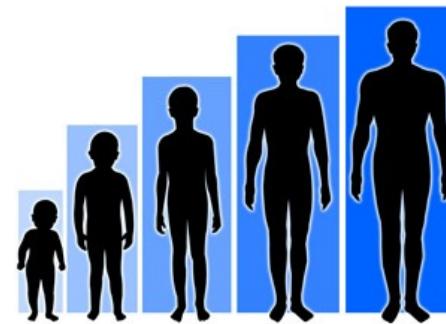


THE CELL CYCLE

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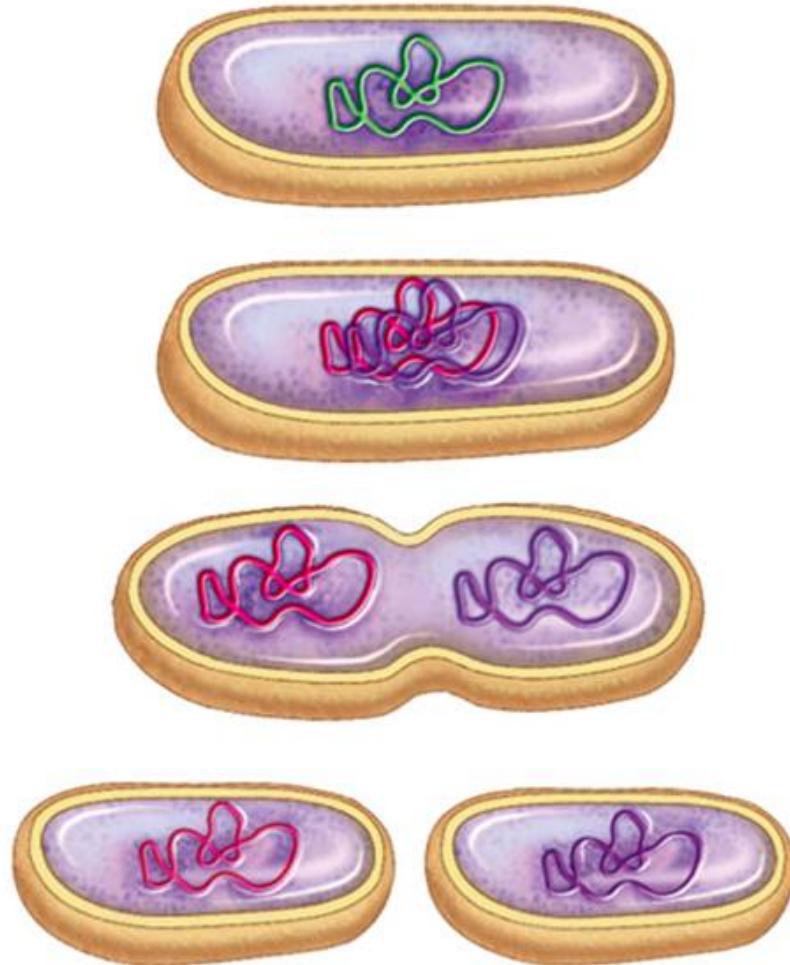
Cell Division

- aka “mitosis”
- Purposes
 - Reproduction
 - Unicellular
 - Growth and Development
 - Multicellular
 - Tissue renewal
 - Multicellular



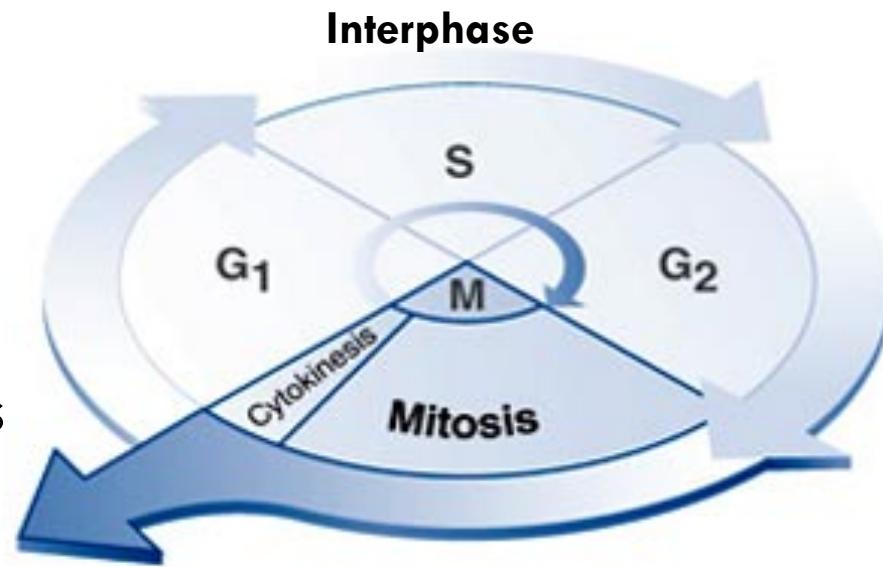
Binary Fission

- “Division in half”
- Bacteria
 - Chromosome duplicates
 - Cell grows
 - Divides
- Asexual



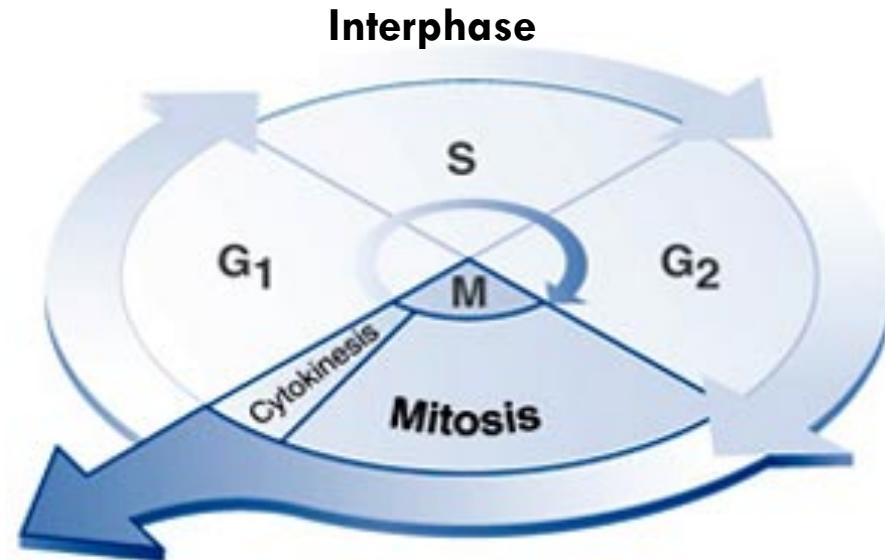
Cell cycle (overview)

