

What is Mitosis?

Worksheet

Mitosis is nuclear division in four stages: Prophase (chromosomes condense, spindle forms), Metaphase (chromosomes align at metaphase plate), Anaphase (sister chromatids separate), Telophase (nuclei reform). Cytokinesis (cytoplasm division) follows, producing two genetically identical diploid cells.

Questions

1. During which phase do chromosomes first become visible under a microscope?
 - A) Interphase
 - B) Prophase
 - C) Metaphase
 - D) Anaphase
2. Chromosomes align at the cell's equator during:
 - A) Prophase
 - B) Metaphase
 - C) Anaphase
 - D) Telophase
3. A diploid cell ($2n = 20$) completes mitosis. Each daughter cell has:
 - A) 10 chromosomes
 - B) 20 chromosomes
 - C) 40 chromosomes
 - D) unpredictable
4. Cytokinesis is:
 - A) separation of sister chromatids
 - B) condensation of chromosomes
 - C) division of the cytoplasm
 - D) reformation of the nuclear envelope
5. A human skin cell ($2n = 46$) undergoes mitosis. How many chromosomes are in each daughter cell?
6. At what stage do sister chromatids separate during mitosis?
7. Why is mitosis important for growth in a multicellular organism?
8. Define: What is mitosis?
9. Define: Name the four stages of mitosis.
10. Define: At which stage do sister chromatids separate?

Answer Key

1. B) Prophase - Prophase: chromosomes condense and become visible; spindle fibres form.
2. B) Metaphase - Metaphase: chromosomes line up at the metaphase plate.
3. B) 20 chromosomes - Mitosis produces two identical cells; each daughter = $2n = 20$.
4. C) division of the cytoplasm - Cytokinesis is the physical splitting of the cell into two after nuclear division.
5. Parent cell: $2n = 46$ chromosomes After mitosis: two daughter cells, each $2n = 46$ Identical diploid cells
6. Anaphase Sister chromatids (held at centromere) separate Chromatids are now independent chromosomes They move to opposite poles
7. Mitosis produces identical copies Cells divide to increase tissue mass Example: skin cells divide thousands per minute
8. Division of the cell nucleus to produce two identical diploid daughter nuclei, essential for growth and repair.
9. Prophase, Metaphase, Anaphase, Telophase.
10. Anaphase - sister chromatids (now chromosomes) move to opposite poles.

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