Where Water Goes

Trace kidney structures to explain blood volume control.

HS-AP12-2 "Observe and identify the structures of the kidney; then construct an explanation for maintaining blood volume via kidney function."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the names of kidney structures, circle statements about water returning to blood, and number the steps that link sweating to lower urine volume.

After Practice

1. After a hot soccer practice, Maya notices that she has made very little urine. Her kidneys are doing more than removing waste: they are helping stabilize the amount of water in her blood. Each kidney receives blood through a renal artery and sends blood back through a renal vein. Urine leaves through a ureter, which carries it to the bladder. Inside a kidney, the outer cortex surrounds an inner medulla. A central renal pelvis collects urine before it enters the ureter. Following these connected structures lets you track which fluid returns to circulation and which fluid leaves the body.

2. The nephron is a tiny filtering unit within the kidney. In the cortex, a glomerulus, a cluster of small blood vessels, filters water and small dissolved substances into a surrounding capsule. Blood cells and most proteins stay in the blood. The filtered fluid passes through a tubule, including a loop of Henle that dips into the medulla, and then flows toward a collecting duct. Along this route, useful substances and much of the water move from the tubule back into nearby capillaries. The collecting duct carries the remaining fluid toward the renal pelvis as urine.

3. As sweating removes water, Maya's blood becomes more concentrated and her blood volume may fall. Sensors signal the pituitary gland to release more antidiuretic hormone, or ADH. ADH makes the collecting ducts more permeable to water. Water then moves from the ducts into surrounding kidney tissue and returns to the blood through nearby capillaries. Less water remains to become urine, making her urine more concentrated. This response limits further water loss and helps support blood volume, but it cannot replace water already lost through sweating. Maya still needs to drink.

2 ANSWER WITH EVIDENCE

Use the passage

1. Trace blood into and out of a kidney. Name both vessels, then explain why urine takes a different exit.

2. Where does filtration begin in a nephron, and what part of the kidney contains that structure?

3. Trace filtered fluid from the glomerulus to the ureter. Include the loop of Henle, collecting duct, and renal pelvis in order.

4. How does ADH change water movement in the collecting ducts after sweating, and why does that help support blood volume?

3 YOUR TURN

Your own words

After drinking a large bottle of water while resting, Maya produces more pale urine. In one paragraph, trace the fluid through at least three named kidney structures, then explain how a decrease in ADH could cause this change and help keep blood volume from rising too much.

Where Water Goes

PART 1 · READ AND MARK

Underline the names of kidney structures, circle statements about water returning to blood, and number the steps that link sweating to lower urine volume. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Trace blood into and out of a kidney. Name both vessels, then explain why urine takes a different exit.	**Blood enters through a renal artery and leaves through a renal vein. Urine leaves through a ureter because it carries fluid collected in the renal pelvis, not blood.**
2	Where does filtration begin in a nephron, and what part of the kidney contains that structure?	**Filtration begins at the glomerulus, which is in the cortex.**
3	Trace filtered fluid from the glomerulus to the ureter. Include the loop of Henle, collecting duct, and renal pelvis in order.	**Filtered fluid passes from the glomerulus into a capsule, through a tubule that includes the loop of Henle, and toward a collecting duct. Urine then reaches the renal pelvis and exits through the ureter.**
4	How does ADH change water movement in the collecting ducts after sweating, and why does that help support blood volume?	**ADH makes the collecting ducts more permeable to water. More water returns to the blood through nearby capillaries, leaving less water in urine and limiting further loss of blood volume.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Fluid filtered at a glomerulus enters a capsule and passes through a tubule that includes the loop of Henle. It then flows toward a collecting duct, reaches the renal pelvis as urine, and exits through a ureter. With less ADH, the collecting ducts are less permeable to water. Less water returns to the blood, so more water leaves as pale, dilute urine. This limits how much blood volume rises after Maya drinks.

Accept accurate descriptions of water moving from the collecting ducts through kidney tissue and nearby capillaries into the blood. For the open task, look for a correct structure sequence and a clear link between lower ADH, reduced water reabsorption, and greater urine volume.