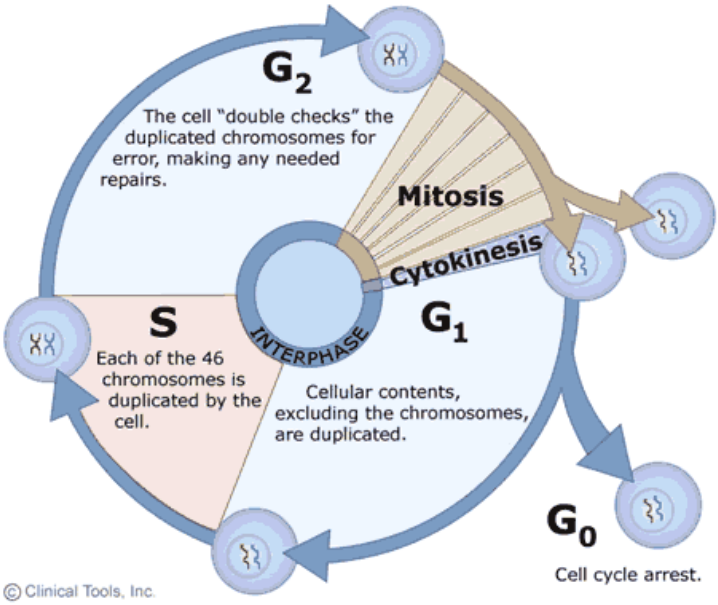
Cell Cycle: Mitosis

Cell cycle image 1 *(Sciculous)

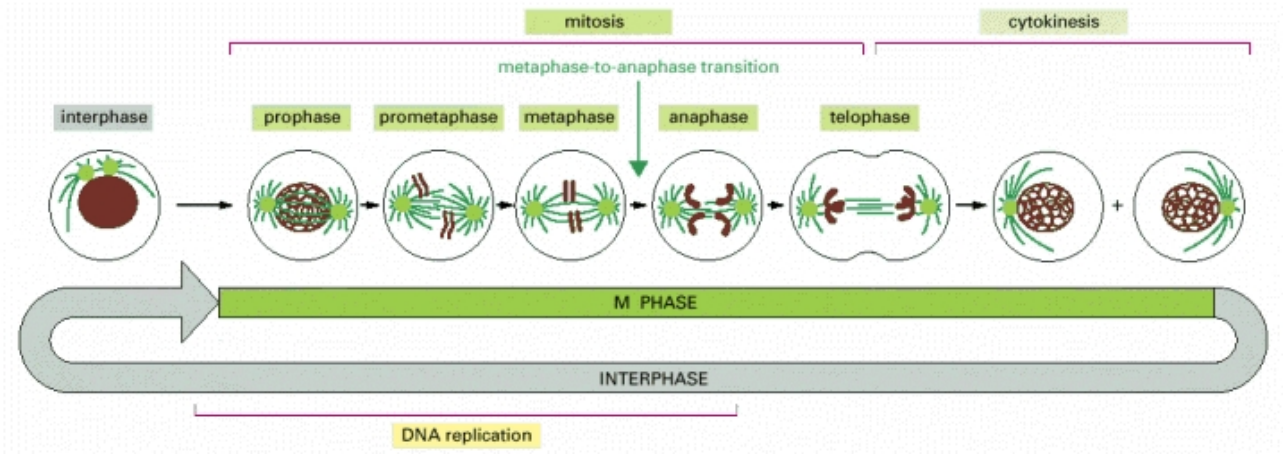


1. **Interphase:** Long period of the cell cycle between one mitosis and the next. Includes; *(Alberts)
   - I. G_1 phase (Gap 1) - Cellular contents excluding the chromosomes, are duplicated.
   - II. S phase (DNA Synthesis) - Each of the 46 chromosomes are duplicated by the cell.
   - III. G_2 phase (Gap 2) - The Cell "double checks" the duplicated chromosomes for error, making any needed repair.
2. **Mitosis** - nuclear/chemical events resulting in two daughter nuclei which have identical genetic material to each other and to the mother cell. *(Michael)
   - I. **Prophase** - the first stage of mitosis.
     - The chromosomes condense and become visible
     - The centrioles form and move toward opposite ends of the cell ("the poles")
     - The nuclear membrane dissolves
     - The mitotic spindle forms (from the centrioles in animal cells)
     - Spindle fibers from each centriole attach to each sister chromatid at the kinetochore
   - II. **Metaphase**
     - The Centrioles complete their migration to the poles
     - The chromosomes line up in the middle of the cell ("the equator")
   - III. **Anaphase**
     - Spindles attached to kinetochores begin to shorten.
     - This exerts a force on the sister chromatids that pulls them apart.
     - Spindle fibers continue to shorten, pulling chromatids to opposite poles.
     - This ensures that each daughter cell gets identical sets of chromosomes.
   - IV. **Telophase**
     - The chromosomes decondense
     - The nuclear envelope forms
   - V. **Cytokinesis**
     - division of the cytoplasm.
     - Cytokinesis reaches completion, creating two daughter cells

     *(This usually occurs with mitosis, but in some organisms this is not so.)

