Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour: \_\_\_\_\_

**Blood Composition and Typing Summary**

**Use any resources (textbook or internet search) to answer the following questions:**

1. What makes up the blood in our bodies?

• \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(erythrocytes) – The most abundant cells in   
 our blood; they are produced in the bone marrow and contain a protein called   
 hemoglobin that carries oxygen to our cells.

• \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (leukocytes*)* – They are part of the immune   
 system and destroy pathogens.

• \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – The yellowish liquid portion of blood that   
 contains electrolytes, nutrients and vitamins, hormones, clotting factors, and   
 proteins such as antibodies to fight infection.

• \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (thrombocytes*)* – The clotting factors that are   
 carried in the plasma; they clot together in a process called coagulation to seal a   
 wound and prevent a loss of blood.

2. The average adult has about \_\_\_\_\_\_\_\_\_\_\_ liters of blood inside of their body, which makes   
 up 7-8% of their body weight.

3. This red liquid is living \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that carries oxygen and nutrients to all parts of the   
 body, and carries carbon dioxide and other waste products back to the lungs, kidneys and   
 liver for disposal. It fights against \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and helps heal   
 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, so we can stay healthy.

4. There are about one \_\_\_\_\_\_\_\_\_\_\_\_\_ red blood cells in two to three drops of blood. For   
 every \_\_\_\_\_\_\_\_\_\_\_ red blood cells, there are about \_\_\_\_\_\_\_\_\_\_\_ platelets and   
 \_\_\_\_\_\_\_\_\_\_ white cell.

5. Your blood type is established before you are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, by specific   
 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ inherited from your parents. You receive one gene from your   
 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and one from your \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These two genes   
 determine your blood type by causing proteins called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to exist on   
 the surface of all of your red blood cells.

6. There are three alleles or genes for blood type: \_\_\_\_, \_\_\_\_, and \_\_\_\_. Since we have two   
 genes, there are six possible combinations: \_\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, & \_\_\_\_.

7. What are the four types of blood?

AA or AO = \_\_\_\_\_\_\_\_\_\_ BB or BO = \_\_\_\_\_\_\_\_\_\_\_ AB = \_\_\_\_\_\_\_\_\_\_\_ OO = \_\_\_\_\_\_\_\_\_

8. How common are the four blood types? A = \_\_\_\_\_ % B = \_\_\_\_\_ % AB = \_\_\_\_\_ % O= \_\_\_\_%

9. What animal helped scientists discover Rh proteins in blood? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. If someone has the Rh protein, they are said to have Rh \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blood.

11. If someone does not have this protein, they have Rh \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blood.

12. How can blood be used as evidence in a crime?

• Blood samples – Can be analyzed to determine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which can be matched to possible suspects.

• Blood droplets – Can be analyzed to give clues to the location of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,   
 movement of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

• Blood spatter – Can be analyzed to determine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that give   
 investigators clues to how a crime might have happened.

13. Fill in the chart to show the reactions for the blood typing serums.

|  |  |  |
| --- | --- | --- |
| **Blood Type** | **Reactions w/ Anti-A Serum** | **Reactions w/ Anti-B Serum**  + = Clumps   formed  - = No clumps   formed |
| **A** |  |  |
| **B** |  |  |
| **AB** |  |  |
| **O** |  |  |

14. Use the results shown to determine the blood type for each sample.

**A**

**B**

**Rh**

**A**

**B**

**Rh**

**A**

**B**

**Rh**

**Blood Type: \_\_\_ Blood Type: \_\_\_ Blood Type: \_\_\_**

**A**

**B**

**Rh**

**A**

**B**

**Rh**

**A**

**B**

**Rh**

**Blood Type: \_\_\_ Blood Type: \_\_\_ Blood Type: \_\_\_**

Identify each part of blood based on the descriptions. Use **P** for plasma, **RBC** for red blood cell, **WBC** for white blood cell, and **PLT** for platelet.

1. \_\_\_\_\_\_\_\_ A mixture of water, sugar, fat, protein, and potassium and calcium salts.  
2. \_\_\_\_\_\_\_\_ Contains a special protein called hemoglobin, which carries oxygen and causes these cells to be red

3. \_\_\_\_\_\_\_\_ More than 92% of this substance is water.  
4. \_\_\_\_\_\_\_\_ Produce proteins called antibodies that help our bodies fight infection

5. \_\_\_\_\_\_\_\_ Contains chemicals that helps blood form clots

6. \_\_\_\_\_\_\_\_ Fragments of cells that gather at a cut or other wound and stick to the edges

7 \_\_\_\_\_\_\_\_ Makes up 55% of the blood

8. \_\_\_\_\_\_\_\_ Makes up 45% of the blood

9. \_\_\_\_\_\_\_\_ Makes up 0.1% of the blood

10. \_\_\_\_\_\_\_ Makes up 0.17% of the blood

Fill in the chart below

|  |  |  |
| --- | --- | --- |
| **Blood Type** | **Receive** | **Give** |
| **OO** |  |  |
| **AB** |  |  |
| **AA or AO** |  |  |
| **BB or BO** |  |  |

People with Type O blood are said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, because they can   
 donate blood to everyone. However, they can only receive blood that is Type \_\_\_\_\_\_\_\_\_   
 because it does not carry either the \_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_ agglutinogens and their   
 immune system views them as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

People with Type AB blood are said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,   
 because they can receive blood from\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is because   
 they have both A and B agglutinogens on their red blood cells and their immune system   
 views these molecules as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\*\*\*Go to: http://nobelprize.org/educational\_games/medicine/landsteiner/index.html  
Click on How to Play –** *You must read through this in order to understand the game!*

1. What should you do with the syringe?
2. If the blood in test tube A clots, what is the blood type of the patient?
3. If the blood in test tube B clots, what is the blood type of the patient?
4. If the blood in the Rh test tube clots, what is the Rh factor of the patient?
5. How do you give the patient the blood transfusion?

# Go BACK to http://nobelprize.org/educational\_games/medicine/landsteiner/index.html

**Click on Play the Blood Typing Game**  
Patient #1 –Description of patient:  
What was his/her blood type? \_\_\_\_\_\_ Which bags of blood did you give to him? \_\_\_\_\_\_\_\_\_\_\_

Patient #2 – Description of patient:  
What was his/her blood type? \_\_\_\_\_\_ Which bag of blood did you give to him? \_\_\_\_\_\_\_\_\_\_\_\_

Patient #3 – Description of patient:  
What was his/her blood type? \_\_\_\_\_\_\_ Which bags of blood did you give to her? \_\_\_\_\_\_\_\_\_\_