Inside the System

Trace how small structures support body functions

HS-AP1-2 "Develop and use a model to illustrate the hierarchical organization of structural body systems that provide specific functions within the Human Body."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB In each organ example, number one cell, tissue, organ, and system from 1 to 4. Underline a phrase that shows how a smaller structure helps a larger one work.

From Cells to Systems

1. During a sprint, your muscles need more oxygen. Each lung contains millions of tiny air sacs called alveoli. Flat epithelial cells make the thin epithelial tissue lining each sac. Oxygen passes from the air across that lining into nearby blood. Blood vessels and stretchy connective tissue also help each lung work as an organ. The lungs, airways, and breathing muscles work together in the respiratory system, which brings oxygen into the body and removes carbon dioxide.

2. After the sprint, your kidneys help keep your blood in balance. Cells lining the kidney's tiny tubules form epithelial tissue. These cells move useful substances, including water, from fluid in the tubules back toward the blood. Tubules and blood vessels are parts of each kidney, an organ built from several tissues. The kidneys, ureters, bladder, and urethra make up the urinary system. This system removes wastes in urine and helps control the amount of water in your body.

3. A model can link these structures by placing cells inside tissues, tissues inside organs, and organs inside systems. Arrows can show how work at one level supports a larger job. If alveolar epithelial tissue becomes thicker from disease, oxygen must cross a longer distance before reaching the blood. Less oxygen may enter the blood with each breath, even if air reaches the sacs. A similar chain of effects can begin in another organ when its cells stop doing their usual work.

2 ANSWER WITH EVIDENCE

Use the passage

1. Build a four-level lung model. Write the structures in order from smallest to largest, using arrows.

2. In your lung model, how do the lining and blood vessels work together?

3. If the alveolar lining thickens, trace one effect from the tissue level to the respiratory system's job.

4. Why is a lung an organ rather than a single tissue? Use two structures from the passage.

3 YOUR TURN

Your own words

Suppose damaged cells lining kidney tubules return less water to the blood. Draw a four-level model from those cells to the urinary system, then add a short note predicting how the damage could affect urine.

Inside the System

PART 1 · READ AND MARK

In each organ example, number one cell, tissue, organ, and system from 1 to 4. Underline a phrase that shows how a smaller structure helps a larger one work. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Build a four-level lung model. Write the structures in order from smallest to largest, using arrows.	**Alveolar epithelial cells → epithelial tissue lining the alveoli → lung → respiratory system.**
2	In your lung model, how do the lining and blood vessels work together?	**Oxygen crosses the thin lining into blood in nearby vessels.**
3	If the alveolar lining thickens, trace one effect from the tissue level to the respiratory system's job.	**Oxygen crosses the thicker tissue less easily, so less may enter the blood with each breath. The respiratory system may supply less oxygen to the body.**
4	Why is a lung an organ rather than a single tissue? Use two structures from the passage.	**A lung contains multiple tissues, including epithelial tissue lining the alveoli and stretchy connective tissue.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Kidney tubule epithelial cells → epithelial tissue → kidney → urinary system. If the cells return less water to the blood, more water may leave the body in urine.

Accept models that correctly order cells, tissue, organ, and system. The prediction should connect reduced water return by tubule cells to increased water in urine.