- Interphase
 - 90% of cell life
 - Cell grows
 - Copies chromosomes
- Mitosis
 - Nucleus & chromosomes divide
- Cytokinesis
 - Cell divides

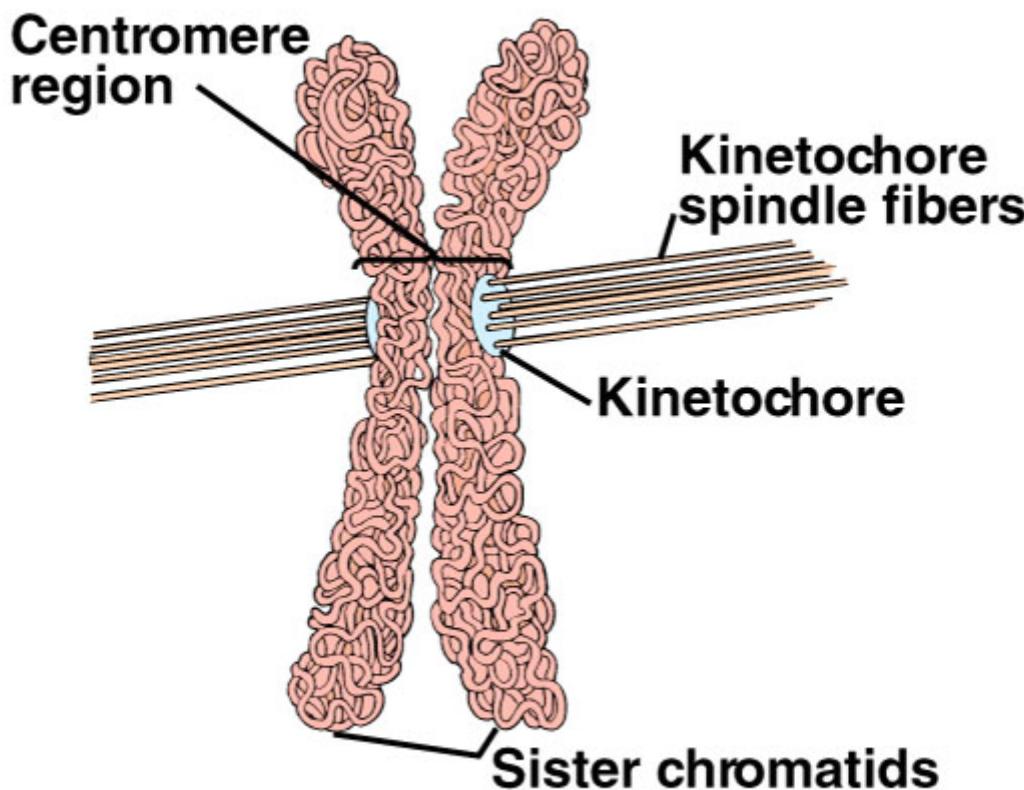


Interphase

- Three steps
 - G_1
 - Gap 1
 - S
 - Chromosomes replicate
 - G_2
 - Gap 2
- Growth happens in all
- Chromosomes “spaghetti-like”

