



Introduction to
**Human
Anatomy**

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Cell Division

Mitosis And Meiosis

Mitosis & Meiosis

➤ **Mitosis:**

-Division of Somatic(Body cells)

➤ **Meiosis:**

-Division of Gametes(Sex Cells)

Mitosis

➤ Interphase

➤ Prophase

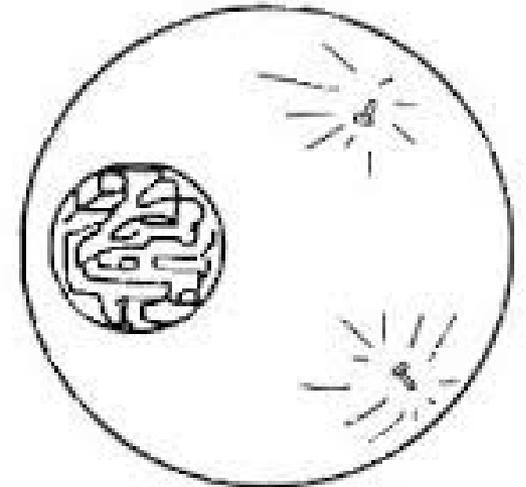
➤ Metaphase

➤ Anaphase

➤ Telophase

Interphase

- Notable things Happen!
 1. Cell preparing to divide
 2. Genetic material doubles

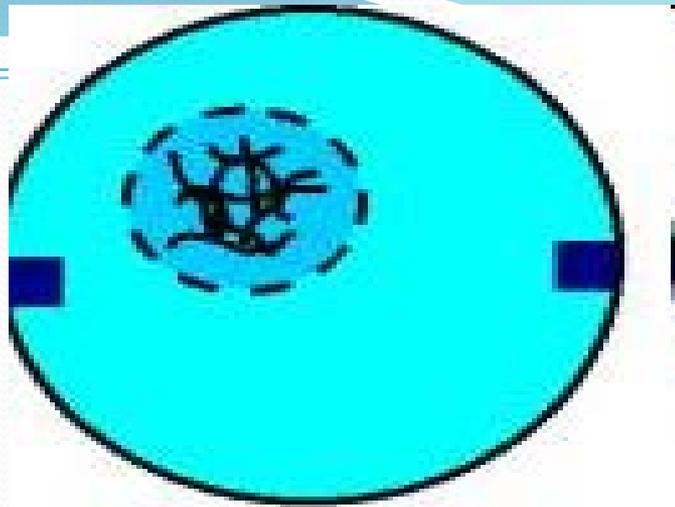


Interphase

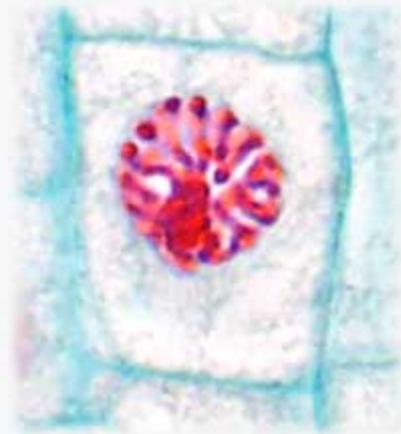
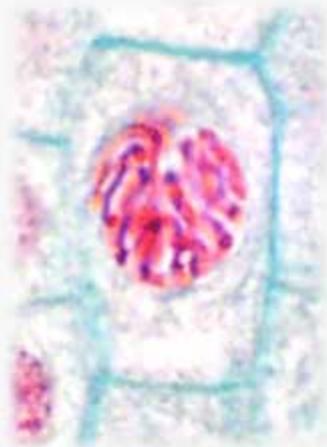
Prophase

➤ Chromosomes **pair-up!**

1. Chromosomes thicken & shorten
 - become **visible**
 - 2 **chromatids** jointed by a centromere
2. **Centrioles** move to the opposite sides of the nucleus
3. **Nucleolus** Disappears
4. Nuclear membrane **disintegrated**



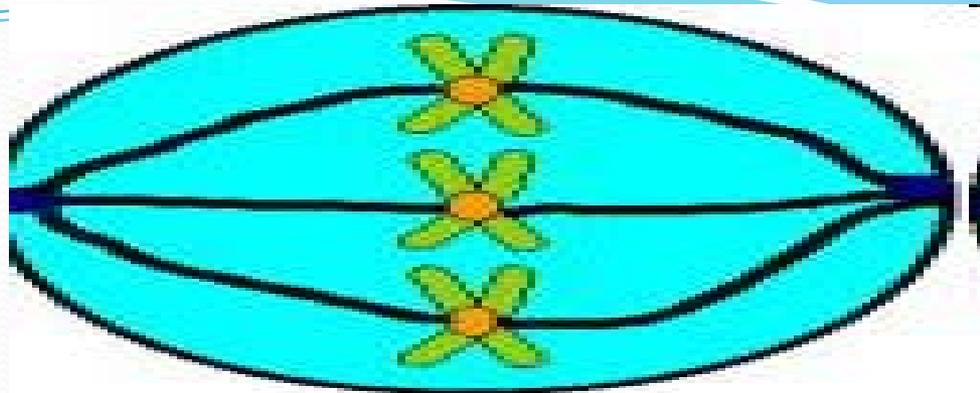
prophase



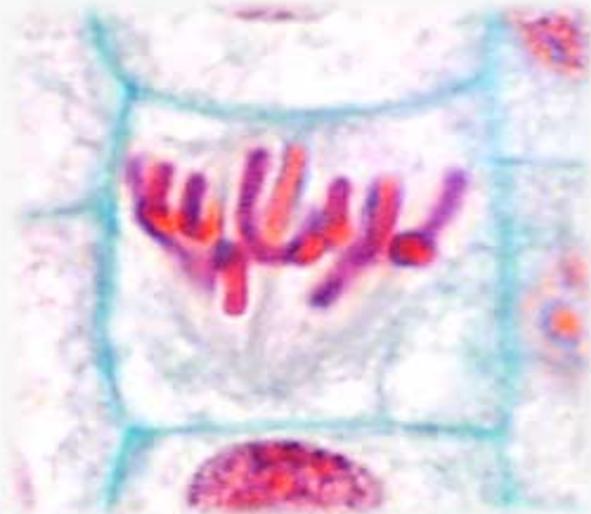
Prophase

Metaphase

- Chromosomes **meet in the middle.**
- 1. Chromosomes arrange at **equator** of cell
- 2. Become attached to **spindle fibers** by **Centromeres**
- 3. Homologous chromosomes Do not Associate.



