Cell Theory

Name: _____ **Class:** _____ **Date:** _____

Read and Learn

Cell theory explains how cells relate to living organisms. Its three main principles are:

- **All living organisms consist of one or more cells.**
- **The cell is the basic structural and functional unit of life.**
- **All cells arise from pre-existing cells.**

Cells are the **fundamental units of life** because they form organisms and carry out essential life processes. A single-celled organism performs these processes within one cell. In multicellular organisms, specialised cells work together.

New cells form when existing cells **divide**. Before division, genetic material is copied and then passed to the new cells. Cell division allows organisms to grow, replace damaged or worn-out cells, and reproduce.

Scientists and Cell Theory

Scientist	Contribution
Robert Hooke	Observed tiny compartments in cork in 1665 and named them "cells." He was viewing the walls of dead plant cells.
Antonie van Leeuwenhoek	Used microscopes to observe living microorganisms, including bacteria and single-celled organisms.
Matthias Schleiden	Proposed that plants consist of cells.
Theodor Schwann	Proposed that animals consist of cells, helping establish that cells are common to living organisms.
Rudolf Virchow	Helped popularise the principle that cells arise from pre-existing cells, building on earlier research.

Cell theory underpins modern biology. It helps explain growth, reproduction, tissue repair, and diseases involving changes in cells, such as cancer.

Multiple Choice

1. Which statement is part of cell theory?

A. Only animals consist of cells.
B. All cells arise from pre-existing cells.
C. All cells have the same shape.
D. Cells form spontaneously from non-living material today.

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2. Who named the tiny compartments he observed in cork "cells"?

A. Robert Hooke
B. Theodor Schwann
C. Rudolf Virchow
D. Matthias Schleiden

3. Which scientist is associated with observing living microorganisms?

A. Matthias Schleiden
B. Rudolf Virchow
C. Antonie van Leeuwenhoek
D. Robert Hooke

4. Which process produces new cells from existing cells?

A. Digestion
B. Diffusion
C. Excretion
D. Cell division

Complete the Main Principles

Word bank: cells • pre-existing • structural • functional

1. All living organisms consist of one or more _____.
2. The cell is the basic _____ and _____ unit of life.
3. All cells arise from _____ cells.

Match the Scientist to the Contribution

Write the correct letter beside each scientist.

Scientist	Answer	Contribution
Matthias Schleiden	_____	A. Helped popularise the idea that cells come from existing cells
Theodor Schwann	_____	B. Observed living microorganisms
Rudolf Virchow	_____	C. Proposed that plants consist of cells
Antonie van Leeuwenhoek	_____	D. Proposed that animals consist of cells

True or False?

Write **T** or **F**. Correct each false statement.

1. A single-celled organism can carry out the processes needed for life. _____

2. All cells in a multicellular organism have identical structures and functions. _____

3. Cell division helps replace damaged and worn-out cells. _____

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Apply Your Understanding

1. Explain why cells are called the basic structural and functional units of life.

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2. A student says, "New skin cells appear from nowhere when a cut heals." Use cell theory to correct this statement.

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3. A bacterium divides into two bacteria. Explain how this observation supports cell theory.

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4. Before microscopes were developed, scientists could not observe cells. Explain how improvements in microscopes helped the development of cell theory.

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5. Give one example of how cell theory helps scientists understand growth, disease, or tissue repair. Explain your example.

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Cell Theory — Answer Key

Multiple Choice

1. **B** — All cells arise from pre-existing cells.
2. **A** — Robert Hooke.
3. **C** — Antonie van Leeuwenhoek.
4. **D** — Cell division.

Complete the Main Principles

1. **cells**
2. **structural; functional**
3. **pre-existing**

Match the Scientist to the Contribution

Scientist	Answer	Contribution
Matthias Schleiden	**C**	Proposed that plants consist of cells
Theodor Schwann	**D**	Proposed that animals consist of cells
Rudolf Virchow	**A**	Helped popularise the idea that cells come from existing cells
Antonie van Leeuwenhoek	**B**	Observed living microorganisms

True or False?

1. **True.**
2. **False.** Multicellular organisms contain specialised cells with different structures and functions.
3. **True.**

Apply Your Understanding

Accept scientifically correct answers in students' own words.

1. Why are cells the basic structural and functional units of life?

Cells form the structure of all living organisms and perform essential life processes. Single-celled organisms carry out these processes within one cell; multicellular organisms have specialised cells that work together.

2. Where do new skin cells come from when a cut heals?

New skin cells arise through the division of existing cells. They do not appear from nowhere. This supports the principle that all cells come from pre-existing cells.

3. How does a bacterium dividing support cell theory?

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The two new bacterial cells arise from a pre-existing bacterial cell. This demonstrates that new cells form through cell division.

4. How did improvements in microscopes help develop cell theory?

Better microscopes allowed scientists to observe cells and microorganisms in greater detail and compare different organisms. Observations of plant and animal cells, and later cell division, provided evidence for cell theory.

5. How does cell theory help explain growth, disease, or tissue repair?

Accept one explained example:

- **Growth:** Existing cells divide, increasing the number of cells in an organism.
- **Tissue repair:** Cells divide to replace damaged cells, helping wounds heal.
- **Cancer:** Changes in cells can cause uncontrolled cell division, producing tumours.
- **Infection:** Some diseases are caused by cellular organisms, such as bacteria, that multiply through cell division.

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