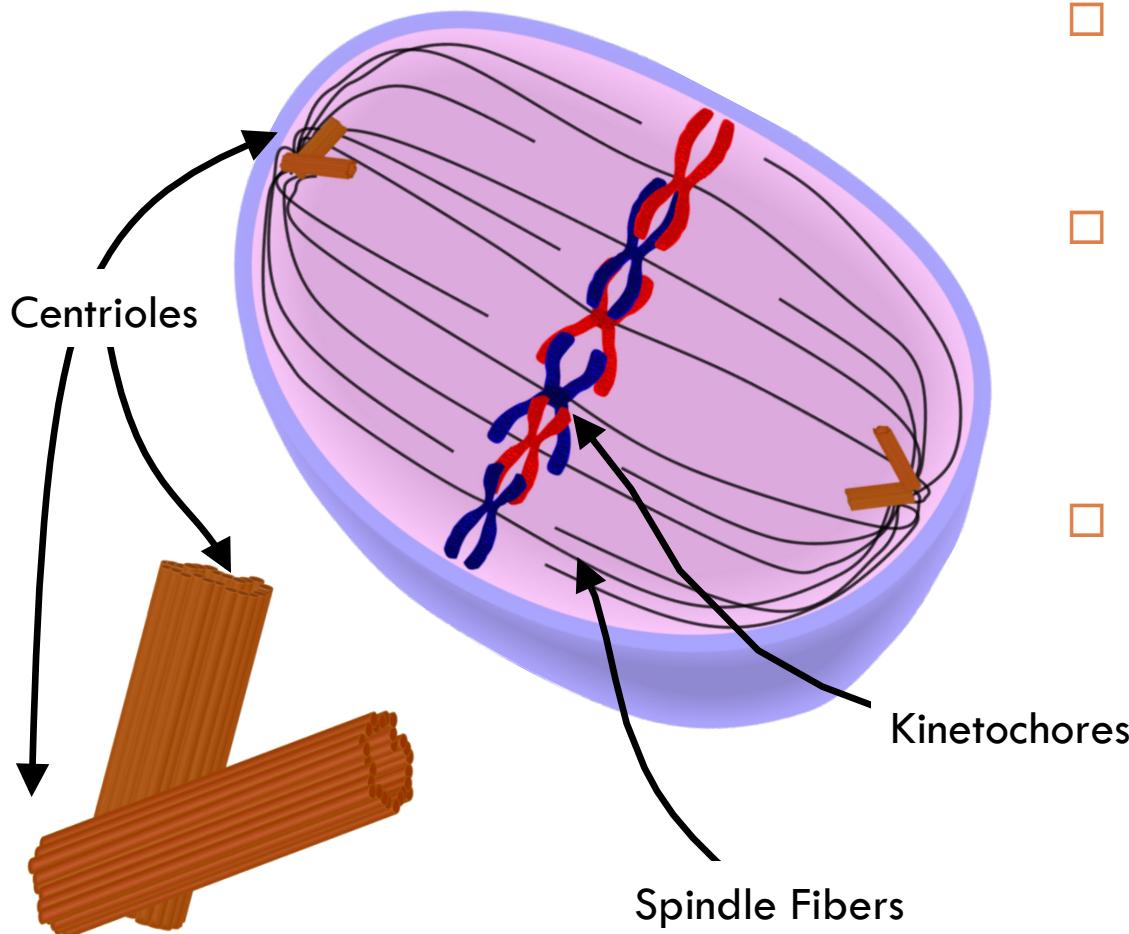


Anatomy of mitosis



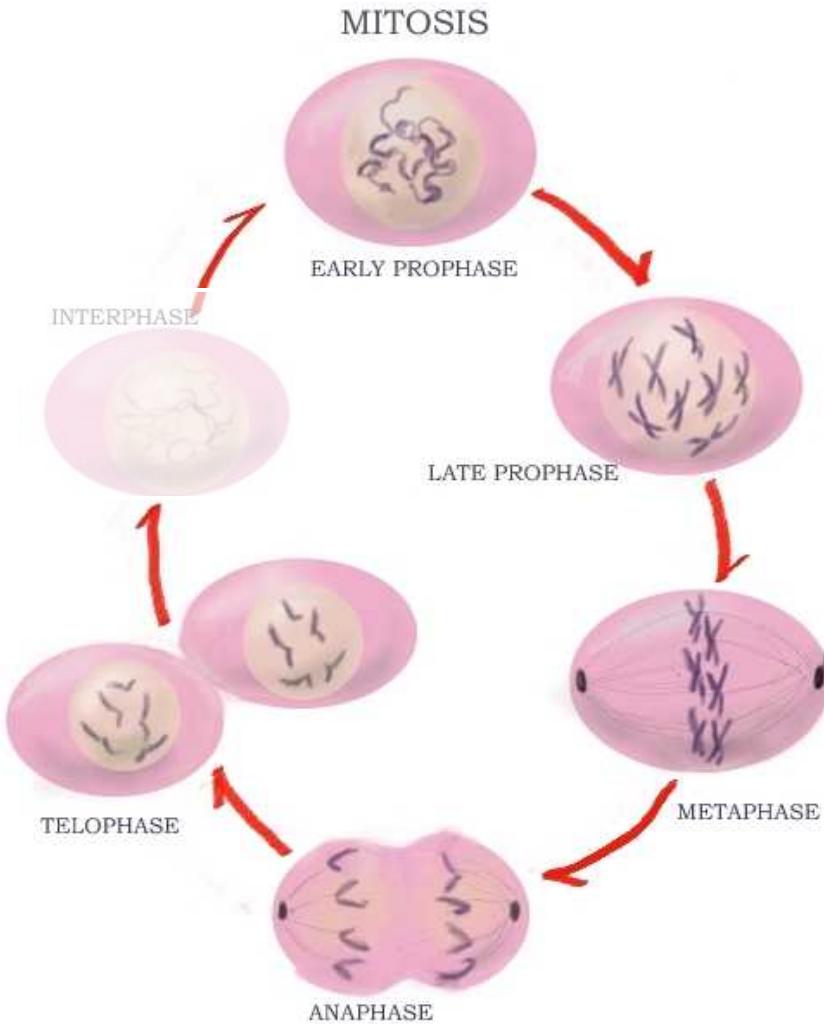
- Sister chromatids
 - Identical copies of DNA
- Centromere
 - Holds SCs
- Kinetochore
 - Attachment

Anatomy of mitosis



- Centriole pairs
 - Anchor & Winch
- Kinetochores
 - Microtubules attach to chromosome
- Spindle fibers
 - Attach the two

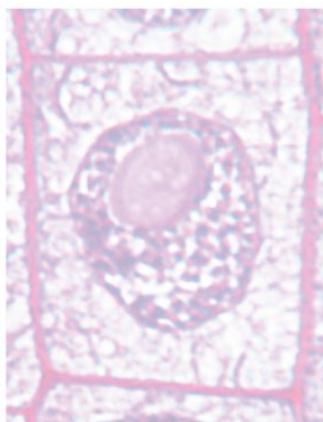
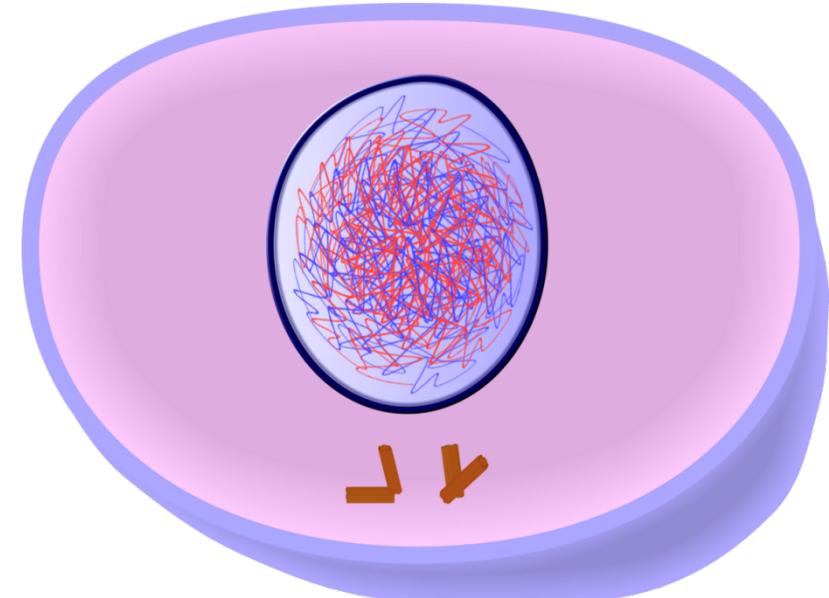
Phases of mitosis



