

Cell Systems Casebook

Trace how cell structures and processes keep organisms alive.

LS.2 "The student will investigate and understand that all living things are composed of one or more cells that support life processes, as described by the cell theory..."

NAME _____ DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each sentence that explains how a cell structure or cell process supports life. In the margin, write O for an organelle or structure, D for cell division, or T for transport.

Cells at Work

- ① More than three centuries ago, Robert Hooke viewed thin cork through a microscope and called the tiny boxlike spaces cells. Later scientists examined living tissues and shared evidence. Their observations led to cell theory: every living thing is made of one or more cells, the cell is the basic unit of life, and new cells come from existing cells. Cell theory changed as tools and observations improved. This history shows that scientific explanations are built, tested, and revised with evidence.
- ② Inside cells, specialized structures carry out life processes. The cell membrane controls what enters and leaves. Cytoplasm holds many reactions, while mitochondria release usable energy from food. Ribosomes build proteins. Plant and animal cells both have these parts, as well as DNA in a nucleus. Plant cells also have a rigid cell wall, chloroplasts that capture light energy, and a large central vacuole that stores water and other materials. These differences help plants make food and stay firm.
- ③ When a body grows or repairs a cut, cells divide. Before division, a cell copies its DNA so each new cell receives genetic instructions. Cells also exchange materials with their surroundings. In diffusion, particles move from an area of higher concentration to lower concentration, such as oxygen moving into a cell. Osmosis is diffusion of water across a selectively permeable membrane. A plant root cell can gain water by osmosis. Together, division and transport supply cells, support growth, and help organisms reproduce.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 How does the development of cell theory show the nature of science?

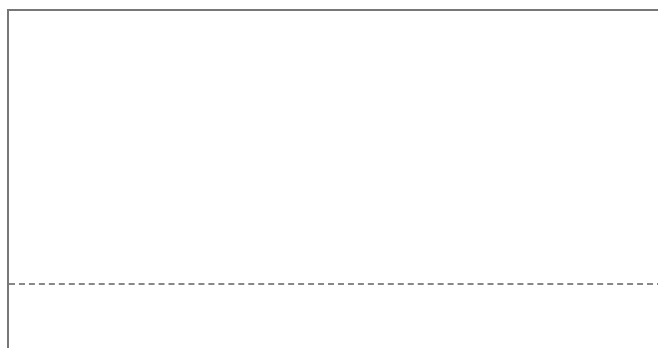
2 Name two structures found in both plant and animal cells. Then name two structures found only in plant cells in the passage.

3 Why does a cell copy its DNA before it divides?

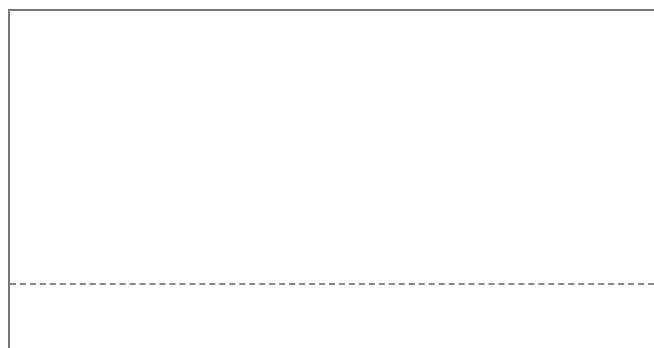
4 Compare diffusion and osmosis. Include what moves in each process.

3 YOUR TURN _____ Your own words

Make a two-panel labeled sketch. In Panel 1, show a plant root cell gaining water by osmosis. In Panel 2, show an animal body cell dividing into two cells. In each panel, label the cell membrane and one other structure or material, add arrows, and write a short caption explaining how the process supports life.



A rectangular box for drawing a plant root cell. A dashed horizontal line is positioned near the bottom of the box, indicating where to draw the cell membrane.



A rectangular box for drawing an animal body cell. A dashed horizontal line is positioned near the bottom of the box, indicating where to draw the cell membrane.

PART 1 • READ AND MARK

Underline each sentence that explains how a cell structure or cell process supports life. In the margin, write O for an organelle or structure, D for cell division, or T for transport. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How does the development of cell theory show the nature of science?	Scientists used observations and evidence, and cell theory changed as tools and observations improved. Scientific explanations are built, tested, and revised with evidence.
2	Name two structures found in both plant and animal cells. Then name two structures found only in plant cells in the passage.	Both types may have a cell membrane, cytoplasm, mitochondria, ribosomes, and a nucleus with DNA. Plant-only structures include a cell wall, chloroplasts, and a large central vacuole.
3	Why does a cell copy its DNA before it divides?	It copies its DNA so each new cell receives genetic instructions.
4	Compare diffusion and osmosis. Include what moves in each process.	In diffusion, particles move from higher concentration to lower concentration. Osmosis is the diffusion of water across a selectively permeable membrane.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: A plant root cell has a cell wall, cell membrane, and vacuole. Arrows labeled H₂O point into the cell through the membrane. Caption: Osmosis brings water into the root cell. Panel 2: One animal cell with a cell membrane, nucleus, and copied DNA becomes two cells, each with a nucleus. Caption: Cell division makes new cells for growth and repair.

Accept any two shared structures and any two plant-only structures named in the passage. For the sketch, accept accurate labels, arrows showing water entering during osmosis, and two daughter cells formed by division.