

Leaf Cell Team

Tracing how plant-cell parts work together.

MS-LS1-2 "Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Circle the five named cell parts, and underline words that tell what each part contributes to the whole cell. Use your markings as evidence for an arrow model.

A Leaf Cell at Work

- ① Imagine a leaf cell in a lettuce plant as a tiny food-making workshop. It is not a pile of separate parts. The parts work together so the cell can stay alive, make materials, and support the plant. A model can show these connections with arrows. In a cell model, arrows do more than point to parts. They show how one part's work helps another part and how all the parts help the whole cell carry out its job.
- ② At dawn, light reaches the leaf. Chloroplasts use light energy to help the cell make food. Mitochondria release usable energy from food, helping the cell do its activities. The nucleus holds instructions that guide the cell's activities. These parts have different roles, but none tells the full story alone. The chloroplasts provide food, mitochondria make energy available, and the nucleus guides activities. Together, their work helps the leaf cell make and use resources needed to function.
- ③ The cell membrane forms a boundary around the cell. It controls what enters and leaves, so the cell can take in needed materials and release wastes. A plant cell also has a cell wall outside its membrane. The wall is stiff and supports and protects the cell, helping the plant keep its shape. In a complete model, the membrane, wall, nucleus, chloroplasts, and mitochondria are connected. Their combined jobs allow the leaf cell to function as one living system.

2 ANSWER WITH EVIDENCE Use the passage

- 1 A student draws only chloroplasts in a model of a leaf cell. Explain why this model is incomplete. Name two other parts that should be included and tell how each contributes to the cell.

- 2 Write a three-step arrow chain that shows how food made in a leaf cell can help the cell carry out activities.

- 3 A model shows a stiff outer layer and a boundary that controls materials moving in and out. Identify these two parts and describe what each contributes to the plant cell.

- 4 Use two details from the passage to explain why a leaf cell is a system instead of a pile of separate parts.

3 YOUR TURN Your own words

Create a labeled arrow model of a water-lily leaf cell. Include the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall, use at least five arrows to show contributions, and write one sentence explaining how the parts function as a system.

PART 1 • READ AND MARK

Circle the five named cell parts, and underline words that tell what each part contributes to the whole cell. Use your markings as evidence for an arrow model. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	A student draws only chloroplasts in a model of a leaf cell. Explain why this model is incomplete. Name two other parts that should be included and tell how each contributes to the cell.	One part alone cannot show the cell as a working system. For example, the nucleus guides cell activities, and mitochondria release usable energy from food for cell activities.
2	Write a three-step arrow chain that shows how food made in a leaf cell can help the cell carry out activities.	Chloroplasts help make food → mitochondria release usable energy from food → the cell carries out activities.
3	A model shows a stiff outer layer and a boundary that controls materials moving in and out. Identify these two parts and describe what each contributes to the plant cell.	The stiff outer layer is the cell wall, which supports and protects the cell. The boundary is the cell membrane, which controls what enters and leaves.
4	Use two details from the passage to explain why a leaf cell is a system instead of a pile of separate parts.	Chloroplasts help make food, and mitochondria release usable energy from that food for cell activities. Their connected jobs help the whole cell function.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Model labels and arrows: cell membrane → needed materials enter; cell membrane → wastes leave; cell wall → support and protection; nucleus → guides cell activities; chloroplasts → food; food → mitochondria; mitochondria → usable energy → cell activities. Together, these parts help the water-lily leaf cell take in materials, make food, use energy, release wastes, and stay supported.

Accept models that include all five named parts and show accurate connections to whole-cell function. Accept different valid arrow arrangements if the cell wall and cell membrane have distinct roles and the other parts are linked to the cell's activities.