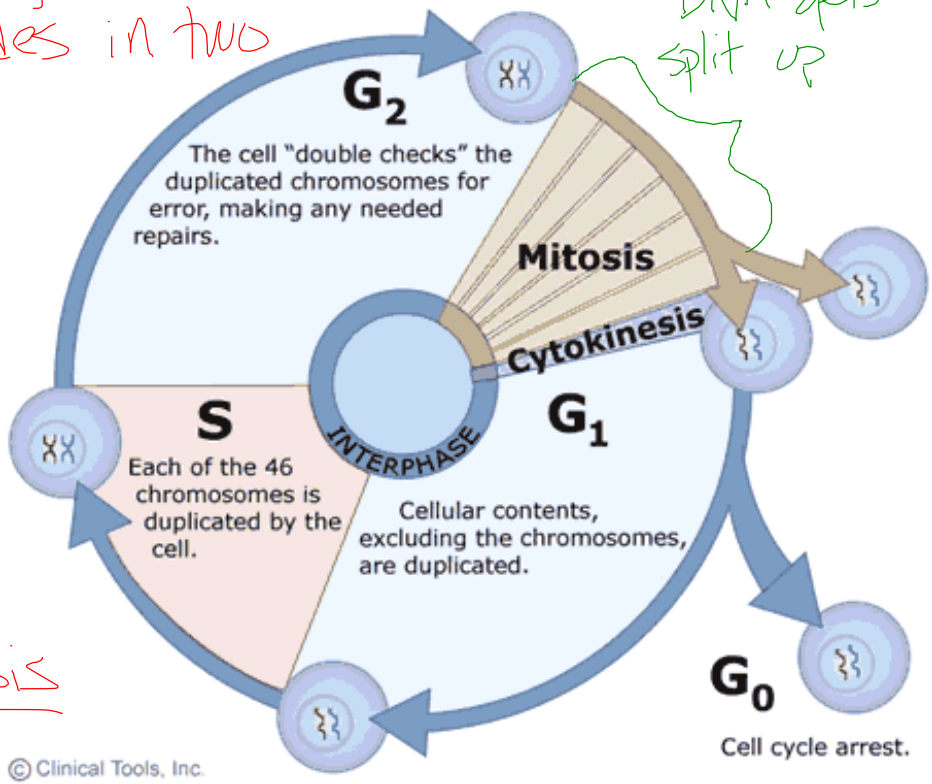
Mitosis

Biology

The Big Picture

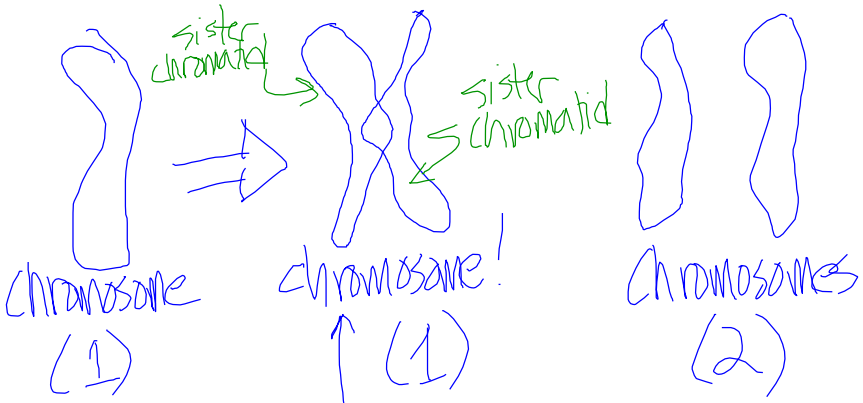
- The Cell Cycle
- In order to divide:
  - Cells grow & duplicate cellular contents (G1)
  - Cells replicate DNA (S)
  - Cells grow more & error check (G2)
  - Cells divide (M + cytokinesis)



