

## Mitosis "Flip" Book



### *Introduction:*

Mitosis is a process of cell division which results in the production of two daughter cells from a single parent cell. The daughter cells are identical to one another and to the original parent cell.

In a typical animal cell, mitosis can be divided into four principal stages:

- **Prophase:** The chromatin, diffuse in interphase, condenses into chromosomes. Each chromosome has duplicated and now consists of two sister chromatids. At the end of prophase, the nuclear envelope breaks down into vesicles.
- **Metaphase:** The chromosomes align at the equator and are held in place by microtubules attached to the mitotic spindle and to part of the centromere.
- **Anaphase:** The centromeres divide. Sister chromatids separate and move toward the corresponding poles.
- **Telophase:** Daughter chromosomes arrive at the poles and the microtubules disappear. The condensed chromatin expands and the nuclear envelope reappears. The cytoplasm divides, the cell membrane pinches inward ultimately producing two daughter cells (phase: Cytokinesis).

**Objective:** Students will create a flip book illustrating the changes to a cell during mitosis.

### *Materials:*

- Crayons or colored pencils
- Stapler
- Scissors
- Cell template sheet

### *Procedure:*

1. Cut the sections apart
2. Using the numbered mitosis template sheet as a guide, color the sequential pictures for each phase onto a sheet of your flipbook.
3. The parent cell should have 4 chromosomes.
4. Use colored pencils or crayons to color chromosomes, centromeres, etc.  
BE SURE TO USE THE COLOR KEY ON THIS SHEET  
(USE THE SAME COLOR FOR EACH CELL PART ON EACH PAGE).

5. Write the name of each phase in the lower right corner of each sheet and put them in the correct order in your flip book. Page 1 should begin with a single cell in interphase.
6. Once all the pages have been drawn, place them in the correct order with your cover sheet on top. "Mitosis Flip Book by "your name & period".
7. Staple your booklet down the left side so you can "flip" pages and see mitosis animated.

***Results:***

Include a list of structures that can be seen in cells at each phase. If a structure can only be observed in a plant or animal cell, indicate so.

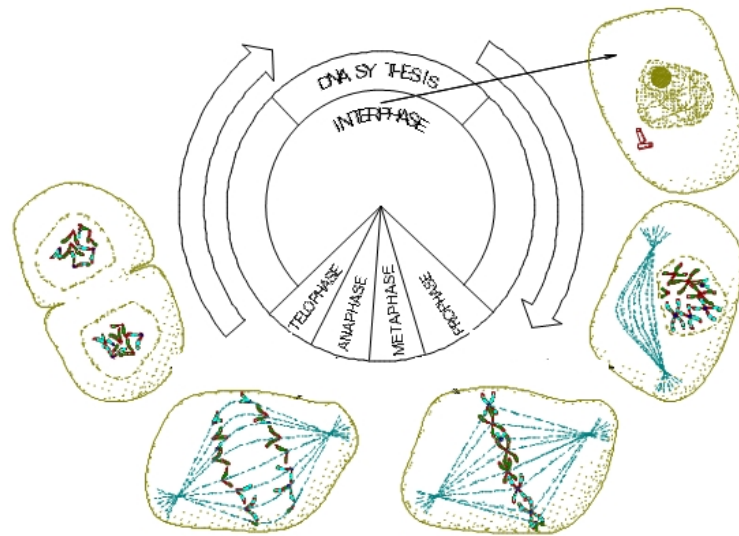
STAGES	STRUCTURES THAT CAN BE SEEN IN CELLS
INTERPHASE	
PROPHASE	
METAPHASE	
ANAPHASE	
TELOPHASE	
CYTOKINESIS	

