Name _____ Date _____ Class _____

Assess Your Understanding

The Body's Transport System

What Is the Role of the Cardiovascular System?

got it?

○ **I get it!** Now I know that the cardiovascular system _____

_____

○ **I need extra help with** _____

_____

What Is the Role of the Heart?

1a. NAME The _____ sends out signals that make the heart muscle contract.

b. PREDICT What do you think would happen if a valve in the heart did not close? _____

_____

got it?

○ **I get it!** Now I know that the heart _____

_____

○ **I need extra help with** _____

_____

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name _____ Date _____ Class _____

Assess Your Understanding

The Body's Transport System

How Does Blood Travel Through Your Body?

2a. IDENTIFY Where does blood returning from the lungs enter the heart?

_____

b. DRAW CONCLUSIONS Why must your blood complete both loops to keep you healthy? _____

_____

_____

_____

got it?

○ **I get it!** Now I know that blood travels _____

_____

_____

○ **I need extra help with** _____

_____

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name ______________________ Date ____________ Class ____________

Key Concept Summaries

The Body's Transport System

What Is the Role of the Cardiovascular System?

The **cardiovascular system,** also known as the circulatory system, consists of the heart, blood vessels, and blood. **The cardiovascular system delivers needed substances to cells and carries waste products away from cells. In addition, blood contains cells that fight disease.** Blood transports chemical messengers, oxygen from your lungs, and glucose from your digestive system to your body cells. Blood takes away wastes such as carbon dioxide from body cells.

What Is the Role of the Heart?

The **heart** is a hollow, muscular organ that pumps blood throughout the body. **The heart pumps blood to the body through blood vessels.** The heart has a right side and a left side that are separated by a wall of tissue. Each side has two chambers. Each upper chamber, called an **atrium,** receives blood that comes into the heart. Each lower chamber, called a **ventricle,** pumps blood out of the heart. The **pacemaker,** a group of cells in the right atrium, sends out signals that make the heart muscle contract. Valves separate the atria from the ventricles. A **valve** is a flap of tissue that prevents blood from flowing backward. The heart works continuously in a series of six steps that repeat over and over.

How Does Blood Travel Through Your Body?

The overall pattern of blood flow through the body is similar to a figure eight. The heart is at the center where the two loops cross. **In the first loop, blood travels from the heart to the lungs and then back to the heart. In the second loop, blood travels from the heart throughout the body and then back to the heart.** Your body has three kinds of blood vessels—arteries, capillaries, and veins. **Arteries** carry blood away from the heart. The **aorta** is the largest artery in the body. From the arteries, blood flows into tiny vessels called **capillaries.** From capillaries, blood flows into **veins** that carry blood back to the heart.

On a separate sheet of paper, explain how blood travels through the body and why the cardiovascular system is important.

Name _____ Date _____ Class _____

Lesson Quiz

The Body's Transport System

If the statement is true, write *true*. If the statement is false, change the underlined word or words to make the statement true.

1. _____ The heart pushes blood through your blood vessels.

2. _____ The heart, blood vessels, and blood are part of the digestive system.

3. _____ The lower chambers, called valves, pump blood out of the heart.

4. _____ In the first loop of blood circulation, blood travels from the heart to the lungs and then back to the heart.

5. _____ From the arteries, blood flows into tiny vessels called veins.

Fill in the blank to complete each statement.

6. The _____ delivers needed substances to cells and carries waste products away from cells.

7. Blood contains _____ that fight disease.

8. The _____ is a hollow, muscular organ that pumps blood throughout the body.

9. In the second loop of blood circulation, blood travels from the heart throughout the body and then _____.

10. The _____ is the largest artery in the body.

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name _____ Date _____ Class _____

Assess Your Understanding

A Closer Look at Blood Vessels

What Is the Role of Blood Vessels?

1a. DESCRIBE In which direction do arteries carry blood? _____

_____

b. COMPARE AND CONTRAST How are arteries and veins alike and different? _____

_____

_____

got it?

○ **I get it!** Now I know that the structure of blood vessels _____

_____

○ **I need extra help with** _____

_____

What Causes Blood Pressure?

2a. DEFINE What is blood pressure? _____

_____

b. RELATE CAUSE AND EFFECT How might having low blood pressure affect your body? _____

_____

_____

got it?

○ **I get it!** Now I know that blood pressure is _____

_____

○ **I need extra help with** _____

_____

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Name _____ Date _____ Class _____

Key Concept Summaries

A Closer Look at Blood Vessels

What Is the Role of Blood Vessels?