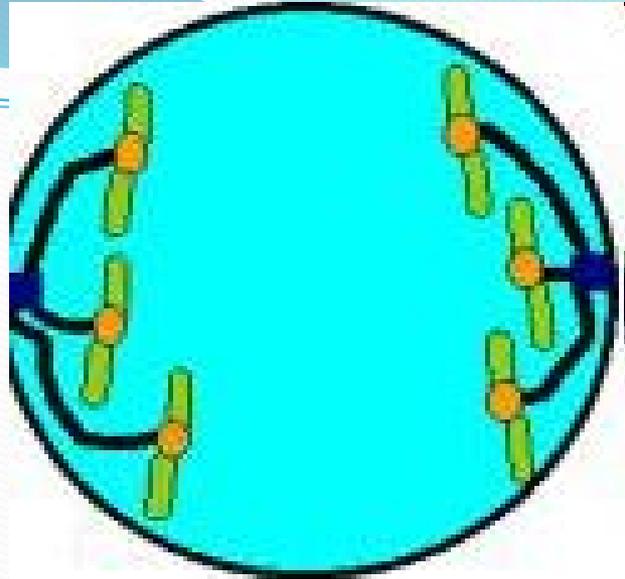
metaphase



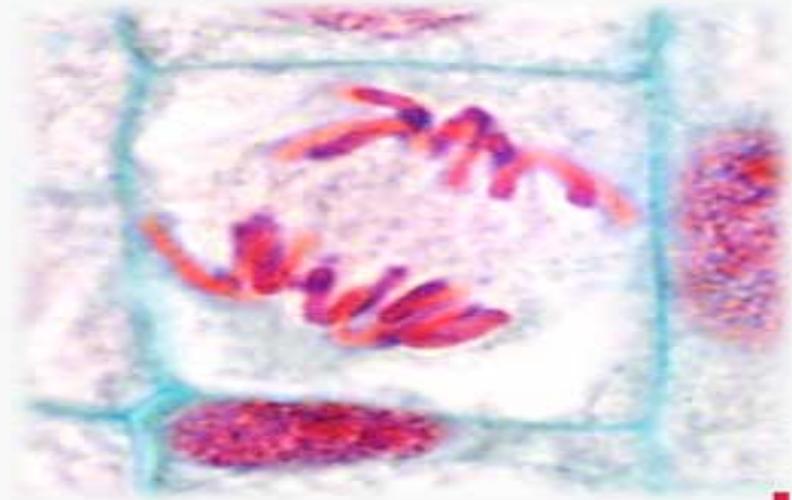
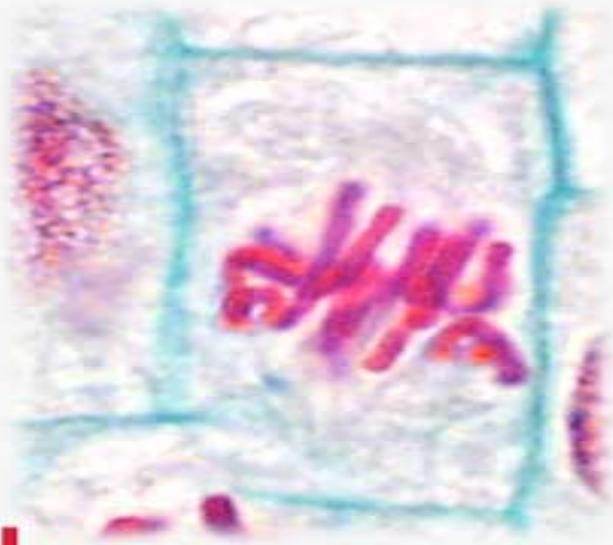
Metaphase

Anaphase

- Chromosomes get pulled **Apart!**
- Spindle fibers contract poles of chromatids to the opposite poles of the cell.