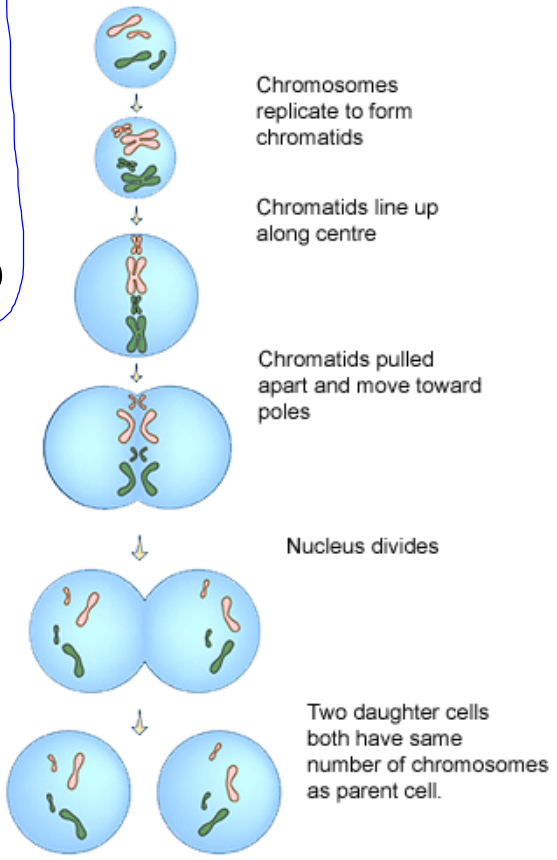
Objectives

- Students will be able to describe the overall process of mitosis
- Students will be able to identify and define key components of the cell cycle
- Students will be able to identify and explain the different phases of mitosis

Overview

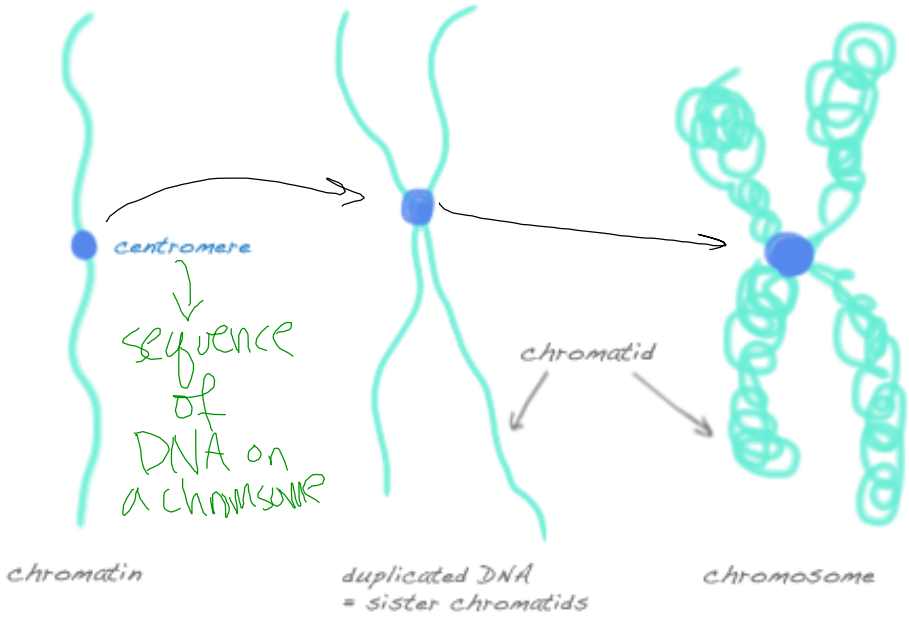


- Cell division requires each cell to have an identical copy of DNA
- DNA is organized into chromosomes
- Before mitosis, DNA is replicated (copied!) so chromosomes are doubled into "sister chromatids"
- During mitosis, sister chromatids split – each new cell gets one sister chromatid
- Mitosis happens only for "somatic" cells – cells that make up the structures in each individual organism.
- For reproduction, a different type of cell division is necessary



