfusing the cells back to the donor.

GRIFOLS

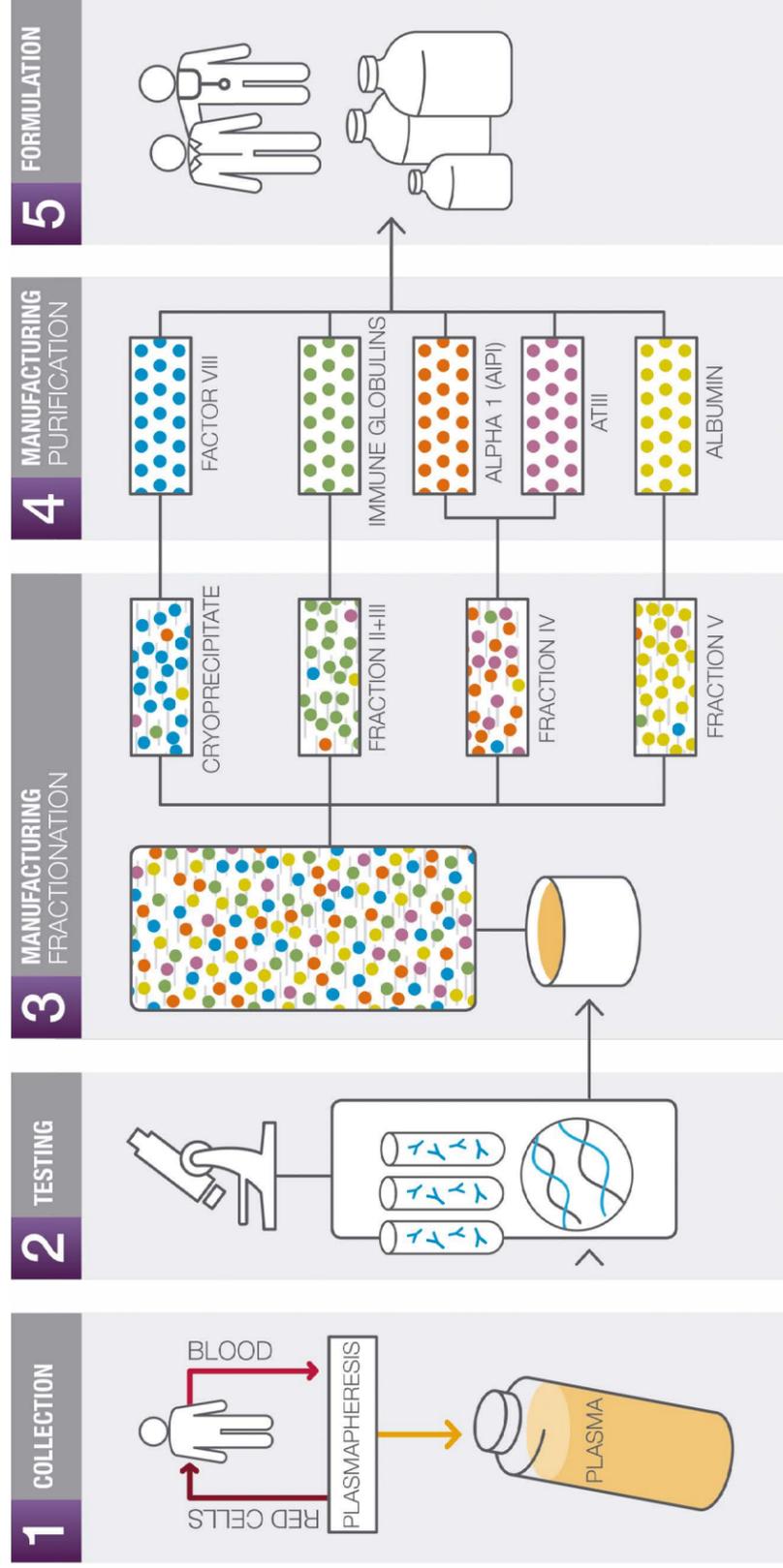
UNIT 2

BLOOD COMPONENTS



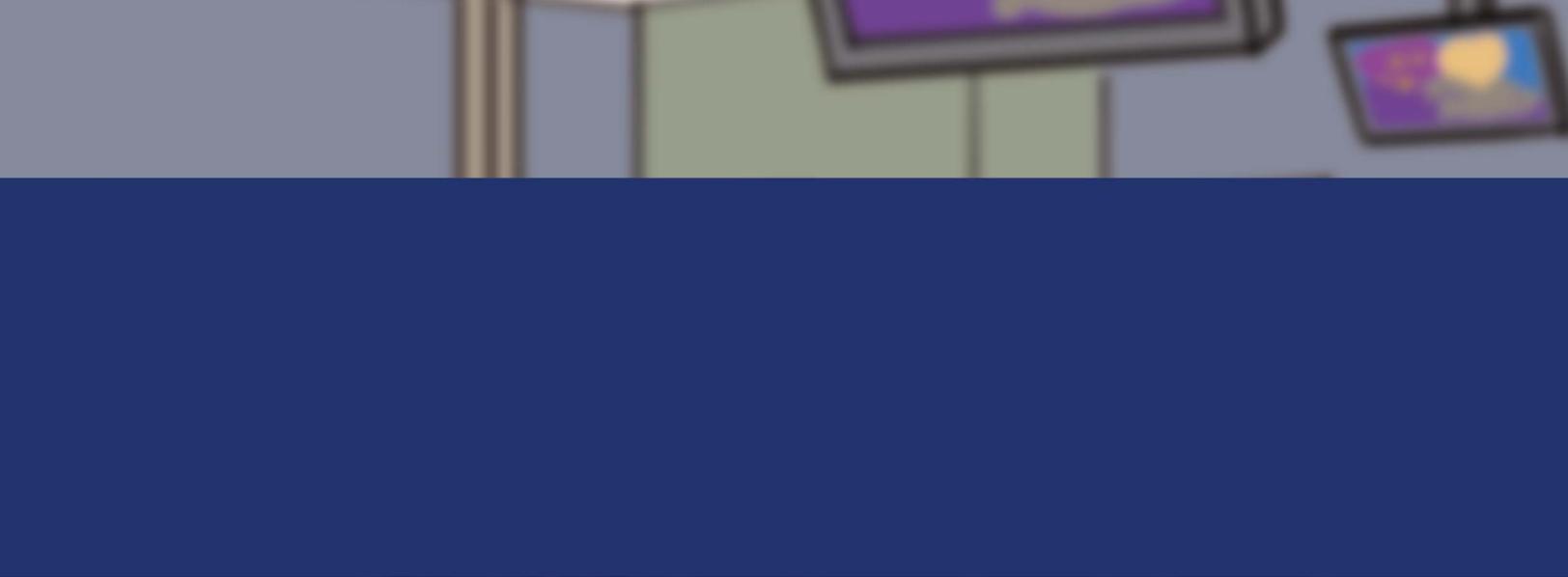
UNIT 4

PLASMA PROCESS



This graphic summarizes the process that Grifols conducts from donor to patient to obtain plasma-derived products that save lives.

GRIFOLS



GRIFOLS

In collaboration with