Anaphase

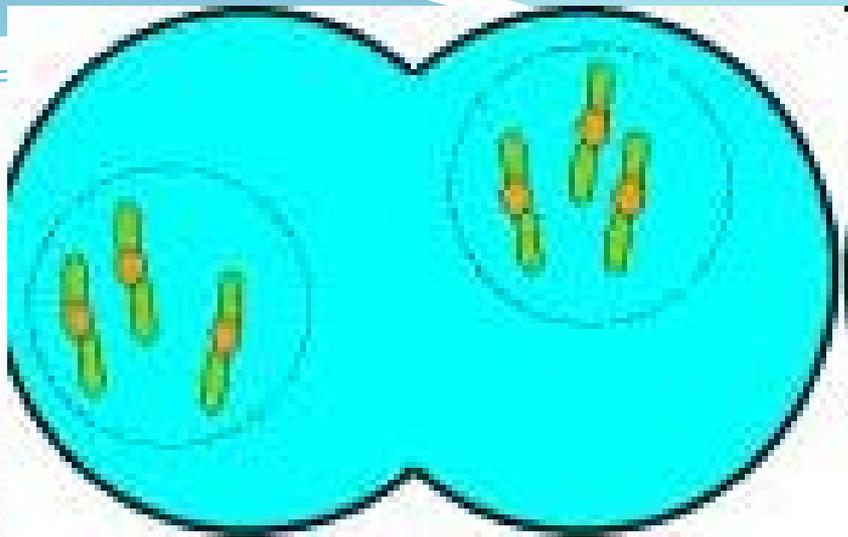


Anaphase

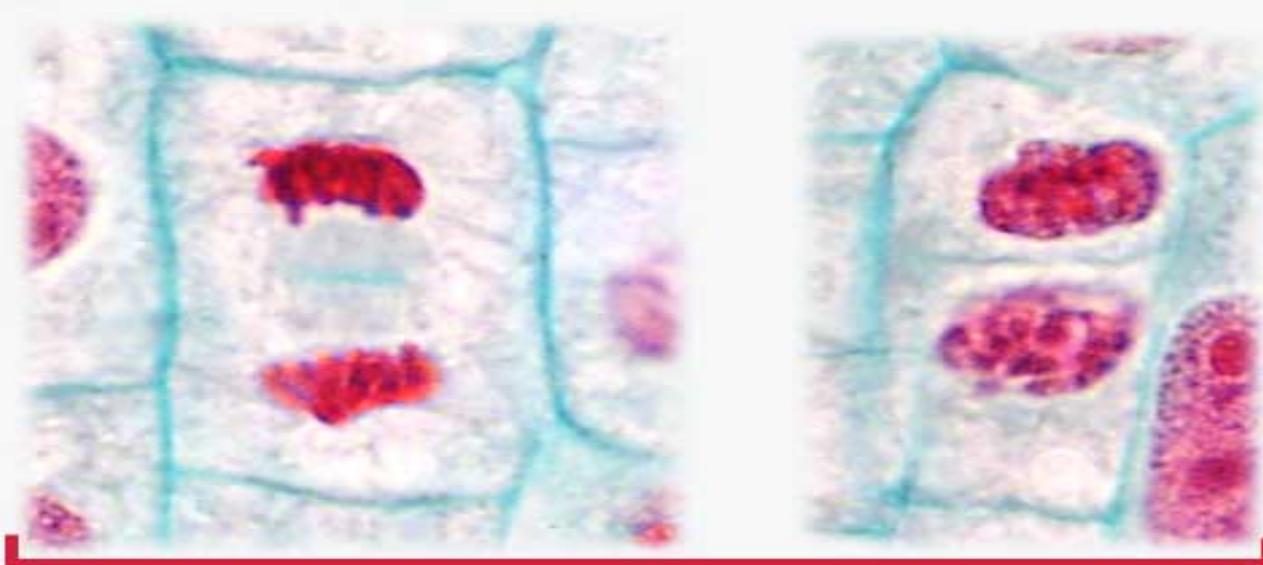
Telophase

➤ Now there are **Two!**

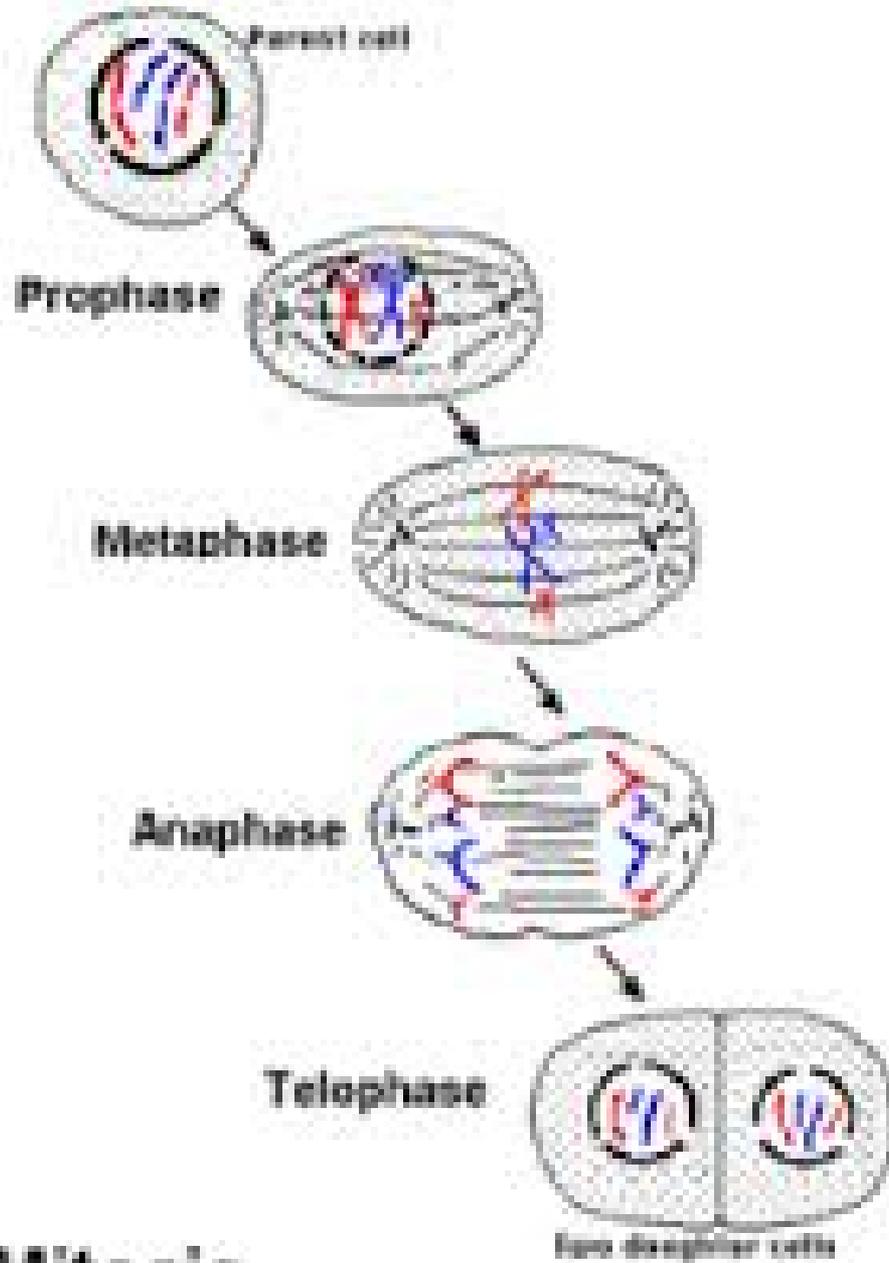
1. Chromosomes uncoil
2. Spindle fibers disintegrated
3. Centrioles replicate
4. Nuclear membrane forms
5. Finally cell divides.



Telophase



Telophase



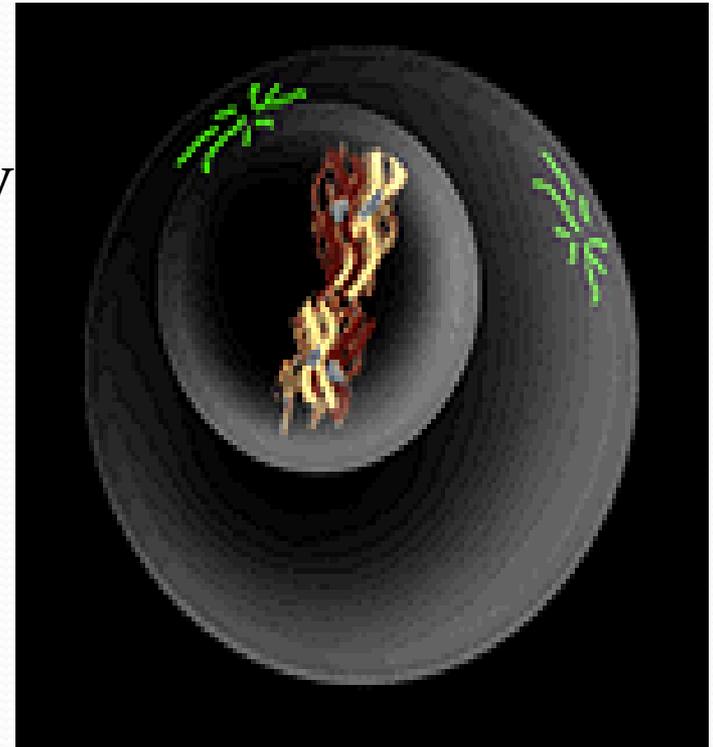
Mitosis

Meiosis

- 4 daughter cells produced
- Each daughter cell has half chromosomes of the parent
- 2 sets of cell division are involved

