Circulatory System – Review Worksheet

+ Blood: A Fluid Tissue

Mini Glossary

**Hemoglobin (HEE muh gloh bun):** a molecule that carries oxygen and carbon dioxide

**Plasma (PLAZ muh):** the liquid part of blood that carries nutrients, minerals, and oxygen to cells

**Platelets (PLAYT lut):** an irregularly shaped fragment of a cell that helps clot blood

<Functions of blood>

- Blood carries oxygen from your lungs to your body cells. Carbon dioxide diffuses from your body cells to your blood. Your blood carries carbon dioxide to your lungs to be exhaled.
- Blood carries waste from your cells to your kidneys to be removed.
- Blood carries nutrients and other materials to your body cells.
- Cells and molecules in blood fight infections and help heal wounds.

<Parts of blood>

- **Red blood cells** supply your body with oxygen.
  - Red blood cells contain **hemoglobin**, which is a chemical that can carry oxygen and carbon dioxide.
  - The life span of a red blood cell is **120 days**, and is then rapidly replaced.
- **White blood cells** fight **bacteria** and **viruses**.
  - Your body reacts to invaders by **increasing** the number of white blood cells.
  - White blood cells enter infected tissues, destroy bacteria and viruses, and absorb dead cells.
  - Life span of **3 days**
- **Platelets** are **irregularly shaped** cell fragments that help **clot blood**.
  - Release chemicals that help form blood clot
  - Life span of **5 to 9 days**
- **Plasma** – **liquid** part of blood
  - Made mostly of **water**
  - Nutrients, minerals, and oxygen are dissolved in plasma
  - Carries wastes from cells

<Blood clotting>

- **Platelets** stick to a wound and release chemicals.
- Clotting factors carry out a series of chemical reactions.
- Threadlike fibers, called **fibrin**, form a sticky net.
- The net traps blood cells and plasma and forms a clot.
- Skin cells then begin the repair process under the scab.
- Scab falls off.
<Blood types—A, B, AB, O>
- based partly on antigens
  - chemical identification tags in the blood
  - type O has no antigens and can donate blood to any type
- also based on antibodies
  - proteins that identify substances that do not belong in the body, such as other blood types, and destroy them
  - type AB has no antibodies, so it can receive blood from any type
- Rhesus factor is another chemical identification tag in blood.
  - If people who lack the Rh factor (Rh-) receive Rh+ blood, they will produce antibodies against the blood.
  - Antibodies cause clots to form in the blood vessels.

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Antigen</th>
<th>Antibody</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>Anti-B</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>Anti-A</td>
</tr>
<tr>
<td>AB</td>
<td>A, B</td>
<td>None</td>
</tr>
<tr>
<td>O</td>
<td>None</td>
<td>Anti-A</td>
</tr>
</tbody>
</table>
1. The parts of the human blood are shown below. Write the function of each part on the lines below the illustration. Use the following terms.

- Help clot blood
- Contain hemoglobin
- Help fight infection
- Contain nutrients and minerals

A. White blood cells
B. Red blood cells
C. Platelets
D. Plasma

a. _______________________________________________________

b. _______________________________________________________

c. _______________________________________________________

d. _______________________________________________________

2. Summarize information about the parts of blood in the chart below.

<table>
<thead>
<tr>
<th>Parts of Blood</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red blood cells (erythrocytes)</td>
<td></td>
</tr>
<tr>
<td>White blood cells (leukocytes)</td>
<td></td>
</tr>
<tr>
<td>Plasma</td>
<td></td>
</tr>
<tr>
<td>Platelets (thrombocytes)</td>
<td></td>
</tr>
</tbody>
</table>
3. Complete the following table. Possible blood types of the donor are listed horizontally. The possible blood types of the receiver are listed vertically. Make a check in the box if the receiver can receive blood from the donor directly above. Then answer the questions below the table.

<table>
<thead>
<tr>
<th>Receiver (can receive blood from)</th>
<th>Donor (can give blood to)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood type O A B AB</td>
</tr>
<tr>
<td>O</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td></td>
</tr>
</tbody>
</table>

a. who can receive any blood type?

b. Who can receive only O type blood?

4. Using the phases below, fill in the boxes in the correct order to explain how a wound heals.

- Clot forms.
- Clot hardens.
- Clotting factors carry out chemical reaction.
- Fibrin forms.
- Net traps blood cells.
- Platelets stick to wound.
- Scab falls off.
- Skin cells repair under scab.

1. [Blank]
2. [Blank]
3. [Blank]
4. [Blank]
5. [Blank]
6. [Blank]
7. [Blank]
8. [Blank]
**Blood Vessels**

**Mini Glossary**

<table>
<thead>
<tr>
<th>term</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>artery</td>
<td>a blood vessel that carries blood away from the heart</td>
</tr>
<tr>
<td>atriums (AY tree umz)</td>
<td>the two upper chambers of the heart</td>
</tr>
<tr>
<td>capillaries (KAP uh ler eez)</td>
<td>very small blood vessels that connect arteries and veins</td>
</tr>
<tr>
<td>coronary (KOR uh ner ee) circulation</td>
<td>the flow of blood to and from the tissues of the heart</td>
</tr>
<tr>
<td>pulmonary circulation</td>
<td>the flow of blood through the heart to the lungs and back to the heart</td>
</tr>
<tr>
<td>vein</td>
<td>a blood vessel that carries blood back to the heart</td>
</tr>
<tr>
<td>ventricles (VEN trih kulz)</td>
<td>the two lower chambers of the heart</td>
</tr>
</tbody>
</table>

**Blood vessels carry blood to every part of your body**

- **Arteries** are blood vessels that carry blood away from the heart
  - Each ventricle of the heart is connected to an artery.
  - The right ventricle connects to the **pulmonary** artery.
  - The left ventricle connects to the **aorta**.
  - Every time your heart **contracts**, blood is moved from your heart into your arteries.

