

What Does Circulation Work?

Name: _____

Date: _____

Circulation

- The busy transportation system inside your body is moving _____ liters (2,000 gallons) of materials each day to keep you alive!
- The group of organs that transports materials from one place in your body to another is the _____.
- The circulatory system consists of _____, the heart, and a network of blood vessels.

Circulation: Blood

- Blood consists of _____ and _____ parts.
- It includes...
 - Plasma
 - _____ Blood Cells
 - _____ Blood Cells
 - Platelets
- The liquid part of blood is _____.
- It consists of about 90% _____ and 10% nutrients and other materials.
- The _____ part of blood includes red blood cells, white blood cells, and platelets.
- _____ **blood cells**, or *erythrocytes* are large microscopic cells without nuclei that carry oxygen from the lungs to body cells and carry carbon dioxide from body cells to the lungs.
- _____ blood cells, also called *leukocytes*, help protect you from infections and disease.
- They are _____ than red blood cells, but _____ in number.
- They also found in your _____, liver, and lymph glands.
- Some white cells, called *lymphocytes* are your immune systems first _____.
- They seek out _____, viruses, and fungi in your body
- _____ are small colorless bodies that release chemicals to form clots to stop the flow of blood.
- Blood transports _____ and oxygen to your body's cells.
- It carries carbon dioxide and other waste products _____ from the body's cells.

- Blood helps maintain a proper _____ for your body and fights disease.
- Why is the color of red blood cells significant?
- Red blood cells contain an iron-rich molecule called _____.
- This gas transporting molecule gives blood its color and makes up _____ of a red cell.
- It attaches to _____ molecules.
- The amount of red blood cells, white blood cells, platelets, and plasma in your blood are always _____.
- The white blood cells will increase in number because their function is to _____ your body from infection and disease.

Circulation: William Harvey

- In 1628, English physician William Harvey showed that blood flows through blood vessels and is pumped by the _____.
- Before the discover, people believed the blood oozed _____ inside the body.
- Their explanation was simply that _____ keep the blood flowing in the body.
- There was a tendency for people to say “god did it” whenever they _____ understand how something worked.
- As they figured out how things worked, they no longer attributed everything to _____.

The Heart

- God designed the heart to pump _____ to all parts of the body.
- It is made up of cardiac muscle, _____, _____, and connective tissue.
- When you place your hand over your heart you can feel it _____.
- Your heart is located between your _____ and is protected by the sternum.
- Make a fist.
- That is about the size of your _____.
- Your heart beats about _____ times a day!
- It can pump approximately _____ of blood every minute.
- As you grow, your body needs more _____.
- At 12 years of age, your heart beats between 70 and 100 times per _____.

- The heart not only pumps blood through the body, but also pumps blood _____ to the lungs, where it can be replenished with oxygen.
- Recall that your heart is divided into two _____ separated by a wall of muscle called the septum.
- The heart contains _____ chambers.
- Each upper chamber is an _____.
- Each lower chamber is a _____.
- Why does your heart make the distinct lub-dub sound?
- The sound relates to the _____ of the heart valves.
- As the heart contracts, it pushes blood from one chamber to the _____.
- A one-way valve _____ behind each chamber.
- The pumping action of the heart creates your blood _____.
- Blood pressure is measured in _____ ways: systolic and diastolic.
- _____ is the pressure in your arteries from when your heart muscle contracts in a heart beat.
- _____ is the pressure in your arteries between heartbeats when the heart muscle rests between beats and refills with blood.
- Both systolic and diastolic pressure are measured to monitor heart and blood _____.
- A reading _____ than 120 mm Hg systolic pressure and _____ than 80 mm Hg is considered healthy.

Pathway of Blood Flow Through the Heart

- Step 1
 - Veins carry oxygen-poor blood from the _____ back to the heart.
 - The *superior vena cava* brings blood from the _____ body and the *inferior vena cava* from the _____ body.
 - The blood is deposited into the _____ atrium.
- Step 2
 - When the heart contracts, the blood is pushed from the right atrium through the tricuspid valve, into the right _____.
 - This and other valves in the circulatory system open by the force of pumping blood in one _____ and close preventing blood flow from backing up.
 - The right ventricle also _____ and pushes blood through the pulmonary valve into the pulmonary artery.
 - An _____ is a blood vessel that carries blood away from the heart.
- Step 3

- The blood travels from the pulmonary artery to the _____.
- In the lungs, the blood _____ carbon dioxide and picks up oxygen.
- Step 4
 - Blood returns to the _____ through the *pulmonary veins*.
 - The blood can only pass _____ way through the mitral valve that closes each time blood is forced through and is deposited in the left atrium
 - The left atrium contracts and pushes blood into the left _____.
- Step 5
 - From the left ventricle, the blood is pumped through the aortic valve, which closes once the blood is pumped through into the _____, the largest artery.
- Step 6
 - The aorta branches to other _____, and blood flows to all parts of the body.
 - The blood circulates through the _____ depositing oxygen, before returning as oxygen-poor blood back to the heart by the superior and inferior vena cava.

Blood Vessels

- Blood vessels transport blood throughout the _____.
- These blood vessels _____ in size and structure.
- Your system of blood vessels, lined up end to end, is more than _____ long!
- How many times can your blood vessels circle around the Earth? _____
- There are three types of blood vessels:
 - _____
 - _____
 - Capillaries
- The outermost layer of the artery is composed of _____ tissue.
- The next layer is composed of _____ muscle cells and elastic tissue.
- The _____ layer is in contact with blood.
- It is composed of endothelial cells and an _____ membrane.
- Blood flows through the _____ cavity at the center.
- The outermost layer of the vein is composed of _____ tissue.
- It covers a band of _____ muscles.
- This layer is _____ than in arteries.

- The _____ of veins is lined with endothelial cells.
- It also contains _____.
- _____ branch into smaller and smaller blood vessels until they become capillaries.
- _____ are the smallest blood vessels.
- In fact, they are so narrow that red blood cells pass through them _____ file.

Scripture Spotlight

- *In Mark 16:15, Jesus commands his disciples to go into all the world preaching the gospel. Think about Christians being like blood. How could the flow of blood through your body be like Christians taking the gospel to all the world?*