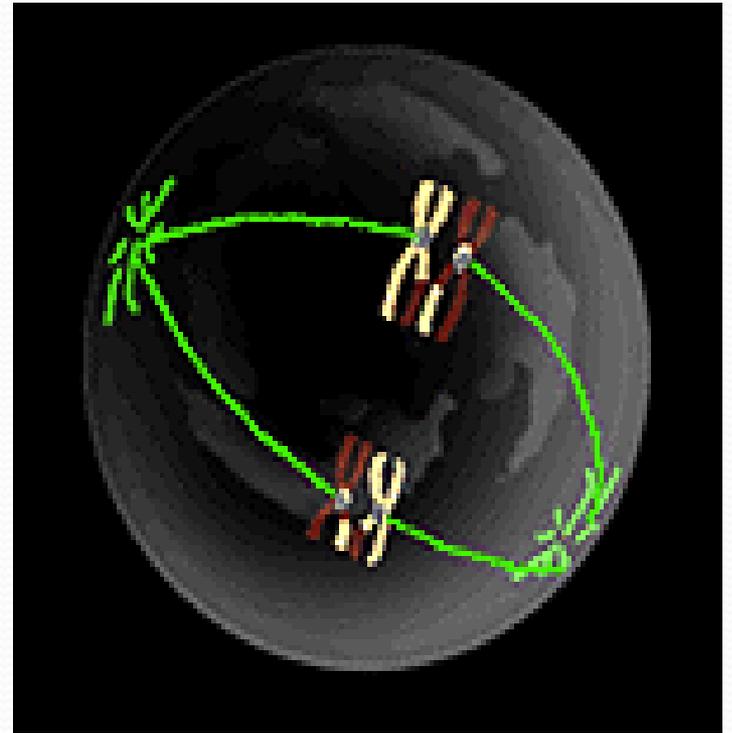
Prophase I

- Chromosomes condense
- Homologous chromosomes pair with each other
- Each pair contains four sister chromatids - tetrad



