Cells, Seen and Explained

Read how observations became the three tenets of cell theory.

BIO.1A.2 "Describe the tenets of cell theory and the contributions of Schwann, Hooke, Schleiden, and Virchow."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the three tenets of cell theory. Circle each scientist's name, then number the four sentences that describe their contributions in the order they appear.

From Cork to Cell Theory

1. In 1665, Robert Hooke examined a thin slice of cork with a microscope he had built. The pattern reminded him of rows of small rooms, so he called the compartments "cells." Cork comes from a plant, but the compartments Hooke saw were the empty walls of dead cells. He did not watch living cells grow or divide. His name for the compartments lasted, even as better microscopes revealed much more inside living cells. The view raised a question: were these tiny units peculiar to cork, or were they a common feature of living things?

2. Nearly two centuries later, Matthias Schleiden studied many kinds of plant tissue and concluded that plants are made of cells. Theodor Schwann then studied animal tissue and reached a similar conclusion about animals. Together, their findings supported a broad idea: every living thing is made of one or more cells. A single-celled organism carries out life processes in one cell, while an oak or a mouse has many cells. Scientists also came to recognize the cell as the basic unit of structure and function in living things: tissues are built from cells, and the activities of living things depend on cells.

3. One question remained: where do new cells come from? Some researchers once thought cells could form from nonliving material. Rudolf Virchow argued that every cell comes from a cell that already exists. That idea became the third major tenet of cell theory. A yeast cell in a drop of sugary water, for example, can form a bud that grows and separates into a new cell. If you counted cells before and after budding, you would find an additional cell, not a cell that sprang from the liquid. This claim connected cell theory to how living things grow.

2 ANSWER WITH EVIDENCE

Use the passage

1. What did Hooke contribute, and why could his cork observation alone not show how living cells work?

2. How did Schleiden's and Schwann's studies of different tissues support one tenet of cell theory?

3. The passage says that a mouse has many cells. How is the tenet that cells are basic units of structure and function different from that fact?

4. How does Virchow's contribution explain the new yeast cell described in the passage?

3 YOUR TURN

Your own words

A student sees new cells at the edge of a healing cut and claims they appeared from empty space. Write a four- or five-sentence museum label that corrects the claim, states all three tenets of cell theory, and explains what Hooke, Schleiden, Schwann, and Virchow each contributed.

Cells, Seen and Explained

PART 1 · READ AND MARK

Underline the three tenets of cell theory. Circle each scientist's name, then number the four sentences that describe their contributions in the order they appear. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What did Hooke contribute, and why could his cork observation alone not show how living cells work?	**Hooke named the compartments he saw in cork "cells." They were the empty walls of dead cells, so he could not observe living cells at work.**
2	How did Schleiden's and Schwann's studies of different tissues support one tenet of cell theory?	**Schleiden concluded that plants are made of cells, and Schwann reached the same conclusion about animals. Together, their findings supported the tenet that every living thing is made of one or more cells.**
3	The passage says that a mouse has many cells. How is the tenet that cells are basic units of structure and function different from that fact?	**The fact tells how many cells a mouse has. The tenet explains that its tissues are built from cells and that its life processes depend on cells.**
4	How does Virchow's contribution explain the new yeast cell described in the passage?	**Virchow argued that every cell comes from an existing cell. The new yeast cell grows as a bud from the original cell rather than forming from the liquid.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The new cells at the edge of the cut came from cells already there, as Virchow argued, not from empty space. Schleiden's work on plants and Schwann's work on animals helped show that every living thing is made of one or more cells. Cells are the basic units of structure and function, so the cells in the skin build tissue and carry out life processes. Hooke named cells after seeing the empty compartments in cork, although he did not observe living cells at work.

For the marking task, accept underlines of the three tenets even if students include nearby explanatory words. For the museum label, accept varied wording if it accurately distinguishes Hooke's observation from the later conclusions and connects existing cells to the healing cut.