Two Paths, One Exit

Trace urine from the kidneys to outside the body.

HAP.14.5 "Develop and use models to illustrate the path of urine through the urinary tract."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the first mention of each structure urine passes through, number those structures in travel order starting with a collecting duct, and circle the place where urine from both kidneys first meets.

Urine on the Move

1. During a long bus ride, your kidneys keep making urine even when a restroom is nowhere nearby. Each kidney filters blood in tiny units called nephrons. Useful water and dissolved materials can return to the blood as fluid moves through each nephron. Waste and extra water remain in the fluid. By the time the fluid reaches a collecting duct, it is on its way out of the kidney as urine. Many collecting ducts carry urine toward cup-shaped spaces called calyces. The calyces drain into a wider space, the renal pelvis, near the center of each kidney.

2. The renal pelvis narrows into a ureter, a tube that leaves the kidney. Each kidney has its own ureter; these two tubes do not join each other on the way down. Muscles in the ureter wall squeeze in waves, pushing urine toward the bladder even when you lie down. Both ureters empty into the bladder, a stretchy muscular sac in the lower abdomen. The bladder holds urine while its wall expands. In a route model, arrows should follow the movement of urine, not the direction blood flows through a kidney. The bladder is a shared destination, not the place where urine is made.

3. When it is time to urinate, the bladder wall contracts and a ring of muscle near its outlet relaxes. Urine then enters the urethra, the single tube that carries it from the bladder to an opening outside the body. The urethra is not another name for a ureter: ureters carry urine to the bladder, while the urethra carries it away. A complete route can start at a collecting duct in either kidney and end outside the body. If you draw both kidneys, their routes stay separate until they reach the bladder, then share one exit.

2 ANSWER WITH EVIDENCE

Use the passage

1. Trace urine from a collecting duct in the right kidney to outside the body. List each space or tube it passes through in order.

2. A model shows the left and right ureters joining before they reach the bladder. What should you change to make the model accurate?

3. A student draws an arrow from the bladder through a ureter toward a kidney. Which way should the arrow point, and why?

4. A model labels the tube from the bladder to outside the body as a ureter. What label should replace it, and where does a ureter belong?

3 YOUR TURN

Your own words

In the box, draw an arrow model showing how urine from both kidneys reaches one exit. Label the collecting ducts, calyces, renal pelvises, ureters, bladder, urethra, and outside the body, then write one sentence explaining where the two routes meet.

Two Paths, One Exit

PART 1 · READ AND MARK

Underline the first mention of each structure urine passes through, number those structures in travel order starting with a collecting duct, and circle the place where urine from both kidneys first meets. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Trace urine from a collecting duct in the right kidney to outside the body. List each space or tube it passes through in order.	**Collecting duct, calyx, renal pelvis, right ureter, bladder, urethra, outside the body.**
2	A model shows the left and right ureters joining before they reach the bladder. What should you change to make the model accurate?	**Draw the left and right ureters as separate tubes that both enter the bladder. They do not join before reaching it.**
3	A student draws an arrow from the bladder through a ureter toward a kidney. Which way should the arrow point, and why?	**It should point from the kidney through the ureter toward the bladder because ureters carry urine to the bladder.**
4	A model labels the tube from the bladder to outside the body as a ureter. What label should replace it, and where does a ureter belong?	**The tube to the outside is the urethra. A ureter runs from each kidney to the bladder.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Left kidney collecting ducts → calyces → renal pelvis → left ureter → bladder; right kidney collecting ducts → calyces → renal pelvis → right ureter → bladder; bladder → urethra → outside the body. The two routes first meet in the bladder.

Accept singular calyx or collecting duct labels on each side of the model. Check that each kidney has its own path to the bladder and that one urethra leads from the bladder to the outside.