Cell System Workshop

Trace how cell structures work together to use nutrients and manage waste.

S7L2.a "Develop a model and construct an explanation of how cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each structure named in the passage. Number the steps that show nutrients entering, being changed into usable energy or materials, and waste leaving the cell.

A Cell at Work

1. At noon, a leaf cell works like a busy food workshop. Its cell wall gives the cell a firm outer layer, while the cell membrane controls which substances enter or leave. Water enters through the membrane and moves into the cytoplasm, the jellylike space where many reactions happen. Chloroplasts use light energy, water, and carbon dioxide to make sugar. The nucleus contains instructions that help direct the cell's activities, including making materials needed for growth and reproduction.

2. The sugar made in chloroplasts becomes a nutrient the cell can use. In the cytoplasm, mitochondria break down sugar using oxygen and release usable energy. That energy helps the cell build proteins and other materials, grow, and prepare to reproduce. The nucleus directs protein-making by sending instructions that the cytoplasm uses. If the membrane did not control entry, the cell might not get enough water or oxygen, or it could take in harmful substances.

3. As the cell uses nutrients, it also makes waste. Carbon dioxide from mitochondria can move through the cytoplasm and leave through the cell membrane. Lysosomes contain enzymes that break down worn-out cell parts and certain materials. Their breakdown products can be reused, while remaining waste can be removed. The cell wall does not decide what enters, but it supports and protects a plant cell as these processes continue. Together, these structures form a system, because each one affects the cell's ability to obtain nutrients, make materials, and manage waste.

2 ANSWER WITH EVIDENCE

Use the passage

1. Describe the sequence that changes materials from outside a leaf cell into usable energy.

2. How do the nucleus and cytoplasm work together to help the cell make proteins?

3. Compare the jobs of the cell membrane and the cell wall in a plant cell.

4. Explain how lysosomes and the cell membrane help a cell manage waste.

3 YOUR TURN

Your own words

In two panels, draw and label a plant leaf cell and an animal cell. Across your two models, label the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria, then use arrows to show nutrient movement, energy use, and waste removal. Write two sentences explaining how the structures work as a system.

ANSWER KEY

Cell System Workshop

GRADE 7 · S7L2.a

PART 1 · READ AND MARK

Underline each structure named in the passage. Number the steps that show nutrients entering, being changed into usable energy or materials, and waste leaving the cell. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Describe the sequence that changes materials from outside a leaf cell into usable energy.	**Water enters through the cell membrane and reaches the cytoplasm. Chloroplasts use water, carbon dioxide, and light energy to make sugar. Mitochondria break down the sugar with oxygen and release usable energy.**
2	How do the nucleus and cytoplasm work together to help the cell make proteins?	**The nucleus sends instructions for protein-making. The cytoplasm uses those instructions during cell activities.**
3	Compare the jobs of the cell membrane and the cell wall in a plant cell.	**The cell membrane controls which substances enter and leave the cell. The cell wall gives the plant cell support and protection, but it does not decide what enters.**
4	Explain how lysosomes and the cell membrane help a cell manage waste.	**Lysosomes break down worn-out cell parts and certain materials. Some breakdown products can be reused, and waste can leave through the cell membrane.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Panel 1, a plant leaf cell, labels the cell wall, cell membrane, cytoplasm, nucleus, chloroplasts, and mitochondria, with arrows showing water and carbon dioxide entering, sugar moving from chloroplasts to mitochondria, and carbon dioxide leaving. Panel 2, an animal cell, labels the cell membrane, cytoplasm, nucleus, mitochondria, and lysosomes, with arrows showing nutrients entering, mitochondria releasing energy, lysosomes breaking down worn-out parts, and waste leaving; in both cells, the nucleus directs activities and the membrane controls exchange with the surroundings.

Accept equivalent explanations that accurately connect the structures in a sequence or system. In student models, accept different cell shapes and layouts if labels, arrows, and functions are scientifically accurate.