Blood vessels run through all the tissues of the human body. The three kinds of blood vessels have different structures and functions. **Arteries are thick-walled, muscular vessels that carry blood away from the heart to the body's cells. Capillaries are tiny, thin-walled vessels where materials and wastes are exchanged between the blood and the body's cells. Veins are large vessels with walls thinner than artery walls that carry blood from the body cells back to the heart.** Two large arteries carry blood from the heart toward body organs. As these arteries move away from the heart, they branch into smaller arteries. The first branches off the aorta, the **coronary arteries,** carry blood to the heart itself. Thick, elastic artery walls have many tissue layers, which enable arteries to withstand the force of pumping blood. Blood flows from arteries into capillaries, which are made of a single layer of epithelial cells. Needed materials move from the blood through the capillary walls into the body cells; waste products of cells travel in the opposite direction. Materials and wastes pass through capillary walls by diffusion. In **diffusion,** molecules move from an area of higher concentration to an area of lower concentration. Capillaries merge and form larger vessels called veins. From capillaries, blood enters veins and travels back to the heart. The walls of veins have the same tissue layers as arteries, but the walls of veins are thinner than the walls of arteries.

What Causes Blood Pressure?

Blood exerts a force called **blood pressure** against the walls of blood vessels. **The force with which ventricles contract causes blood pressure.** Blood flowing through arteries near the heart exerts higher pressure on the vessel walls than blood flowing through arteries farther from the heart. Blood pressure in veins is always low. Blood pressure measurements are recorded with two numbers represented like a fraction. The first, higher number is a measurement of blood pressure when ventricles contract. The second, lower number is a measurement when ventricles relax. A healthy blood pressure reading is about $\frac{120}{80}$.

On a separate sheet of paper, identify the three types of blood vessels and explain their functions.

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name _____ Date _____ Class _____

Lesson Quiz

A Closer Look at Blood Vessels

If the statement is true, write *true*. If the statement is false, change the underlined word or words to make the statement true.

1. _____ Veins are large vessels with walls thinner than artery walls that carry blood from the body cells back to the heart.

2. _____ Two large veins carry blood from the heart toward body organs.

3. _____ In diffusion, molecules move toward an area of higher concentration.

4. _____ The force with which ventricles contract causes blood pressure.

5. _____ Blood vessels run through many tissues of the human body.

Fill in the blank to complete each statement.

6. _____ are thick-walled, muscular vessels that carry blood away from the heart to the body's cells.

7. _____ are tiny, thin-walled vessels where materials and wastes are exchanged between the blood and the body's cells.

8. The first branches off the aorta, the _____, carry blood to the heart itself.

9. Blood exerts a force called _____ against the walls of blood vessels.

10. Needed materials move from the blood through the capillary walls into _____, and waste products of cells travel in the opposite direction.

Name _____ Date _____ Class _____

Assess Your Understanding

Composition of Blood

What Does Blood Contain?

1a. DEFINE What is plasma? _____

_____

b. MAKE GENERALIZATIONS Why is it important for a person's blood to produce fibrin? _____

_____

_____

got it?

○ **I get it!** Now I know that blood is made of _____

_____

_____

○ **I need extra help with** _____

_____

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name ______ Date ______ Class ______

Assess Your Understanding

Composition of Blood

What Is the Role of Blood Types in Transfusions?

2a. REVIEW Why are the markers on blood cells important? ______

b. PREDICT Can a person with type AB– blood safely receive a transfusion of type O– blood? Explain. ______

c. ANSWER How does your body's transport system work? ______

got it?

- ○ **I get it!** Now I know that blood type is determined by ______
- ○ **I need extra help with** ______

Name _____ Date _____ Class _____

Key Concept Summaries

Composition of Blood

What Does Blood Contain?

Blood has four components: plasma, red blood cells, white blood cells, and platelets. About 45 percent of the volume of blood is cells; the rest is **plasma,** the liquid part of blood. Most materials carried in blood travel in the plasma. In addition to carrying nutrients like glucose, fats, vitamins, and minerals, plasma carries chemical messengers that direct body activities. Plasma also carries away wastes from cells, including carbon dioxide. Red and white blood cells are produced in bone marrow.

Red blood cells carry oxygen from the lungs to cells throughout the body. A red blood cell is made mostly of **hemoglobin,** a protein that contains iron and binds chemically to oxygen molecules. **White blood cells** fight disease by alerting the body to invading organisms, producing chemicals to fight the invaders, and surrounding and killing them. For every white blood cell, there are between 500 and 1,000 red blood cells. **Platelets** are cell fragments that help form blood clots.

What Is the Role of Blood Types in Transfusions?

A blood transfusion is a transfer of blood from one person to another. There are four major types of blood—A, B, AB, and O. **Marker molecules on your red blood cells determine your blood type and the type of blood that you can safely receive in transfusions.** Clumping proteins in your plasma recognize red blood cells with "foreign" markers that are not yours. A process called cross matching is used to insure blood of a compatible type is used in transfusions. Red blood cells may contain a protein referred to as *Rh factor.* A person with the protein has Rh positive blood; a person without it has Rh negative blood. The body's drainage system is a network of veinlike vessels called the **lymphatic system.** After materials are absorbed in tissues through diffusion, excess fluid returns to the bloodstream through these vessels. Once the fluid is inside the lymphatic system, it is called **lymph.** Lymph consists of water, dissolved materials such as glucose, and white blood cells. Lymph flows through small knobs of tissue called **lymph nodes,** which filter lymph, trapping bacteria and other disease-causing microorganisms in the fluid.

