Two Connected Routes

Trace how blood and lymph move materials through the body.

HAP.11.2 "Compare the primary functions of the lymphatic system and its relationship to the cardiovascular system."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two places where the lymphatic and cardiovascular systems connect. Circle one job unique to each system, then number the steps that return excess tissue fluid to the blood.

Why an Ankle Swells

1. After a runner twists an ankle, the area may swell. To understand why, follow fluid through two connected systems. The cardiovascular system uses the heart to push blood through arteries, capillaries, and veins. At capillaries, some fluid leaves the blood and bathes nearby cells, delivering dissolved nutrients and allowing wastes to move toward the blood. Most of that fluid returns directly to blood capillaries, but some remains between cells. If none of the leftover fluid came back, blood volume would gradually drop and tissues would become more swollen. The lymphatic system provides a second route back.

2. Tiny lymphatic capillaries collect excess fluid from the spaces around cells. Once inside these vessels, the fluid is called lymph. Unlike the cardiovascular circuit, this route has no heart pumping lymph around a loop. Muscle movements and one-way valves help move lymph toward larger vessels. Lymph eventually drains into veins near the collarbones, returning fluid to the bloodstream. When lymph drainage from an injured ankle is slower than fluid entering its tissues, swelling can increase. Both systems move fluid, but only the cardiovascular system continuously circulates blood to deliver oxygen throughout the body.

3. The lymphatic system also supports protection and food processing. As lymph passes through lymph nodes, immune cells can trap and respond to pathogens. White blood cells travel in blood too, but lymph nodes provide places where immune responses can begin. In the small intestine, specialized lymphatic vessels absorb many dietary fats and carry them in lymph toward the bloodstream. Meanwhile, blood capillaries there take up other absorbed nutrients, such as glucose, which enter circulation by a different route. These tasks connect the systems without making them interchangeable: lymph returns fluid, supports immune defense, and transports absorbed fats into blood.

2 ANSWER WITH EVIDENCE

Use the passage

1. Compare the routes taken by most fluid that leaves blood capillaries and by the fluid left between cells. How does each return to the blood?

2. How does lymph move differently from blood, and how does each system help maintain the body's fluid supply?

3. Compare the routes taken by many absorbed fats and by glucose in the small intestine. Where do both routes lead?

4. How do lymph nodes and circulating blood play different roles in immune defense?

3 YOUR TURN

Your own words

A classmate says, "The lymphatic system is just another set of blood vessels." Write a five- or six-sentence reply using a sprained ankle and a meal containing fat to explain two lymphatic functions and how each connects to the cardiovascular system. Include one difference in how fluid moves through the two systems.

Two Connected Routes

PART 1 · READ AND MARK

Underline two places where the lymphatic and cardiovascular systems connect. Circle one job unique to each system, then number the steps that return excess tissue fluid to the blood. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Compare the routes taken by most fluid that leaves blood capillaries and by the fluid left between cells. How does each return to the blood?	**Most fluid returns directly to blood capillaries. Leftover fluid enters lymphatic capillaries as lymph and eventually drains into veins near the collarbones.**
2	How does lymph move differently from blood, and how does each system help maintain the body's fluid supply?	**The heart pumps blood through the cardiovascular circuit, while muscle movements and one-way valves help move lymph. Blood supplies fluid to tissues, and lymphatic vessels return excess tissue fluid to the bloodstream.**
3	Compare the routes taken by many absorbed fats and by glucose in the small intestine. Where do both routes lead?	**Specialized lymphatic vessels carry many absorbed fats in lymph toward the bloodstream. Blood capillaries take up glucose directly. Both routes lead to blood circulation.**
4	How do lymph nodes and circulating blood play different roles in immune defense?	**Lymph nodes are places where immune cells can trap and respond to pathogens. Blood carries white blood cells around the body.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The lymphatic system is not another set of blood vessels because its vessels carry lymph. After a sprained ankle, lymphatic capillaries take up excess fluid left between cells. Lymph drains into veins near the collarbones, returning that fluid to the cardiovascular system. After a fatty meal, lymphatic vessels in the small intestine absorb many fats and carry them toward the blood. The heart pumps blood around a circuit, but muscle movements and one-way valves help move lymph. These systems are connected by fluid return and fat delivery, even though they move different fluids in different ways.

Accept equivalent descriptions of lymph returning excess tissue fluid to veins and carrying absorbed fats toward the blood. Responses should distinguish heart-pumped blood circulation from lymph movement aided by muscles and valves.