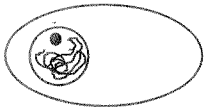
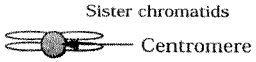
Mitosis Notes

Cell division occurs in a series of stages, or phases.

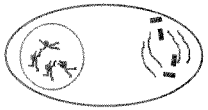
1st: INTERPHASE



- Chromosomes are copied (# doubles)
- Chromosomes appear as threadlike coils (chromatin) at the start, but each chromosome and its copy (sister chromosome) change to sister chromatids at end of this phase



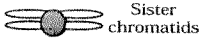
2nd: PROPHASE



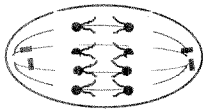
- Mitosis begins (cell begins to divide)
- Centrioles (or poles) appear and begin to move to opposite ends of cell
- Spindle fibers form between the poles

3rd: METAPHASE

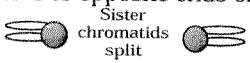
- Chromatids (or pairs of chromosomes) attach to the spindle fibers



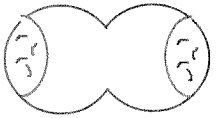
4th: ANAPHASE



- Chromatids (or pairs of chromosomes) separate and begin to move to opposite ends of the cell

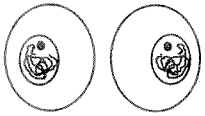


5th: TELOPHASE



- Two new nuclei form
- Chromosomes appear as chromatin (threads rather than rods)
- Mitosis ends

6th: CYTOKINESIS



- Cell membrane moves inward to create two daughter cells - each with its <u>own nucleus</u> with <u>identical chromosomes</u>

MITOSIS WORKSHEET **Name:** ANSWERS

Matching: match the term to the description by dragging and dropping the selections below.

A. Prophase **B.** Interphase **C.** Telophase **D.** Metaphase **E.** Anaphase

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

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

H 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?
I 24. What structure forms in prophase along which the chromosomes move?
E 25. Which phase of mitosis is the last phase that chromatids are together?
A 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?
C 30. What is the phase where cytokinesis occurs?

Name: ANSWERS
Date: _____
Period: _____

Mitosis Assessment

Directions #1-8: Select the answer that best suits the question or statement.

1. The process of mitosis ensures that:
   a. each new cell is genetically different from its parent
   B b. each new cell receives the proper number of chromosomes
   c. cells will divide at the appropriate time
   d. DNA is replicated without errors

2. The image illustrates what phase of mitosis:

   A a. Anaphase
   b. Telophase
   c. Metaphase
   d. prophase

3. Which of the following is NOT part of mitosis?
   a. prophase
   b. metaphase
   D c. Telophase
   d. interphase

5. A cell that has 20 chromosomes undergoes mitosis. Which of the following is true?
   A a. two daughter cells will be created, each have 20 chromosomes
   b. two daughter cells will be created, each have 40 chromosomes
   c. 4 daughter cells will be created, each having 10 chromosomes
   d. 2 daughter cells will be created, each having 10 chromosomes

6. A spindle forms during which phase?
   a. G2
   b. Interphase
   C c. Prophase
   d. metaphase

7. Most cells spend their lives in:
   C a. prophase
   b. metaphase
   c. interphase
   d. telophase

8. Cytokinesis begins during which phase?
   A a. Telophase
   b. synthesis phase
   c. anaphase
   d. metaphase

Directions # 9-13: Identify each phase described in each statement. Some phases may be used more than once.

9. Some 90 percent of a cell's time in the normal cellular cycle may be spent in this phase
   interphase

10. In this phase of mitosis, the chromatin condenses into discrete chromosomes. The nuclear envelope breaks down and spindles form at opposite poles of the cell
   prophase

11. Cytokinesis occurs during this stage of mitosis
   telophase

12. In this phase, chromosomes align at the metaphase plate at right angles to the spindle poles.
   metaphase

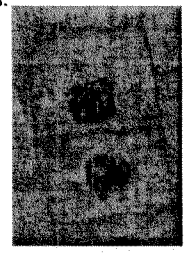
13. In this phase, the paired chromosomes separate and begin moving to opposite ends (poles) of the cell.
   anaphase

Directions #14-16: Identify the phases shown in the following Images.

14. Identify the phase of mitosis:

   a. prophase
   C b. Telophase
   c. anaphase

15. Identify the stage of mitosis:



   a. metaphase
   b. anaphase
   C c. Telophase