On a separate sheet of paper, identify and briefly characterize the four components of blood.

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name _____ Date _____ Class _____

Lesson Quiz

Composition of Blood

If the statement is true, write *true*. If the statement is false, change the underlined word or words to make the statement true.

1. _____ Most materials carried in blood travel in the platelets.

2. _____ Red and white blood cells are produced in the lymphatic system.

3. _____ For every protein, there are between 500 and 1,000 red blood cells.

4. _____ The marker molecules on your red blood cells determine your blood type.

5. _____ To insure safe transfusions, a process called cross matching is used to match your blood type with blood of a compatible type.

Fill in the blank to complete each statement.

6. _____ is a complex tissue with four components: plasma, red blood cells, white blood cells, and platelets.

7. _____ deliver oxygen throughout the body.

8. White blood cells fight _____ by alerting the body of bacteria, by producing chemicals to fight bacteria, and by surrounding and killing invading organisms.

9. The body's drainage system is a network of veinlike vessels called the _____.

10. Platelets are cell fragments that help form _____.

Name _____ Date _____ Class _____

Assess Your Understanding

Cardiovascular Health

What Are Some Cardiovascular Diseases?

1a. DEFINE What is atherosclerosis? _____

_____

b. RELATE CAUSE AND EFFECT How might atherosclerosis and hypertension be related? _____

_____

got it?

○ **I get it!** Now I know that some cardiovascular diseases are _____

_____

○ **I need extra help with** _____

_____

How Can You Maintain Cardiovascular Health?

2a. REVIEW Why is it important to exercise? _____

_____

b. EXPLAIN How does eating a balanced diet help cardiovascular health? _____

_____

got it?

○ **I get it!** Now I know that I can maintain cardiovascular health by _____

_____

○ **I need extra help with** _____

_____

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

Name _____ Date _____ Class _____

Key Concept Summaries

Cardiovascular Health

What Are Some Cardiovascular Diseases?

Cardiovascular disease is the leading cause of death in the United States today. **Diseases of the cardiovascular system include atherosclerosis and hypertension. Atherosclerosis** is a condition in which an artery wall thickens as a result of a buildup of fatty materials such as cholesterol. This condition can lead to a **heart attack,** which occurs when blood flow to part of the heart muscle is blocked, causing cells to die. Treatments for atherosclerosis include low-fat diet, exercise, medications, or surgery, depending on the severity of the condition. High blood pressure, or **hypertension,** is a disorder in which a person's blood pressure is consistently higher than normal—usually defined as greater than $\frac{140}{90}$. Hypertension causes the heart to work harder and may damage blood vessels. Hypertension and atherosclerosis are closely related. As the arteries narrow, blood pressure increases. If hypertension is mild, regular exercise and careful food choices—including limiting intake of sodium—may lower blood pressure. Many people with hypertension require medication to lower their blood pressure.

How Can You Maintain Cardiovascular Health?

People as young as 18 may show signs of atherosclerosis. **To help maintain cardiovascular health, people should exercise regularly; eat a balanced diet that is low in saturated fats, trans fats, cholesterol, and sodium; and avoid smoking.** You strengthen your heart muscle and help to prevent atherosclerosis every time you swim, dance, walk, or ride a bike. Watching your diet is another way to maintain healthy blood vessels, since foods that are high in cholesterol, saturated fats, and trans fats can lead to atherosclerosis. Smokers are more than twice as likely to have a heart attack as nonsmokers. If smokers quit, however, their risk of death from cardiovascular disease decreases.

On a separate sheet of paper, identify two diseases of the cardiovascular system and explain how an individual can maintain cardiovascular health.

Name _____ Date _____ Class _____

Lesson Quiz

Cardiovascular Health

If the statement is true, write *true*. If the statement is false, change the underlined word or words to make the statement true.

1. _____ Hypertension occurs when an artery wall thickens as a result of the buildup of fatty materials.

2. _____ To help maintain cardiovascular health, people should exercise regularly; eat a balanced diet that is low in saturated fats, trans fats, cholesterol, and sodium; and avoid smoking.

3. _____ Hypertension and atherosclerosis are not closely related.

4. _____ Cancer is the leading cause of death in the United States today.

5. _____ "Higher than normal" blood pressure is usually defined as greater than $\frac{140}{90}$.

Fill in the blank to complete each statement.

6. Diseases of the _____ include atherosclerosis and hypertension.

7. A(n) _____ can occur when blood flow to part of the heart muscle is blocked, causing cells to die.

8. _____ is a disorder in which a person's blood pressure is consistently higher than normal.

9. Hypertension causes the heart to work harder and may damage _____ _____.

10. People as young as _____ may show signs of atherosclerosis.

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