M-Phase (mitosis + cytokinesis)

The events of eukaryotic cell division image 2 *(Alberts)



Vocabulary

- Centromere: area where sister chromatids are held together. *(n.d.)
- Chromatid: each of a pair of identical DNA molecules after DNA replication; they are joined at the centromere. *(n.d.)
- Spindle fibers: fibers that attach to chromosomes and move the chromosomes by pulling homologous chromosomes in opposite directions and pushing the poles apart. *(n.d.)
- Centrioles**:** one of a pair of cellular organelles that occur especially in animals, are adjacent to the nucleus, function in the formation of the spindle apparatus during cell division, and consist of a cylinder with nine microtubules arranged peripherally in a circle. *(Mayo Clinic Staff)
- Microtubules: any of the minute tubules in eukaryotic cytoplasm that are composed of the protein tubulin and form an important component of the cytoskeleton, mitotic spindle, cilia, and flagella. *(Mayo Clinic Staff)
- Kinetochores: a specialized structure on the centromere to which the microtubular spindle fibers attach during mitosis and meiosis. *(Mayo Clinic Staff)

Works cited

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Practice I:

Phases/stages:

A. **Cytokinesis**
B. **Mitosis**
C. **G_1**
D. **G_2**
E. **S**
F. **Interphase**

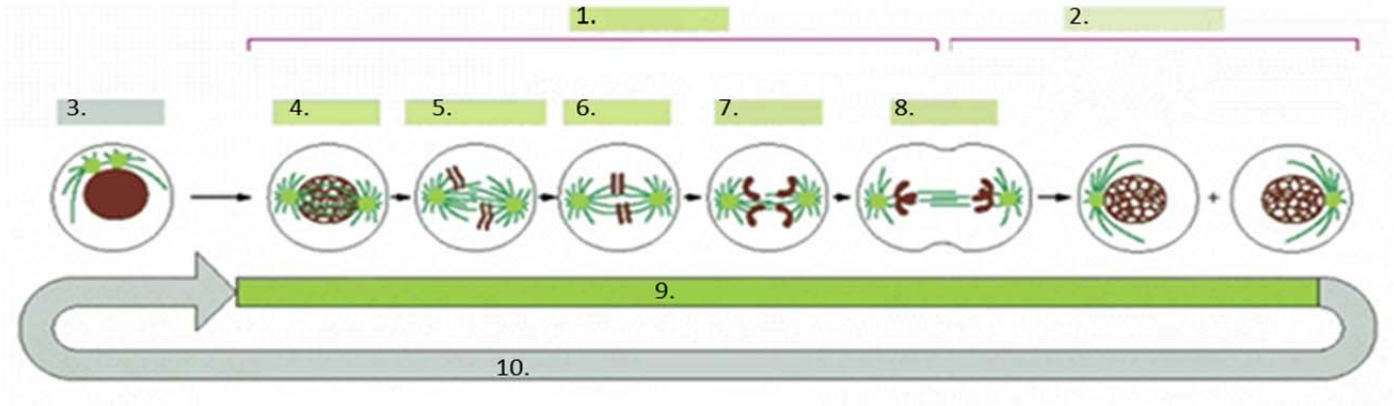
Mix and Match

(Match the phases to the left with what happens at each phase/stage.)

1. _____ Includes, G_1, S, and G_2 phases.
2. ____ The Cell "double checks" the duplicated chromosomes for error, making any needed repair.
3. ____ In this stage, division of the cytoplasm occurs, creating two daughter cells.
4. ____ Each of the 46 chromosome are duplicated by the cell.
5. ____ This stage includes Prophase, Metaphase, Anaphase, Telophase.
6. ____ Cellular contents excluding the chromosomes, are duplicated.

Practice II:

Label the diagram:



Use the following stages/phases and label the digram

A. Interphase
B. Cytokinesis
C. Telophase
D. Anaphase
E. Prometaphase
F. Prophase
G. M-phase
H. Mitosis
I. Metaphase

ANSWERS

Practice I: 1. E 2. D 3. A 4. E 5. B 6. C Practice II: 1. H 2. B 3. A 4. E 5. E 6. E 7. D 8. C 9. G 10. A