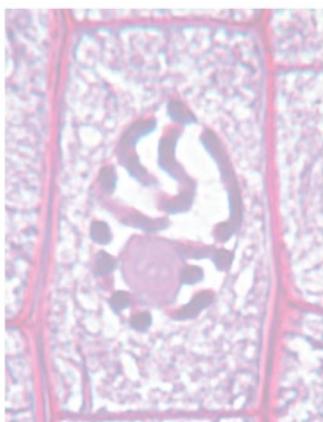
- Really a continuum
- Pneumonic Device
 - Party people make a trend

Interphase

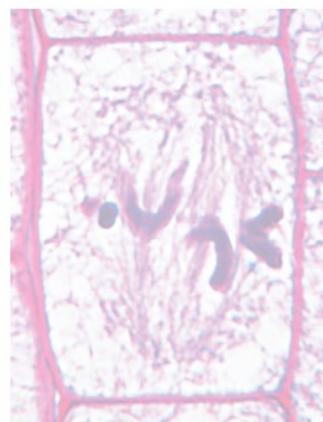
- Chromosomes relaxed
 - Chromatin



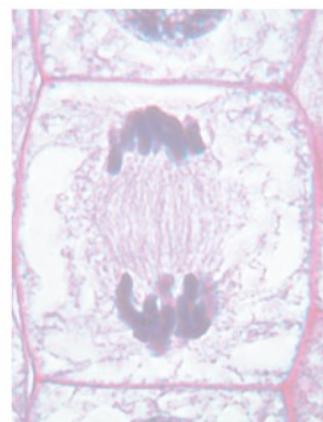
Prophase



Prometaphase



Metaphase



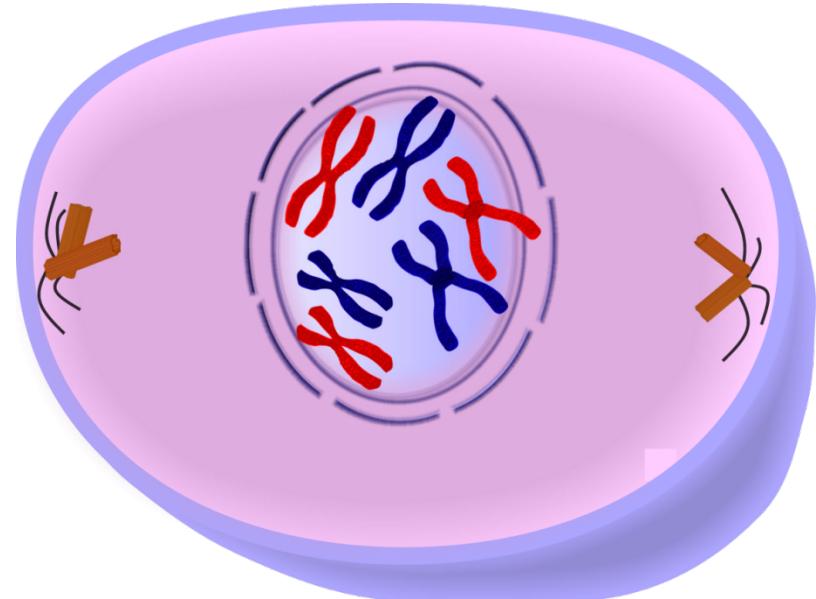
Anaphase



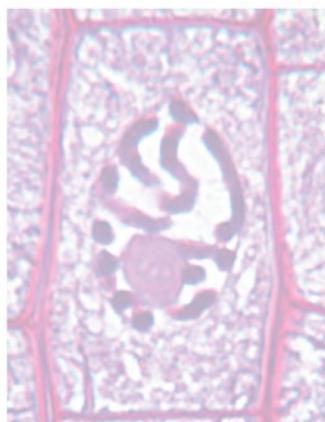
Telophase

Prophase

- Chromosomes condense
 - Visible
- Nuclear envelope breaks down
- Spindle fibers form at centriole pairs



