**Blood**

***Station 1****: Using the reading provided, summarize the functions of blood.*

|  |
| --- |
| **Functions of Blood** |
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |

***Station 2****: In the space below, use the readings provided and answer the questions.*

|  |
| --- |
| **Components of Blood** |

1. What is the liquid component of blood called? What percentage of this liquid is water?

2. What are the solid components of blood called?

3. What percentage of blood is the liquid component? What percentage is the solid component?

3. What makes up plasma?

4. What makes up hematocrit?

5. In the space to the right, draw a picture of a blood sample
that has been centrifuged. Label the ***plasma***, ***formed
elements***, ***white blood cells/platelets***, and ***red blood cells***.

***Station 3:*** *Use the information provided to determine if each patient has normal or abnormal hematocrit values.*The hematocrit, or packed cell volume (PCV), is the percentage of the blood that is made up of red blood cells. To determine this percentage, special hematocrit capillary tubes are used. A blood sample is collected in the capillary tube and centrifuged, which causes the red blood cells, white blood cells, platelets, and plasma to separate. The bottom layer is made up of red blood cells. A thin layer of white blood cells and platelets sits just above the red blood cells, and the plasma is at the top of the tube. The hematocrit test provides a quick evaluation of an individual’s cell status. Follow the directions to determine the hematocrit levels for five patients.

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| **Directions** ✔ when complete |
| **Step 1** | Use the ruler to measure the total height of ALL of the blood in each column A-E below. Record this measurement in mm for the “Total Volume” below each patient sample. |  |
| **Step 2** | Use the ruler to measure the height of the red blood cells (RBCs) in each column. Record this measurement in mm for the “RBC Volume” below each patient sample. |  |
| **Step 3** | Use the following equation to determine the hematocrit percentage for each patient. Record the “Hematocrit” percentage below each patient sample. **RBC Volume (mm)** **x 100 = Hematocrit (%)** **Total Volume (mm)** |  |
| **Step 4** | A normal adult male will have a hematocrit of 42-54% while a normal adult female will have a hematocrit of 38-46%. Determine whether each patient’s hematocrit level is normal, high, or low and record below each patient sample. |  |

**Patient D - Female**

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

**Patient E -Male**

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

**Patient C - Female**

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

**Patient B - Male**

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

**Patient A - Female**

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %



<http://www.peteducation.com/images/articles/hematocrit.gif>

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

Total Volume = \_\_\_\_\_\_

 RBC Volume = \_\_\_\_\_\_

 Hematocrit = \_\_\_\_\_\_ %

***Station 6:***  *Use the materials provided (Blood Cell Count Value Chart, Patient complaints, and blood smear samples) to perform a blood cell count on two patients. Using the information, diagnose each patient. Record your information in the chart below.*

|  |
| --- |
| **Patient Blood Test Results** |
| **Patient No.** | **# of RBCs in Grid** | **RBC Count** *(multiply by 100,000)* | **# of WBCs in Grid** | **WBC Count** *(multiply by 1,000)* | **# of Platelets in Grid** | **Platelet Count** *(multiply by 10,000)* |
| **Patient 11011** |  |  |  |  |  |  |
| **Abnormal Results and/or Observations** | **Diagnosis** |
|  |  |

|  |
| --- |
| **Patient Blood Test Results** |
| **Patient No.** | **# of RBCs in Grid** | **RBC Count** *(multiply by 100,000)* | **# of WBCs in Grid** | **WBC Count** *(multiply by 1,000)* | **# of Platelets in Grid** | **Platelet Count** *(multiply by 10,000)* |
| **Patient 22022** |  |  |  |  |  |  |
| **Abnormal Results and/or Observations** | **Diagnosis** |
|  |  |

**Blood Type**

**Human Blood Groups**

* Human blood comes in a variety of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ blood groups.
	+ 3 alleles - \_\_\_\_\_\_, \_\_\_\_\_\_\_, and \_\_\_\_\_
	+ Alleles \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are codominant
	+ Allele \_\_\_\_\_\_ is recessive
* The best known are the \_\_\_\_\_\_ blood groups and the \_\_\_\_ blood groups.
	+ Classified based on the presence or absence of \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Antigens and Antibodies**

* \_\_\_\_\_\_\_\_\_\_\_\_ – found on the surface of RBCs, react with antibodies
* \_\_\_\_\_\_\_\_\_\_\_\_ – found in the plasma, react with specific antigens

**Blood Types**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Blood Type** | **Genotype** | **Antigen** | **Antibody** | **No Transfusions** | **Yes Transfusions** | **% Population** |
|  |  |  |  |  |  |   |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |   |
|  |  |  |  |  |  |  |

**Agglutination**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – clumping of red blood cells in response to a reaction between an antibody and an antigen
	+ Cause for concern when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 **Rh Factor**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – presence of any Rh antigens on the RBCs
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – lack of Rh antigens on the RBCs
* A person who is Rh- will produce Rh antibodies when exposed to Rh+ blood
	+ If a Rh-negative individual receives Rh-positive they will begin to produce the anti-Rh, with no immediate effect.
	+ A second transfusion of same type of blood will cause blood to clot.



* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* + Medications can be taken to prevent these Rh antibodies from attacking the fetus.

**Hemostasis**

Hemostasis - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **Steps of Hemostasis** |
|  | **What’s Happening** | **What’s the Effect** |
| 1. Blood Vessel

 Spasm |  |  |
| 1. Platelet Plug

 Formation |  |  |
| 1. Blood

 Coagulation |  |  |

**Fate of Blood Clots**

* Small blood clots are digested by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Large blood clots might have to be removed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **Abnormal Blood Clots** |
|  | **Definition** | **Example** | **Could Cause** |
| **Thrombus** |  |  | Infarction(killing of the tissue that is supplied by that blood vessel) |
| **Embolus** |  |  |