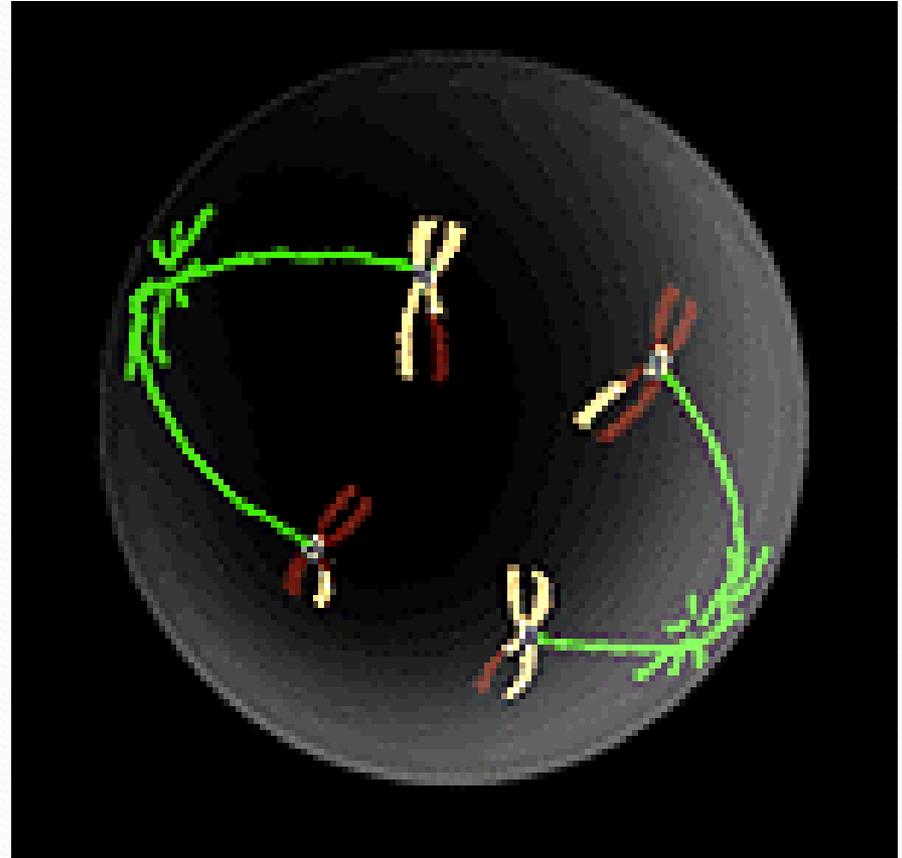
Metaphase I

- Tetrads or homologous chromosomes move to center of cell



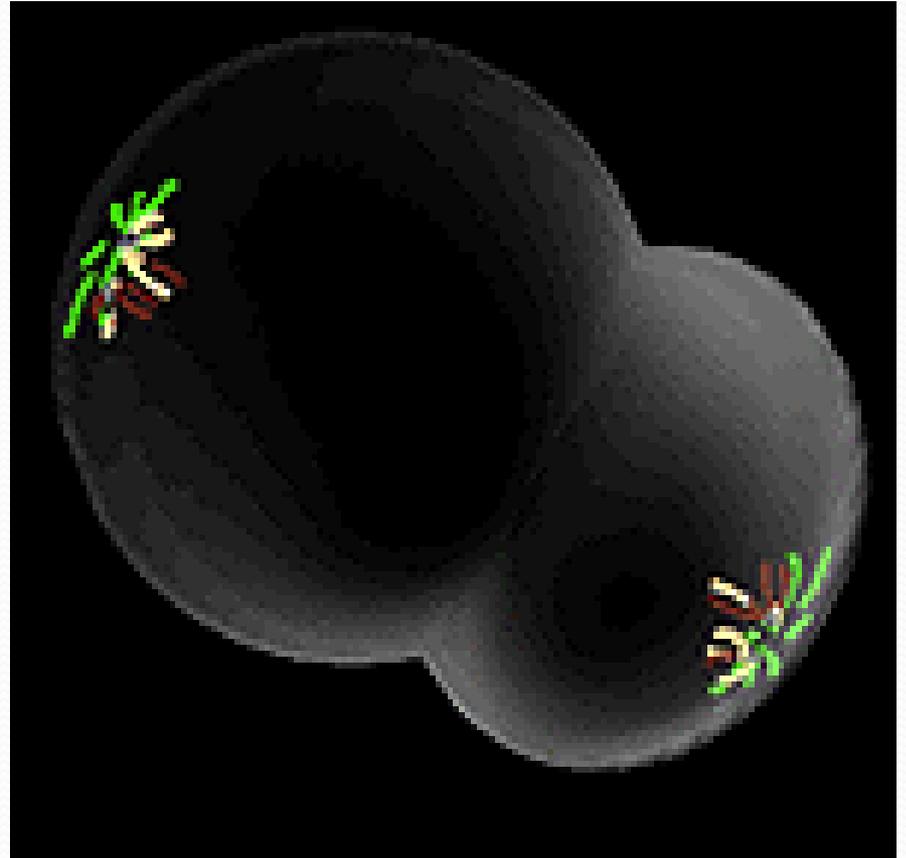
Anaphase I

- Homologous chromosomes pulled to opposite poles



Telophase I

- Daughter nuclei formed
- These are haploid ($1n$)

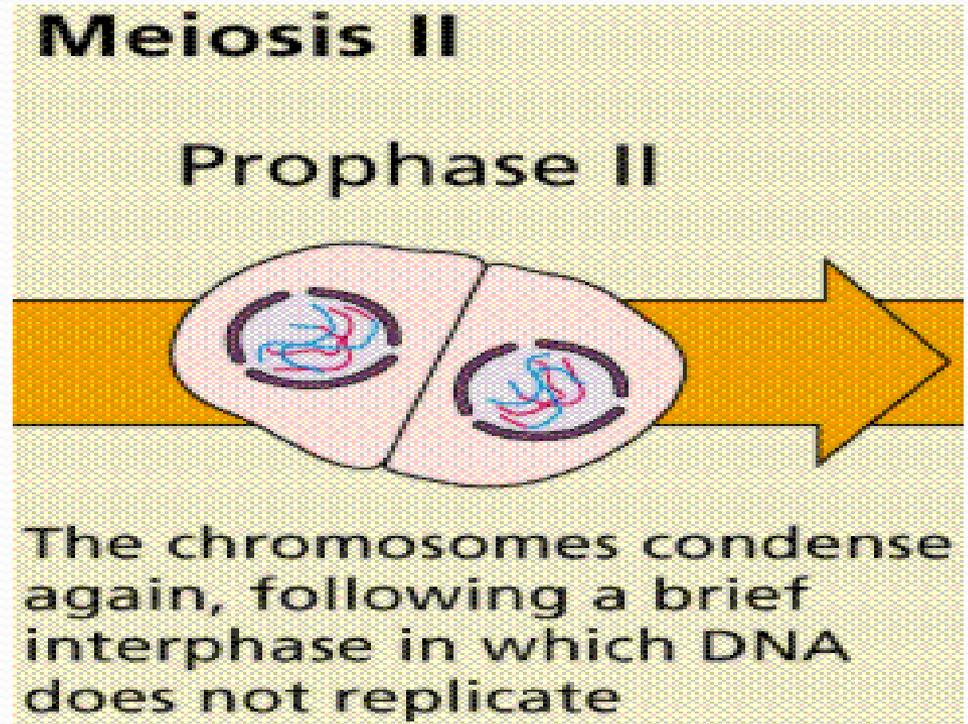


Meiosis II

- Daughter cells undergo a second division; much like mitosis
- *No additional replication occurs*