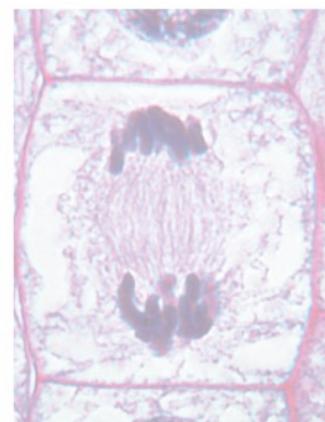
Prophase



Prometaphase



Metaphase



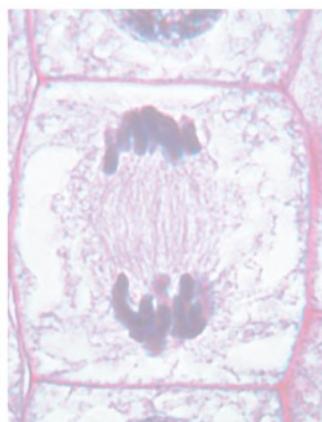
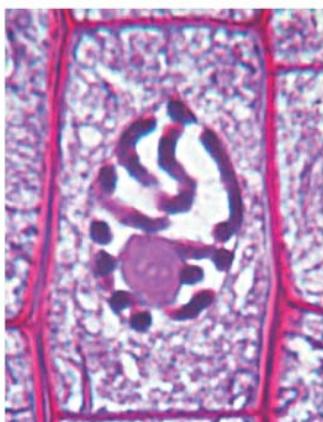
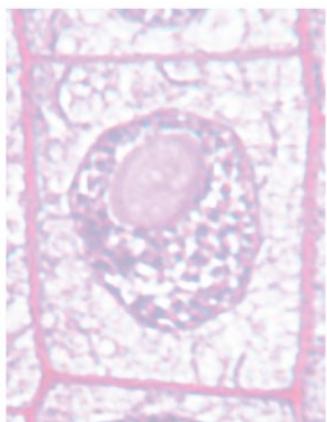
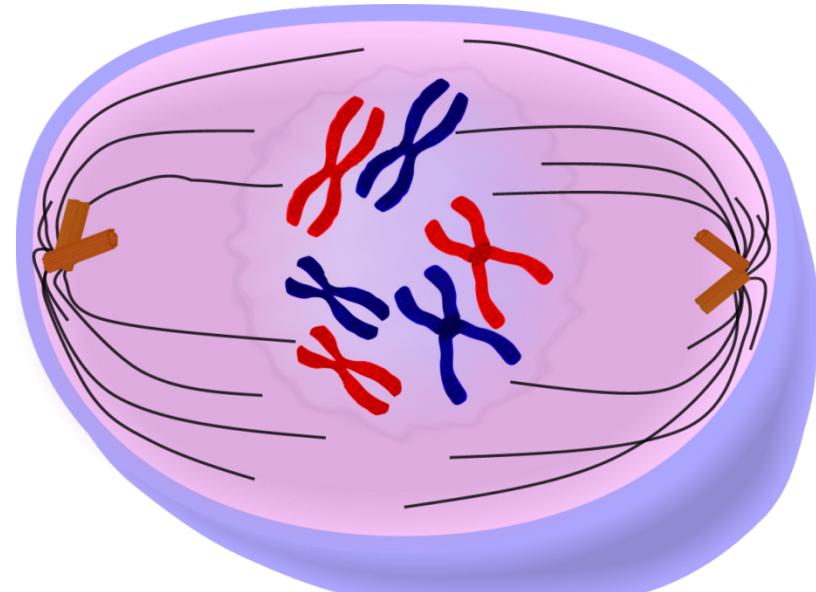
Anaphase



Telophase

Prometaphase

- Nuclear envelope disappears
- Spindle fibers grow
- Chromosomes move towards center



Prophase

Prometaphase

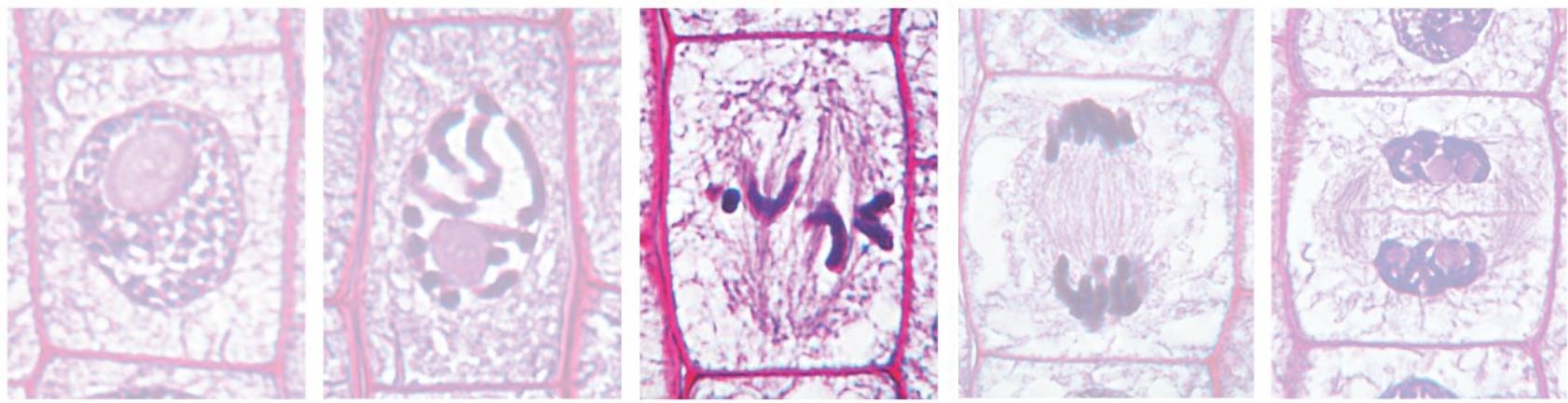
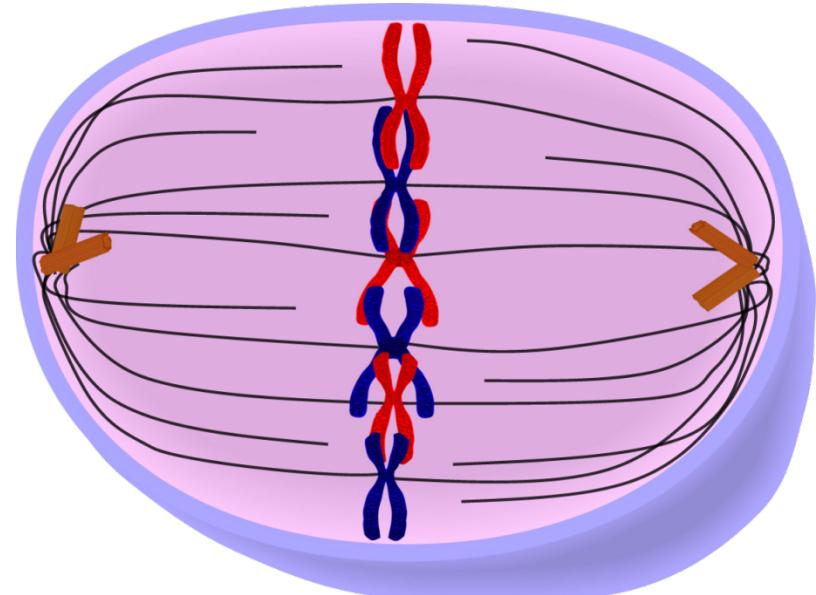
Metaphase

Anaphase

Telophase

Metaphase

- Chromosomes in line
 - Metaphase plate
- Centriole pairs 180°
- Spindle fibers attach



