# Inside a Leaf

Model how cell parts work together

**MS-LS1-2** "Develop and use models to describe the parts, functions, and basic processes of cells."

NAME _____ DATE _____

## 1 READ AND MARK

Read it twice

**YOUR JOB** Underline each cell part named in the passage, circle a phrase that tells what it does, and number the steps that connect sunlight to usable energy.

### A Sunflower Leaf Through the Day

1. On a sunny morning, a sunflower leaf faces the light. Inside its many cells, different parts work together. Imagine one leaf cell as a tiny room. Its stiff cell wall helps the cell keep its shape, while the cell membrane just inside controls what enters and leaves. Jellylike cytoplasm holds the cell's parts in place. The nucleus contains instructions that guide the cell's activities. A model can show these parts as separate shapes, but the real parts interact as the leaf stays alive.

2. Sunlight reaches chloroplasts in the leaf cell. These parts use light energy, water, and carbon dioxide to make sugar and release oxygen. Some sugar is used by mitochondria, which release usable energy for the cell. The cell membrane allows needed materials to move into the cell and waste materials to move out. The nucleus holds instructions for making proteins needed in cell processes. A model with arrows can connect materials to the parts that use them, showing more than a list of names.

3. Later, a dry wind passes over the leaf. Water escapes from tiny openings on the leaf's surface, and less water may be available to its cells. A large central vacuole stores water inside each leaf cell. When that vacuole loses water, it pushes less firmly against the cell wall, so the leaf may droop. The wall still gives the cell a sturdy outer shape. A useful model can show water moving through the membrane, the vacuole changing size, and the leaf's response.

## 2 ANSWER WITH EVIDENCE

Use the passage

1. In a model of the leaf cell, how would you show the different jobs of the cell wall and cell membrane?

2. What labeled arrows would you draw around a chloroplast to show how it makes sugar?

3. What labeled arrow would connect a chloroplast to a mitochondrion, and what would you show coming from the mitochondrion?

4. How could you change a model of a leaf cell to show why the leaf may droop during dry wind?

## 3 YOUR TURN

Your own words

A sunflower leaf has drooped during a dry afternoon, then its plant is watered. Draw two panels showing one leaf cell before and after watering. Label the cell wall, membrane, vacuole, chloroplast, and mitochondrion, add arrows for water and sugar movement, and write two sentences explaining the change in the leaf and how the cell gets usable energy.

**ANSWER KEY**

# Inside a Leaf

**GRADES 6-8 · MS-LS1-2**

## PART 1 · READ AND MARK

Underline each cell part named in the passage, circle a phrase that tells what it does, and number the steps that connect sunlight to usable energy. Accept any marking that follows this job and points at the right text.

## PART 2 · ANSWERS

| # | QUESTION | ANSWER |
|---|---|---|
| 1 | In a model of the leaf cell, how would you show the different jobs of the cell wall and cell membrane? | **Show the wall as a stiff outer layer that helps the cell keep its shape. Show the membrane just inside it, controlling what enters and leaves.** |
| 2 | What labeled arrows would you draw around a chloroplast to show how it makes sugar? | **Draw arrows for light energy, water, and carbon dioxide going to the chloroplast, and arrows for sugar and oxygen coming from it.** |
| 3 | What labeled arrow would connect a chloroplast to a mitochondrion, and what would you show coming from the mitochondrion? | **A sugar arrow goes from the chloroplast to the mitochondrion. The mitochondrion releases usable energy for the cell.** |
| 4 | How could you change a model of a leaf cell to show why the leaf may droop during dry wind? | **Show water leaving through the membrane and a smaller vacuole pushing less firmly against the cell wall. Label the possible result: a drooping leaf.** |

## PART 3 · YOUR TURN (SAMPLE ANSWER)

Before watering: A cell wall surrounds the membrane; a small vacuole has a water arrow pointing out through the membrane. A sugar arrow points from a chloroplast to a mitochondrion. After watering: The wall and membrane remain in place; a water arrow points in through the membrane toward a larger vacuole. A sugar arrow again points from the chloroplast to the mitochondrion. As the vacuole fills, it pushes more firmly against the wall, so the leaf may become less droopy. The chloroplast makes sugar, which the mitochondrion uses to release usable energy.

Accept varied shapes and arrow positions if the parts and movements are labeled correctly. After watering, the model should show a fuller vacuole without suggesting that the cell wall disappears or that the vacuole makes sugar.