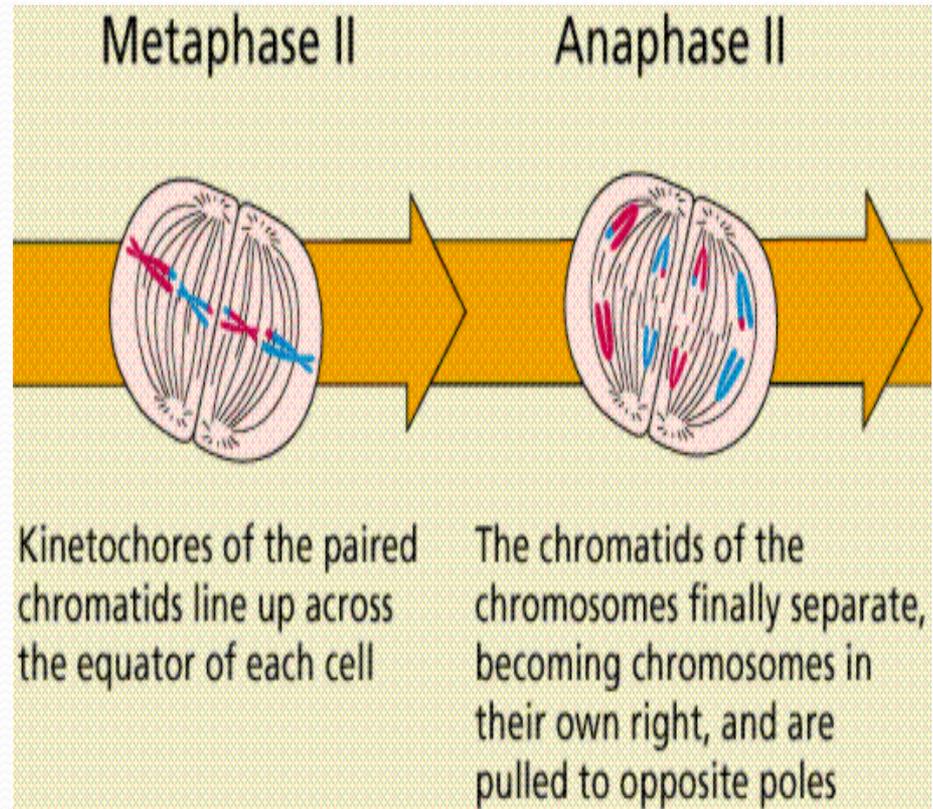
Prophase II

- Spindle fibers form again



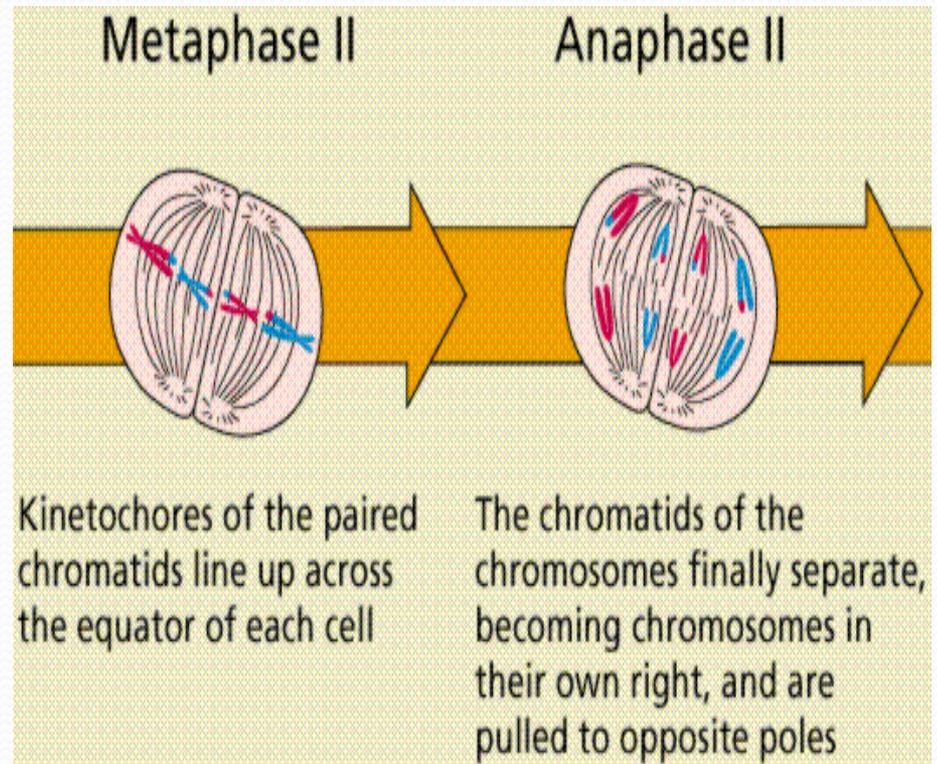
Metaphase II

- Sister chromatids move to the center



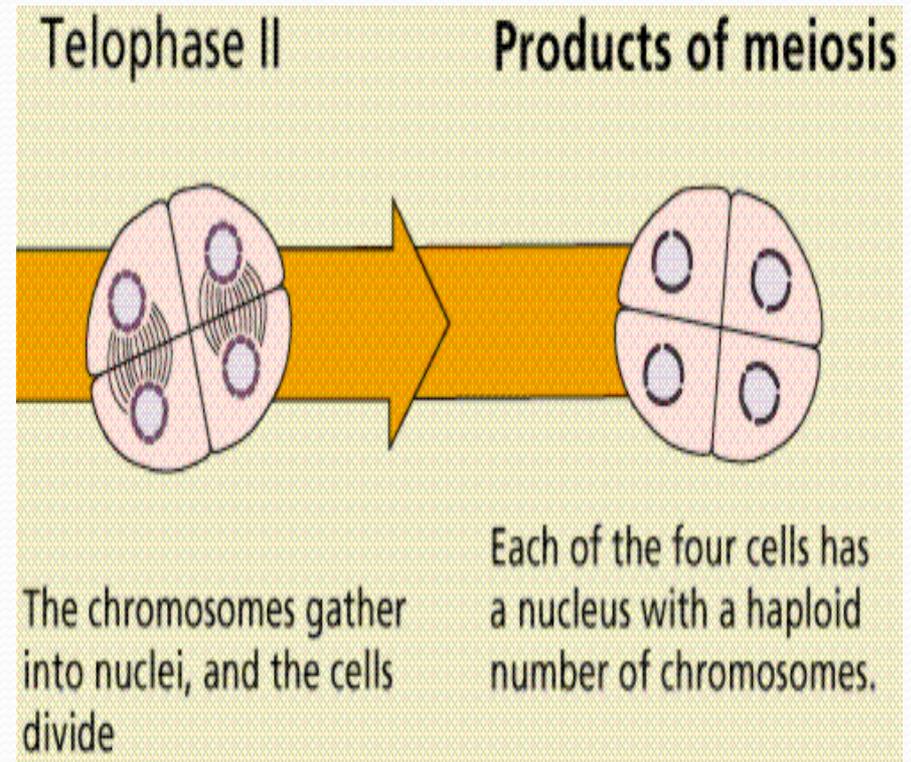
Anaphase II

- Centromeres split
- Individual chromosomes are pulled to poles



Telophase II & Cytokinesis

- Four haploid daughter cells results from one original diploid cell



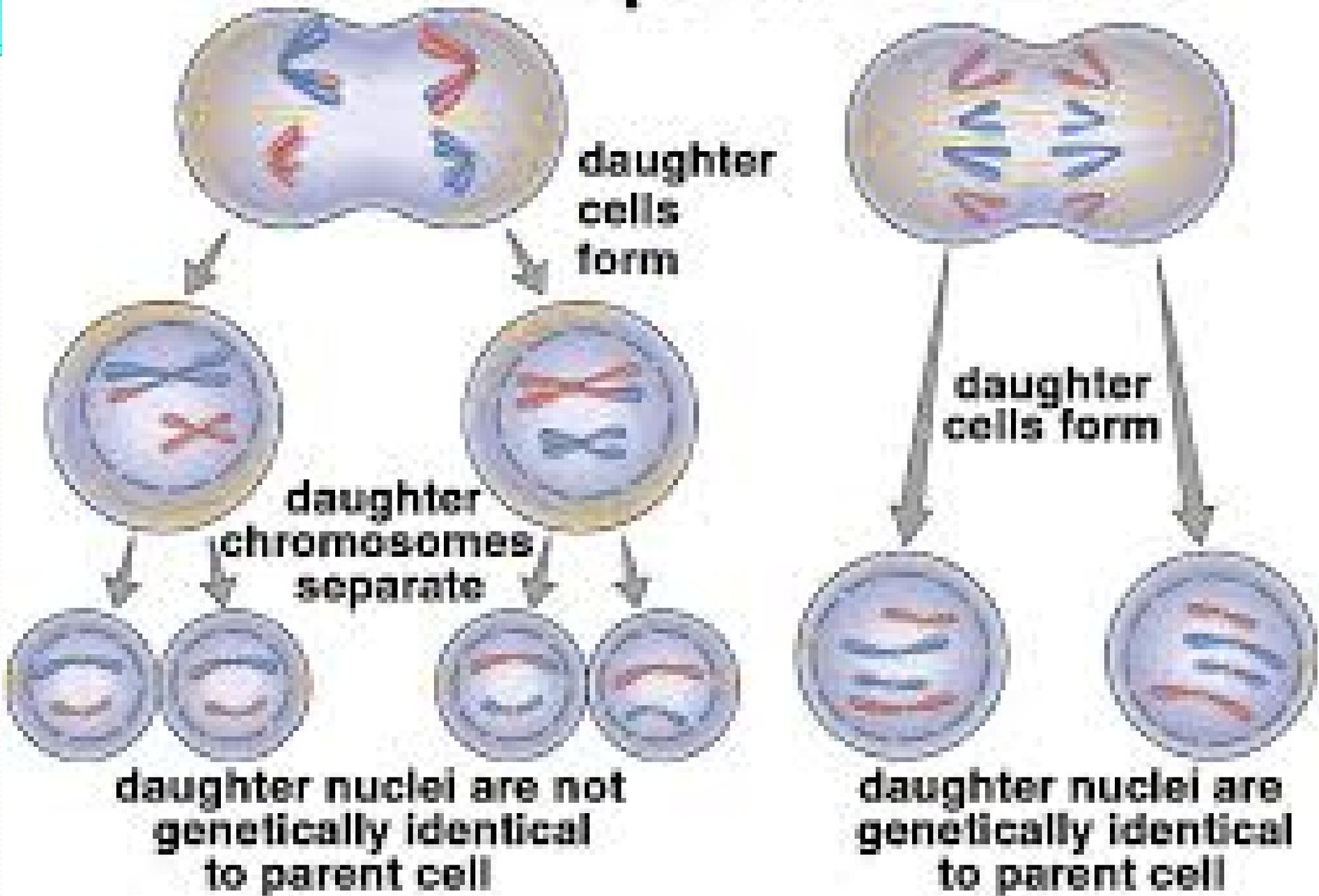
Review Mitosis & Meiosis

- Both are forms of nuclear division
