Blood on the Move

Trace circulation and explain what changes when flow is disrupted.

HAP.10 "Students will investigate the structures and functions of the cardiovascular system, including the cause and effect of diseases and disorders. Design and use models to investigate the functions of the organs of the cardiovascular system..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Number the four heart chambers in the order blood enters them, starting with the right atrium. Circle both descriptions of material exchange at capillaries, and underline one statement about what valves do.

A Trip Up the Stairs

1. When you climb stairs, your leg cells need more oxygen, and your heart moves blood to meet that demand. Blood returning from the body enters the right atrium through large veins. It passes a valve into the right ventricle, which pumps it through pulmonary arteries toward the lungs. In tiny lung capillaries, carbon dioxide leaves the blood and oxygen enters it. Pulmonary veins return the oxygen-rich blood to the left atrium. Blood then passes another valve into the left ventricle. This chamber pumps blood into the aorta, starting its trip through the body.

2. The aorta branches into smaller arteries and arterioles that carry blood toward tissues. Arteries have thick, elastic walls that withstand the pressure of blood leaving the heart. Capillaries have walls only one cell thick, allowing oxygen and nutrients to move into tissues while wastes move into the blood. Blood leaves capillaries through venules, which join to form veins that return blood to the heart. Many veins contain valves that help prevent backward flow, especially when blood travels upward from the legs. Heart valves also keep blood moving forward when chambers squeeze and relax.

3. A valve that does not close tightly may allow blood to leak backward, forcing the heart to move some of the same blood again. If valves in leg veins weaken, blood can pool, and the veins may swell into varicose veins. High blood pressure, or hypertension, puts extra strain on artery walls and the heart over time. The heart muscle needs its own oxygen supply through coronary arteries. A blockage in one of these arteries can cut off oxygen to part of the heart muscle, causing a myocardial infarction, or heart attack. These disorders affect flow in different ways.

2 ANSWER WITH EVIDENCE

Use the passage

1. Trace blood from the right ventricle through the lungs and body until it returns to the right atrium. Include both atria, the left ventricle, and the capillaries.

2. How do the walls of arteries and capillaries suit their different jobs?

3. What could happen if a valve in a leg vein weakens? How is this different from a heart valve that leaks?

4. Compare the cause and effect of hypertension with those of a myocardial infarction as described in the passage.

3 YOUR TURN

Your own words

Draw a model of blood flow from the right atrium through the lungs, body, and a leg vein back to the right atrium. Label the chambers, capillaries, arteries, veins, and venules, then mark a weakened valve in the leg vein and write two sentences explaining where gases are exchanged and what the weakened valve could cause.

Blood on the Move

PART 1 · READ AND MARK

Number the four heart chambers in the order blood enters them, starting with the right atrium. Circle both descriptions of material exchange at capillaries, and underline one statement about what valves do. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Trace blood from the right ventricle through the lungs and body until it returns to the right atrium. Include both atria, the left ventricle, and the capillaries.	**Right ventricle → pulmonary arteries → lung capillaries → pulmonary veins → left atrium → left ventricle → aorta and body arteries → body capillaries → venules → veins → right atrium.**
2	How do the walls of arteries and capillaries suit their different jobs?	**Thick, elastic artery walls withstand pressure from the heart. Capillaries have walls one cell thick, allowing materials to move between blood and tissues.**
3	What could happen if a valve in a leg vein weakens? How is this different from a heart valve that leaks?	**Blood can pool in the leg vein and make it swell into a varicose vein. A leaking heart valve lets blood move backward, so the heart must move some of that blood again.**
4	Compare the cause and effect of hypertension with those of a myocardial infarction as described in the passage.	**Hypertension is high blood pressure that strains artery walls and the heart over time. A myocardial infarction can result when a blocked coronary artery cuts off oxygen to part of the heart muscle.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Model: right atrium → right ventricle → pulmonary arteries → lung capillaries → pulmonary veins → left atrium → left ventricle → aorta and body arteries → body capillaries → venules → leg vein [weakened valve] → right atrium. In lung capillaries, carbon dioxide leaves the blood and oxygen enters it, while body capillaries deliver oxygen to tissues and take up wastes. The weakened leg vein valve may let blood flow backward and pool, causing the vein to swell.

Accept routes that include the correct chamber order and show blood passing through lung and body capillaries. In the model, the weakened valve should be on a leg vein, with pooling or backward flow identified as a possible effect.