Cell Membrane - BLACK  
 Nucleolus - PINK  
 Spindle fibers - ORANGE

Nuclear membrane - PURPLE  
 Chromatin - GREY  
 Centrioles - GREEN

Cytoplasm - YELLOW  
 Chromosomes - RED  
 Cleavage furrow- BLUE

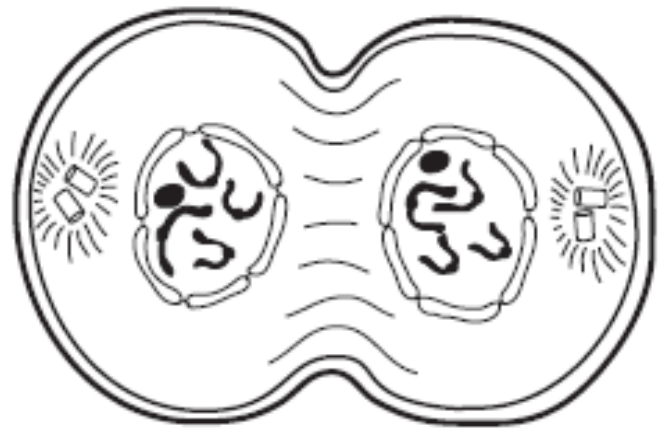
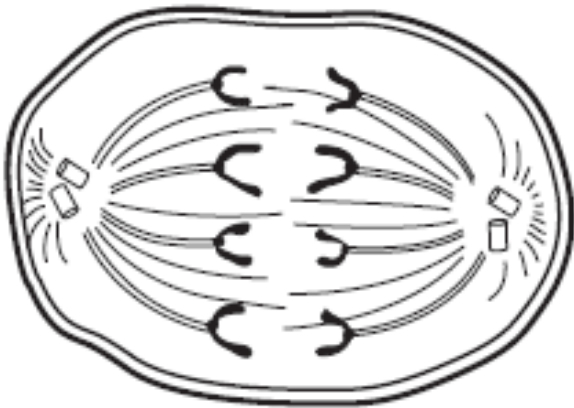
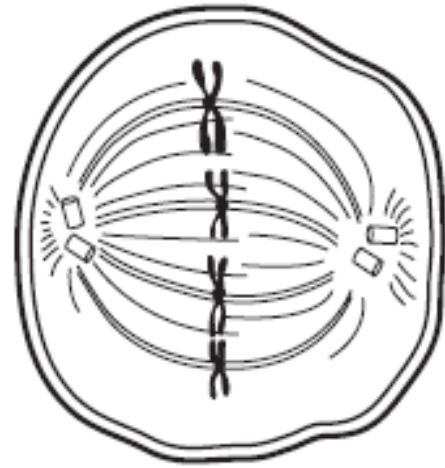
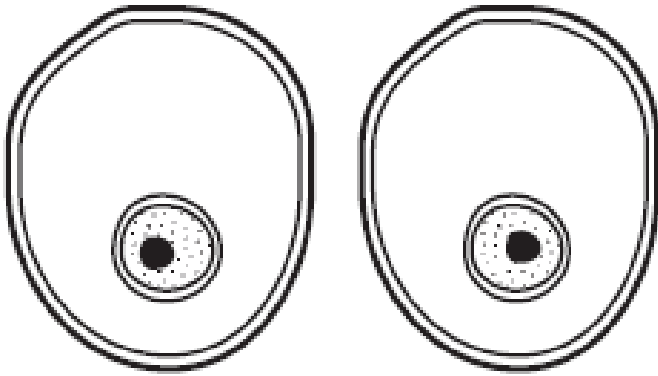
The following diagram shows the cell cycle. Draw arrows from each mitotic stage to the correct cell sketch. Note: Interphase has been done for you.

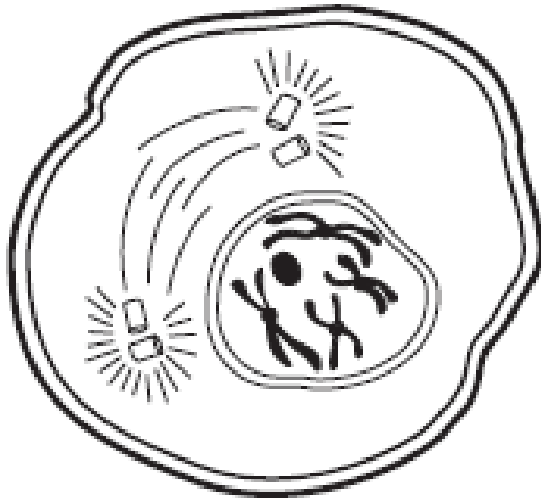


Match each of these cell structures and their function. Write the letter beside the number.

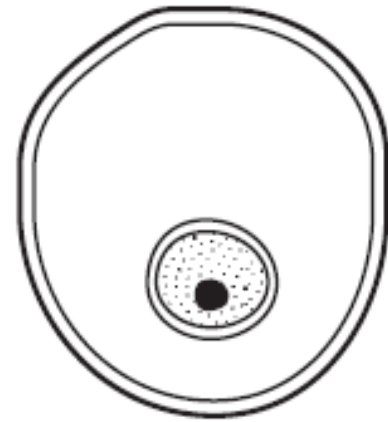
- |                           |   |
|---------------------------|---|
| ___ 1. Centrioles -       | A. Long threads of DNA which can't be seen  |
| ___ 2. Mitotic Spindle    | B. The original chromosome and it's copy while they are attached                            |
| ___ 3. Equator -          | C. What forms between two new plant cells (instead of a cleavage furrow in animal cells)    |
| ___ 4. Cleavage Furrow-   | D. Helps the chromosomes line up at the equator   |
| ___ 5. Cell Plate -       | E. Where the sister chromatids are attached to each other.                                  |
| ___ 6. Centromere -       | F. The long fibers which make up the spindle.   |
| ___ 7. Sister Chromatids- | G. When the cytoplasm divides forming two new cells. This is the last part of cell division |
| ___ 8. Spindle Fibers -   | H. The middle of the cell   |
| ___ 9. Cytokinesis -      | I. The Structures from which the spindle fibers form.                                       |
| ___ 10. Chromatin -       | J. What forms to divide and animal cell into 2 daughter cells.                              |

# Pages for mitosis flip book





\_\_\_\_\_



\_\_\_\_\_

# Mitosis Flip Book



Name

\_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_