- Both involve replication
- Both involve disappearance of the nucleus, and nucleolus, nuclear membrane
- Both involve formation of spindle fibers

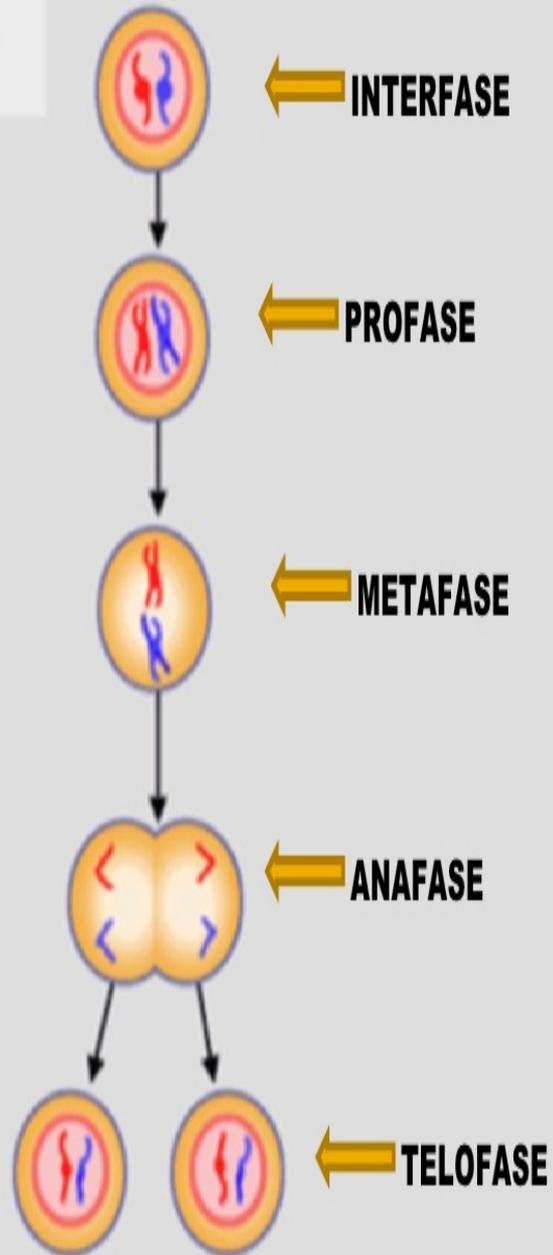
DIFFERENCES

- ***Meiosis*** produces daughter cells that have $1/2$ the number of chromosomes as the parent. Go from $2n$ to $1n$.
- ***Daughter cells*** produced by meiosis are **not** genetically **identical** to one another.
- In ***meiosis*** cell division takes place **twice** but replication occurs only **once**.