- **Veins** carry blood back to the heart
  - One-way valves (venous valves) keep blood moving toward the heart by muscle contractions throughout the body. If the blood flows backward, the pressure from the blood against the valve causes it to close.
  - There are two major veins, the **superior vena cava** which returns blood from the head and neck, and the **inferior vena cava** which returns blood from the abdomen and lower body.

- **Capillaries** are microscopic blood vessels that connect arteries to veins.
  - Nutrients and oxygen diffuse to body cells through capillary beds.
  - Waste materials and **carbon dioxide** diffuse from body cells to capillaries.

**Blood pressure** is the force of the blood on the walls of the blood vessels

- Blood pressure is highest in arteries and lowest in veins
  - A rise and fall of pressure occurs with the heartbeat
  - Normal pulse rate are 60-100 heartbeats per minute for adults

- Measured using two numbers
  - First – a measure of the pressure caused when ventricles contract and blood is pushed out of the heart
  - Second – a measure of the pressure that occurs as the ventricles fill with blood just before they contract again

- Your brain tries to keep your blood pressure constant. When blood pressure is higher or lower than normal, messages are sent to the brain by nerve cells in the arteries. Your brain sends messages to your heart to raise or lower your blood pressure by speeding up or slowing down your heart rate.
1. Review the terms and their definitions in the Mini Glossary. Write a sentence that explains the difference between pulmonary circulation and systemic circulation.

2. Complete the concept map below to show the kinds of blood vessels and their functions.
+ The Cardiac Cycle and Circulation

<Your circulatory system includes the blood, heart, and blood vessels. It moves materials to all parts of your body>

- Movement of materials into and out of your cells occurs by diffusion, or movement of materials from an area of high concentration to an area of low concentration.
- Movement also occurs by active transport, which is the opposite of diffusion

<Heart – controls blood flow through all parts of the body>

- has four chambers
  - atriums – upper two chambers
  - ventricles – lower two chambers
  - a one-way valve separates each atrium from the ventricle below it
  - blood travels only from an atrium to a ventricle.
  - A wall between the two atriums and the two ventricles prevents oxygen-rich and oxygen-poor blood from mixing.

- circulatory system—divided into three sections
  - coronary circulation is the flow of blood to and from the tissues of the heart.
  - In pulmonary circulation, blood flows through the heart to the lungs, where carbon dioxide and other waste materials diffuse out, oxygen diffuses in, and the blood goes back to the heart.
  - Systemic circulation moves oxygen-rich blood to all the organs and body tissues, except the heart and lungs, and returns oxygen-poor blood to the heart.
1. **Draw a line to connect the description on the left to the correct term on the right.**

   1. microscopic blood vessel that connects arteries and veins  
      - **artery**
   2. vessel that carries blood away from the heart  
      - **atrium**
   3. chemical that carries oxygen and carbon dioxide in the blood  
      - **capillary**
   4. upper chamber of the heart  
      - **hemoglobin**
   5. liquid part of the blood that carries nutrients and minerals  
      - **plasma**
   6. lower chamber of the heart  
      - **pulmonary circulation**
   7. flow of blood from the heart to other organs and tissue of the body except the heart and lungs  
      - **systemic circulation**
   8. flow of blood the heart to the lungs and back to the heart  
      - **ventricle**

2. **Label the diagram of the heart. Include the following terms on your diagram: right atrium, right ventricle, left atrium, left ventricle, superior vena cava, inferior vena cava, pulmonary artery, pulmonary vein, aorta. Use a pencil to draw arrows showing the path of oxygen-rich blood. Use a pen to show the path of oxygen-poor blood.**
3. Use the following terms to complete the concept map below.

1. heart
2. arteries
3. lungs
4. capillaries
5. vena cava

which leads to the heart
which return oxygenated blood to the lungs
which pumps blood through the arteries
which carry oxygen-poor blood into the veins
which connect to and then to veins

to the pulmonary veins
to the pulmonary artery
to the aorta
and other
4. **Sequence the stages in pulmonary circulation by completing the flow diagram. Include aorta, pulmonary veins, pulmonary arteries, right atrium, left atrium, and right ventricle.**

![Flow diagram of pulmonary circulation]

a. What is pulmonary circulation?

b. Which vessel carries blood from the heart to the lungs?

c. How is pulmonary vein different from other veins in the body?

d. What happens to the blood during pulmonary circulation?

e. Where does the blood go after pulmonary circulation is complete?

f. What prevents the backflow of blood in the separate chambers of the heart?

- - -

g. How does oxygen get from the lungs into the blood?

h. What do both atriums do at the same time?