Prophase

Prometaphase

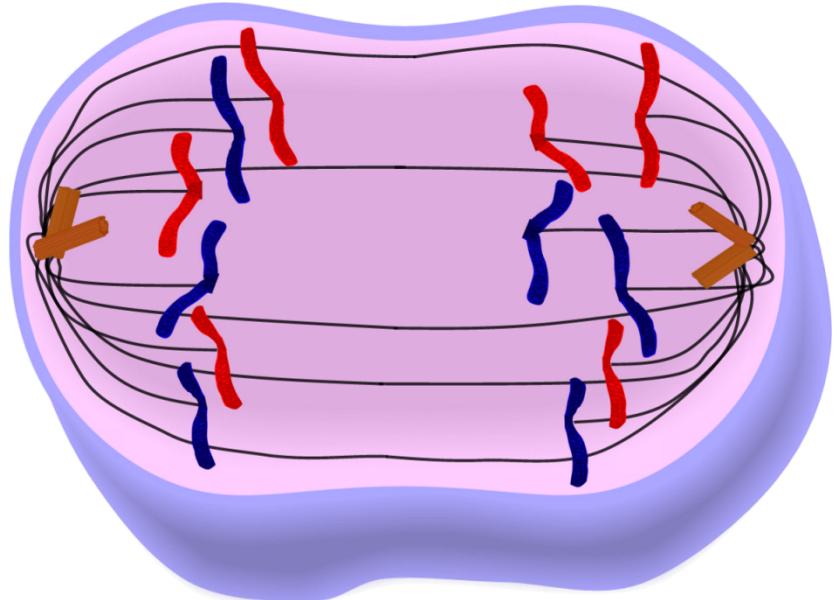
Metaphase

Anaphase

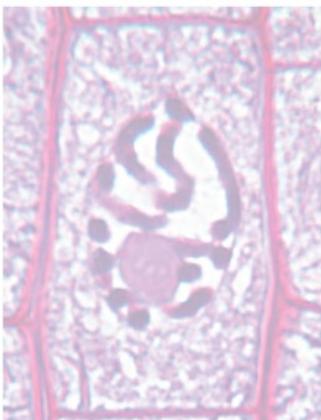
Telophase

Anaphase

- Centromeres split
- Sister chromatids pulled apart
 - ▣ “daughter chromosomes”
- Constriction of spindle fibers



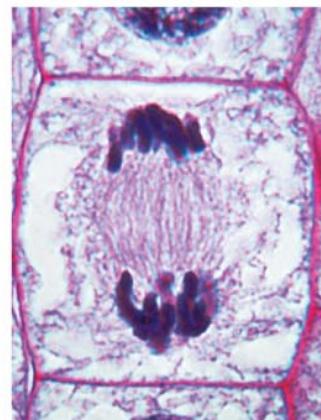
Prophase



Prometaphase



Metaphase



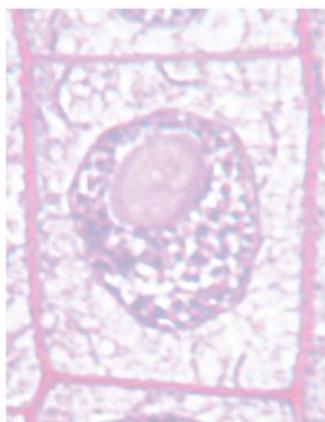
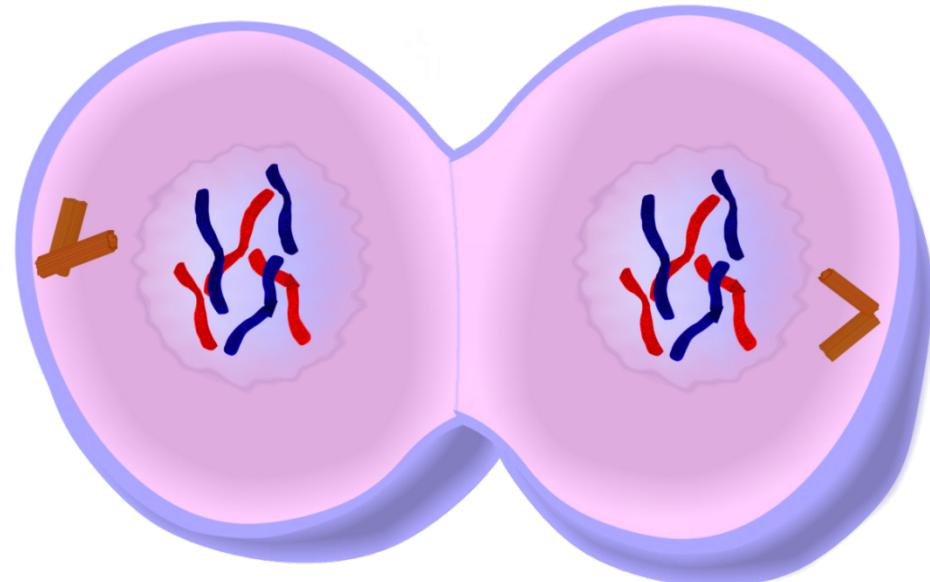
Anaphase