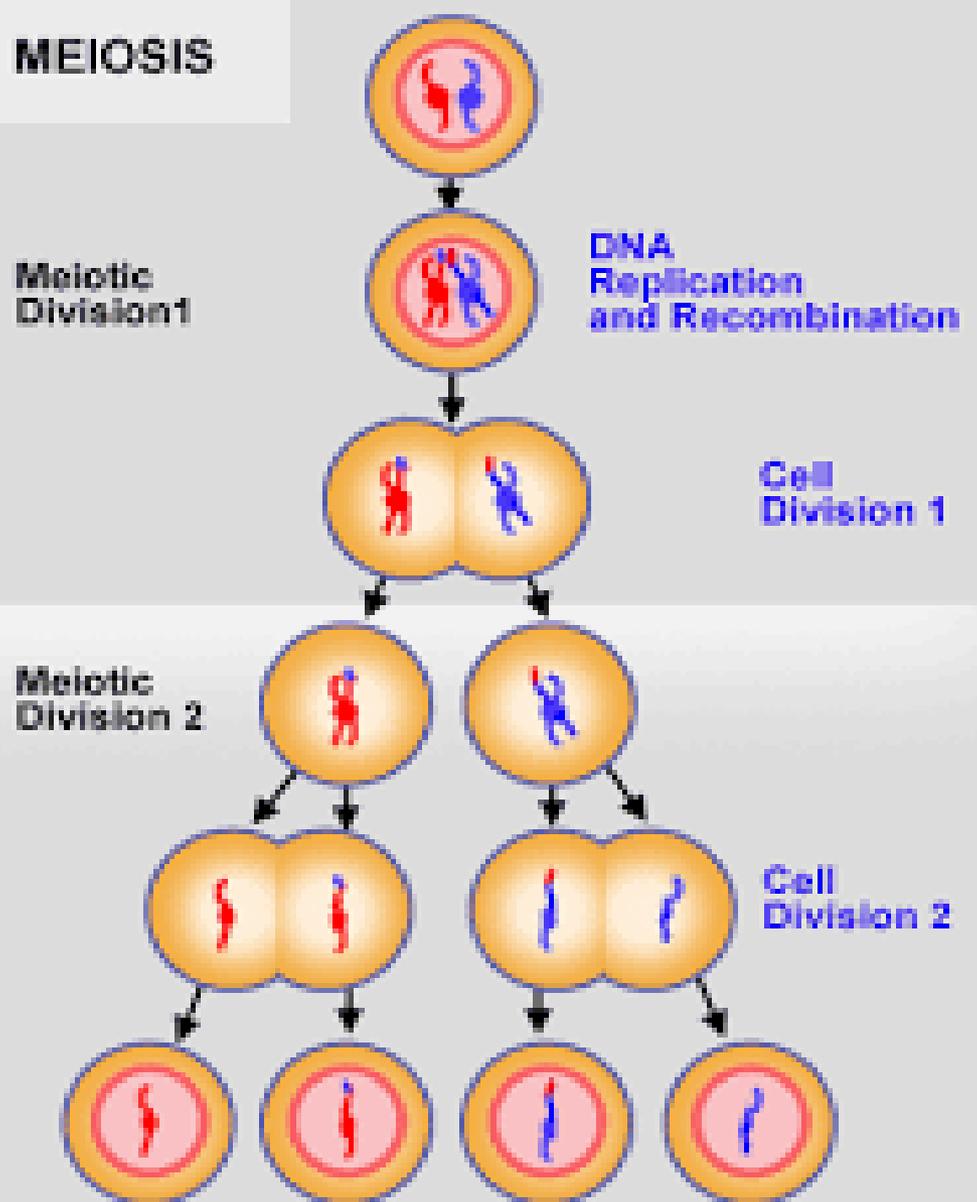
Meiosis compared to mitosis



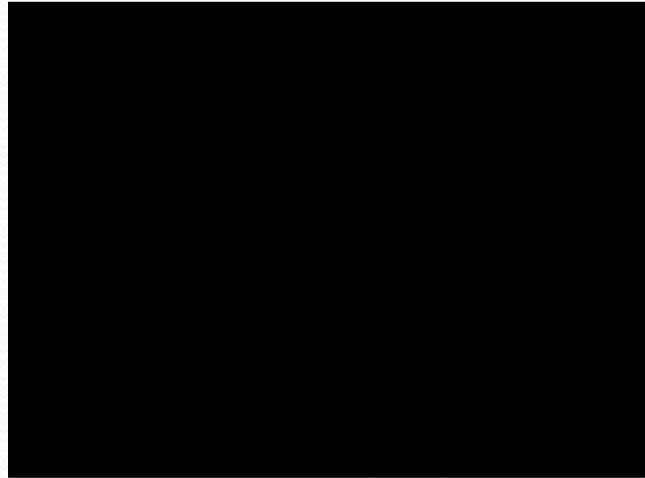
MITOSIS



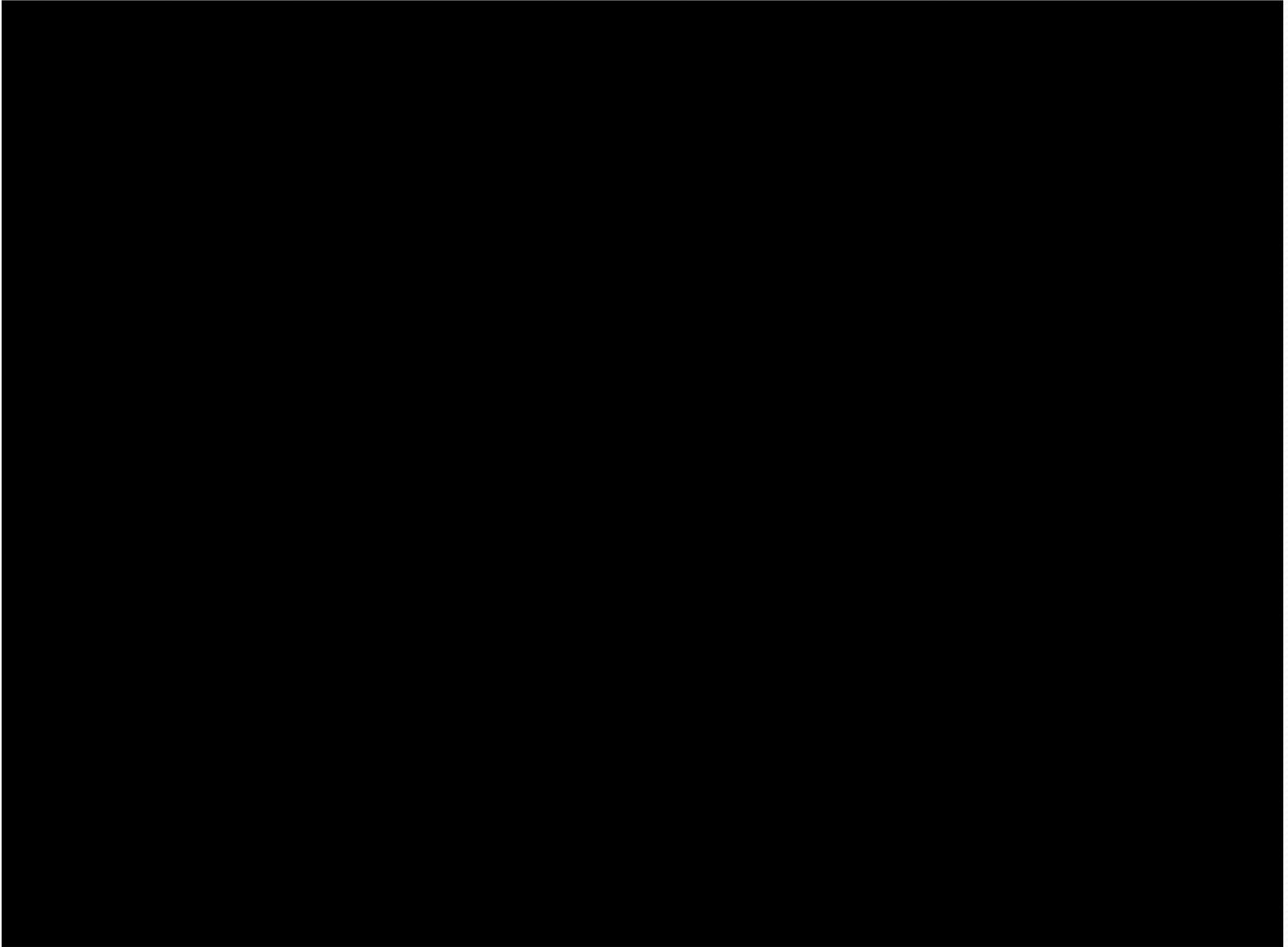
MEIOSIS



Mitosis



Meiosis



Difference b/w Mitosis & Meiosis



References

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