

★ KEY ★

Name: _____ Date: _____ Period: _____

Worksheet: Mitosis & the Cell Cycle

I. Use each of the terms below just once to complete the passage.

- nucleus genetic material chromosomes packed histones
 identical chromatin vanish cell division

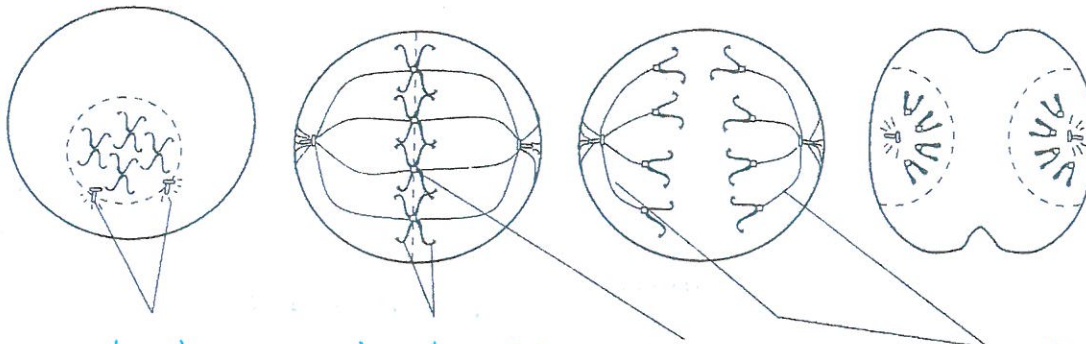
The process by which two cells are produced from one cell is called (1) cell division. The two cells are (2) identical to the original cell. Early biologists observed that just before cell division, several short, stringy structures appeared in the (3) nucleus. These structures seemed to (4) vanish soon after cell division. These structures, which contain DNA and became darkly colored when stained, are now called (5) chromosomes. Scientists eventually learned that chromosomes carry (6) genetic material, which is copied and passed on from generation to generation. Chromosomes normally exist as (7) chromatin, long strands of DNA wrapped around proteins, called (8) histone proteins. However, before a cell divides, the chromatin becomes tightly (9) packed.

II. Complete the table by checking the correct column for each statement.

Statement	Interphase	Mitosis
1. Cell growth occurs.	✓	
2. Nuclear division occurs.		✓
3. Chromosomes are distributed equally to daughter cells.		✓
4. Protein production is high.	✓	
5. Chromosomes are duplicated.	✓	
6. DNA synthesis occurs.	✓	
7. Cytoplasm divides immediately after this period.		✓
8. Mitochondria and other organelles are manufactured.	✓	

III. Identify the following phases of mitosis. Use these choices for #1-4: telophase, metaphase, anaphase, prophase. Then label the diagrams. Use these choices for #5-8: sister chromatids, centromere, spindle fibers, centrioles.

1. prophase 2. metaphase 3. anaphase 4. telophase



5. centrioles 6. sister chromatids 7. centromere 8. spindle fibers

IV. Matching: match the term to the description

A. Prophase

B. Interphase

C. Telophase

D. Metaphase

E. Anaphase

- | | |
|---|---|
| <u>E</u> 1. The sister chromatids are moving apart. | <u>D</u> 10. Chromatids line up along the equator. |
| <u>A</u> 2. The nucleolus begins to fade from view. | <u>A</u> 11. The spindle is formed. |
| <u>C</u> 3. A new nuclear membrane is forming around the chromosomes. | <u>B</u> 12. Chromosomes are not visible. |
| <u>C</u> 4. The membrane of the cell is begins indenting. | <u>C</u> 13. Cytokinesis is completed (as next cycle begins). |
| <u>B</u> 5. The chromosomes become invisible. | <u>C</u> 14. The cell plate is completed. |
| <u>D</u> 6. Chromosomes are located at the equator of the cell. | <u>B</u> 15. Chromosomes are replicated. |
| <u>A</u> 7. The nuclear membrane begins to fade from view. | <u>C</u> 16. The reverse of prophase. |
| <u>C</u> 8. The division (cleavage) furrow appears. | <u>B</u> 17. The organization phase (DNA replicated & cell prepared for division) |
| <u>E</u> 9. The chromosomes are moving towards the poles of the cell. | |

V. Fill in the blank: Some will be used more than once.

A. Prophase

D. Metaphase

G. Chromatid

J. Spindle fiber

B. Interphase

E. Anaphase

H. Cytokinesis

K. Cell plate

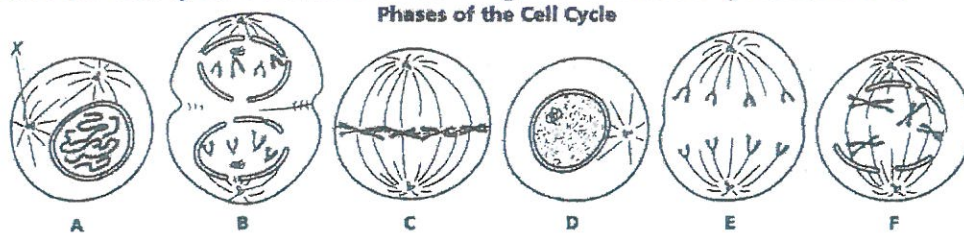
C. Telophase

F. Centromere

I. Mitosis

- B 18. What phase are daughter cells in as a result of mitosis?
- E 19. During what phase of mitosis do centromeres divide and the chromosomes move toward their respective poles?
- A 20. What is the phase where chromatin condenses to form chromosomes?
- F 21. What is the name of the structure that connects the two chromatids?
- G 22. In a chromosome pair connected by a centromere, what is each individual chromosome called?
- H+I 23. What are the two parts of cell division?
- J 24. What structure forms in prophase along which the chromosomes move?
- D 25. Which phase of mitosis is the last phase that chromatids are together?
- B 26. Which phase of the cell cycle is characterized by a non-dividing cell?
- J 27. What structure is produced when protein fibers radiate from centrioles?
- K 28. What forms across the center of a cell near the end of telophase?
- B 29. The period of cell growth and development between mitotic divisions?
- H 30. What is the phase where cytokinesis occurs?

VI. The diagram below shows six cells in various phases of the cell cycle. Note the cells are not arranged in the order in which the cell cycle occurs. Use the diagram to answer questions 1-7.



- Cells A & F show an early and a late stage of the same phase of the cell cycle. What phase is it? Interphase
- Which cell is in metaphase? C
- Which cell is in the first phase of M phase (mitosis)? F
- In cell A, what structure is labeled X? centriole
- List the diagrams in order from first to last in the cell cycle. D A F C E B
- Are the cells depicted plant or animal cells? Animal
- Explain your answer to #6. centrioles are only in animal cells, no cell plate formed in B
- If it were the other type of cell what would be different in the diagrams? cell wall, no centrioles, cell plate
- What is the longest phase of the cell cycle? Interphase
- Why is mitosis important? Cell division - replace old/dying cell, growth, repair, new cells