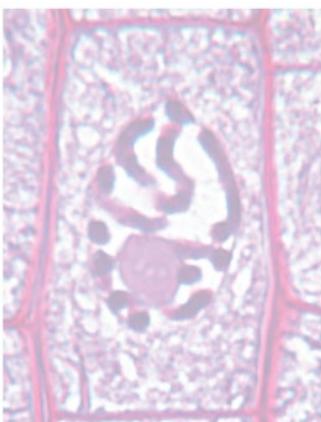
Telophase

Telophase

- Nuclear envelopes reappear
- Chromosomes uncoil
- Spindle fibers disappear



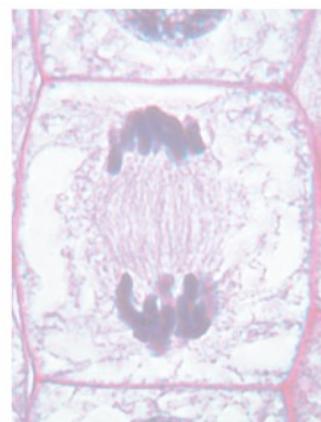
Prophase



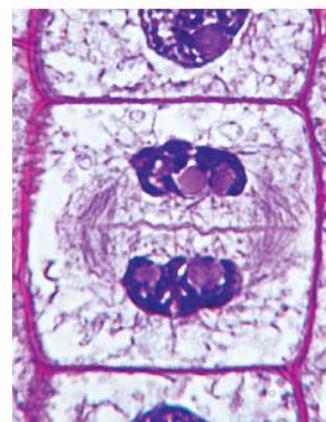
Prometaphase



Metaphase



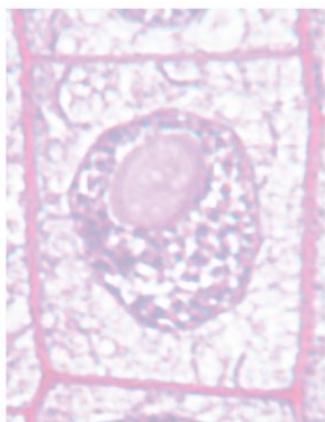
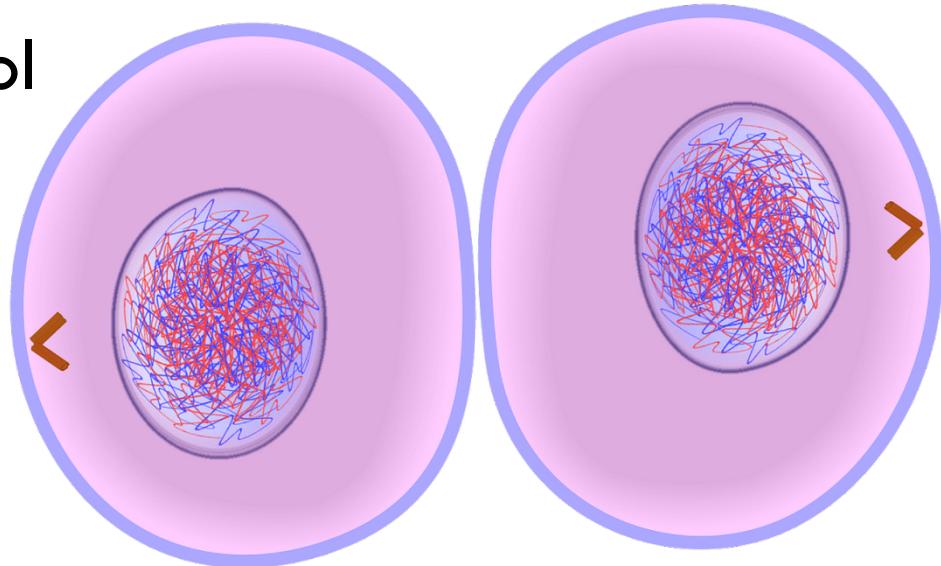
Anaphase



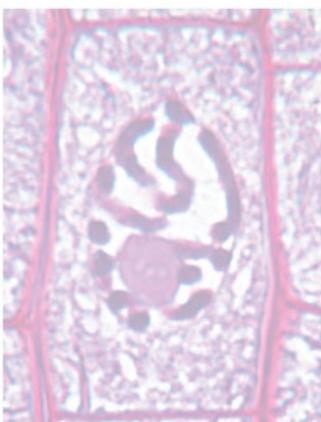
Telophase

Cytokinesis

- Division of the cytosol



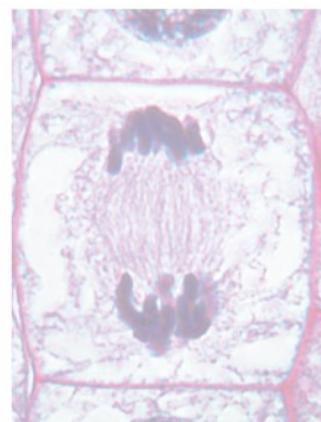
Prophase



Prometaphase



Metaphase



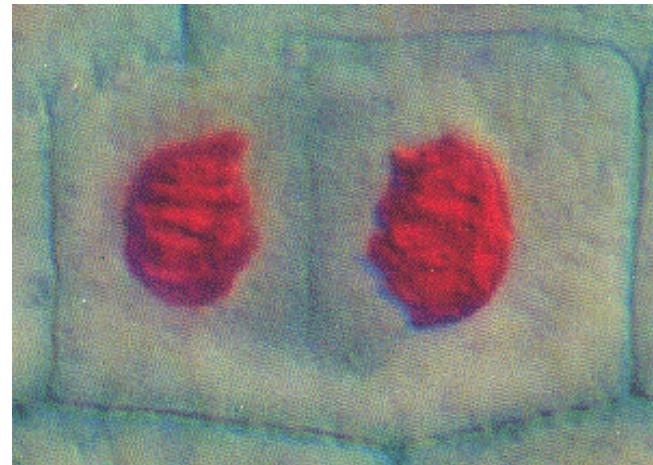
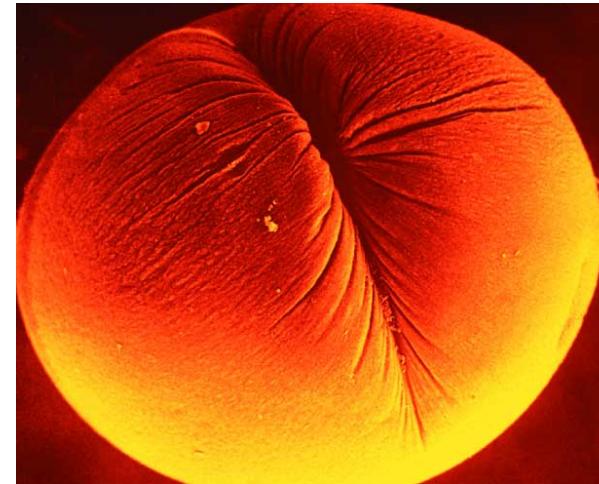
Anaphase