Chromosome Vocabulary

- Chromatin: DNA with all auxiliary substances (material, not a strand)
- Centromere: point of attachment of two strands of (replicated) identical DNA
- Sister chromatids: two strands of identical DNA after replications
- Chromosome: one “chunk” of connected DNA (can be strands or attached via centromere)



Interphase

- Happens before mitosis
- Cell prepares to divide by
  - Getting bigger
  - Replicating DNA
- Consists of G1, S, and G2 phases

Prophase – 1st section of mitosis

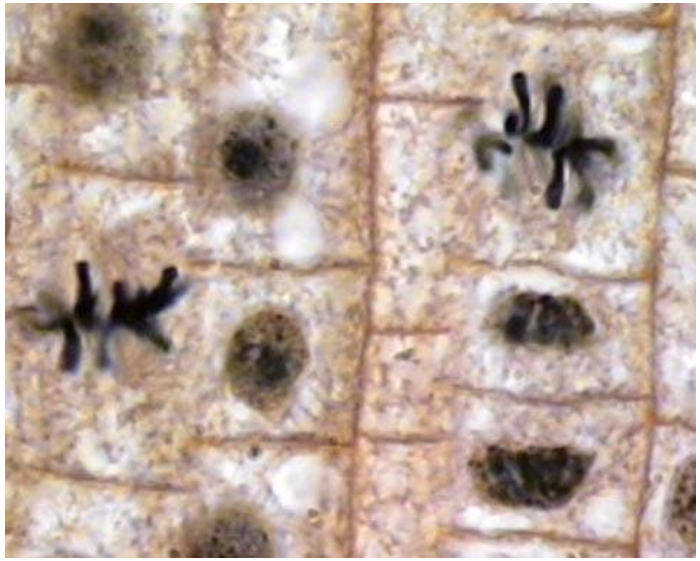
- DNA starts to condense (become visible) into chromosomes
- Nuclear envelope starts to break up
- Centrioles send out spindle fibers and attach to each sister Chromatid

location at edge of a cell

long, thin structures

Metaphase – 2nd stage of mitosis

- Chromosomes line up in the center of the cell
- One sister chromatid on each side of the center



Anaphase – 3rd stage of mitosis

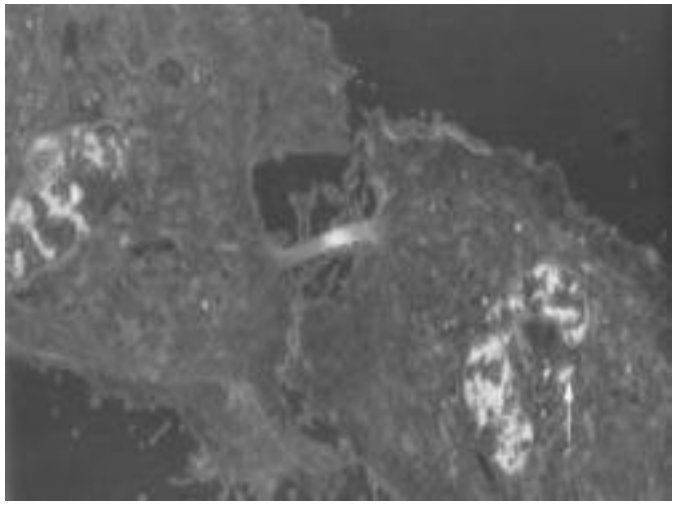
- Sister chromatids are pulled apart
- One chromatid ends up on each side of the cell

Telophase – 4th stage of mitosis

- The cell begins to pinch in half, forming two new cells (start of cytokinesis)
- Chromasomes begin to decondense into diffuse genetic material
- Nuclear envelope regenerates

Cytokinesis (not part of mitosis)

- Happens after mitosis is finished
- A cell wall develops down the middle of the cell. → for plants
- Cells split apart and two new cells are formed.



Remember:

- Please
- Make
- A
- Telephone
- Call

Mitosis
Prophase
Metaphase
Anaphase
Telophase
Cytokinesis

Mitosis Movie

- Mitosis Movie 1