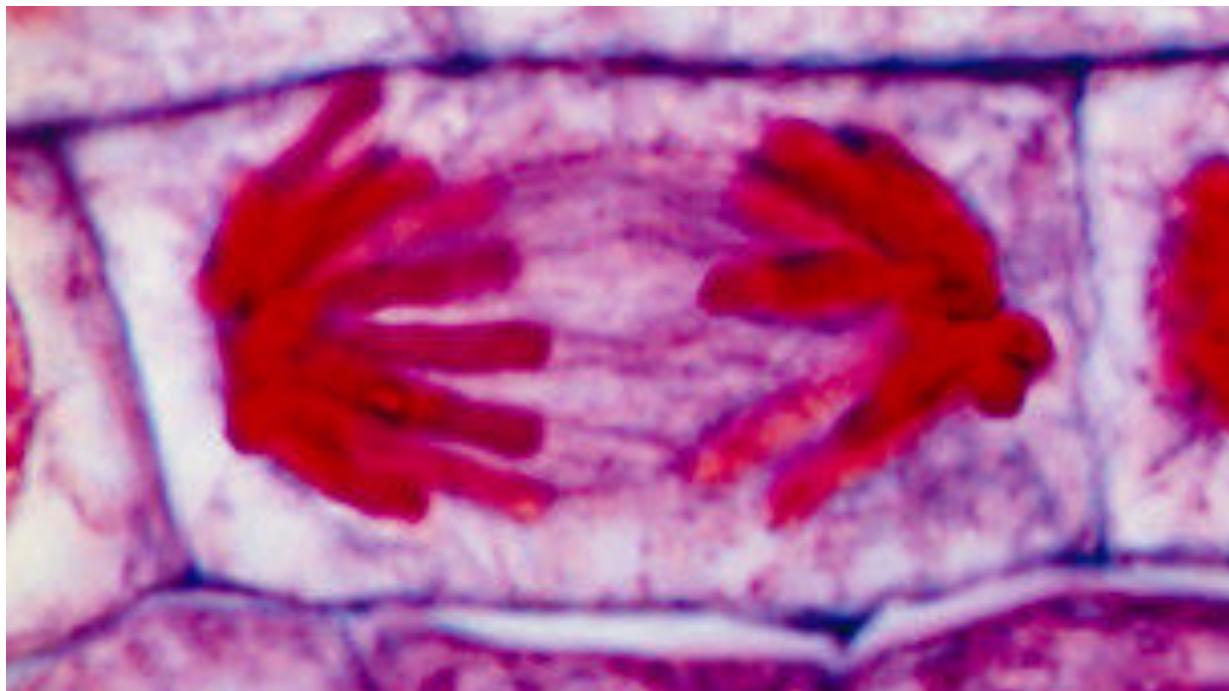
Telophase

Cytokinesis

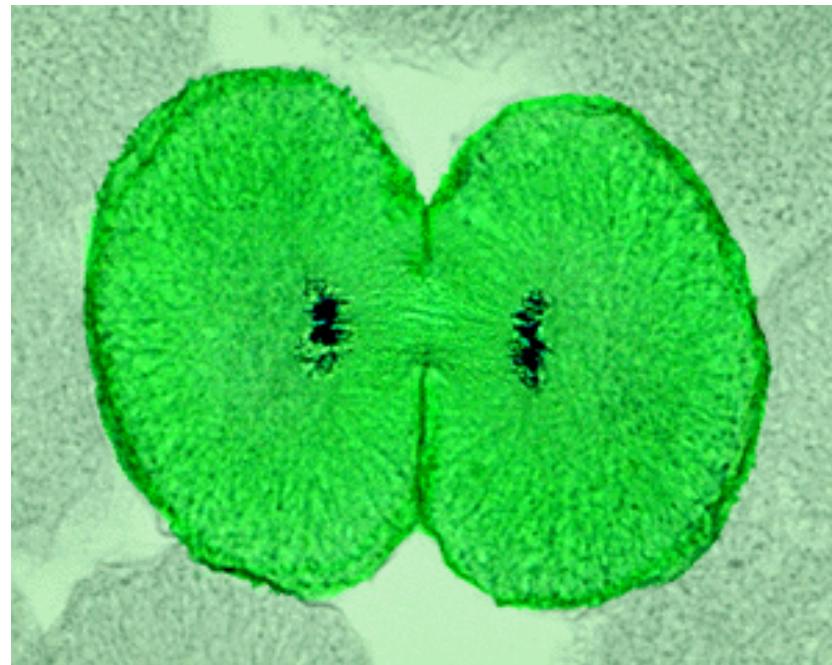
- Animals
 - Cleavage furrow forms
- Plants
 - Cell plate forms



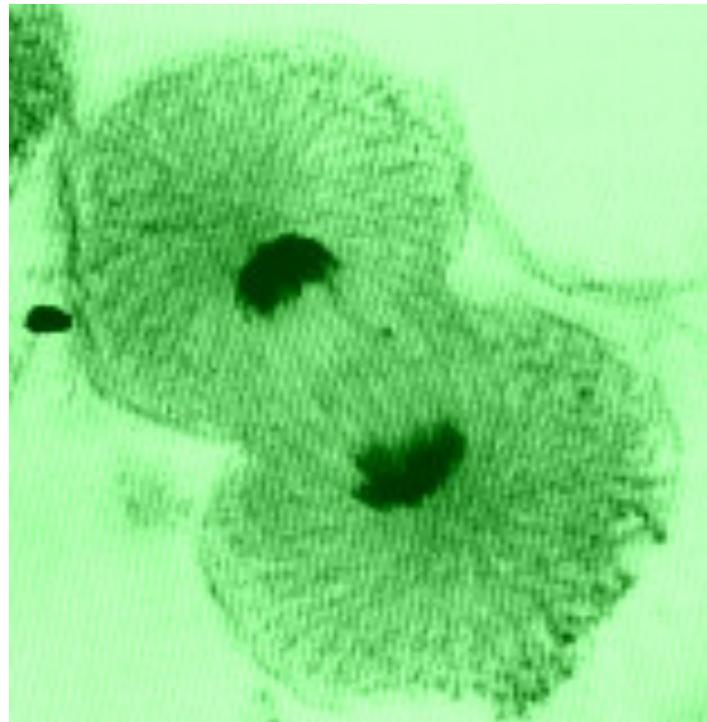
What phase is this?



What phase is this?



What phase is this?



What phase is this?

