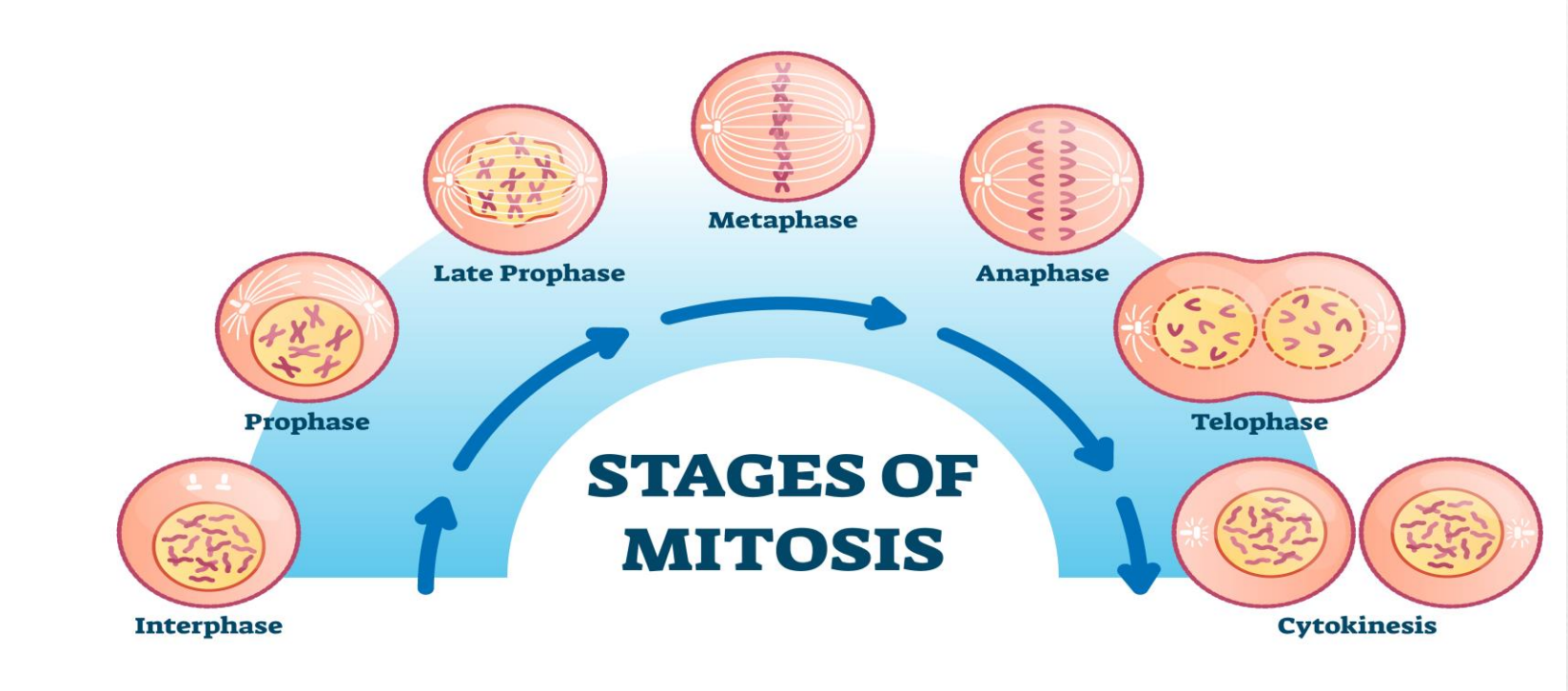
10th Grade

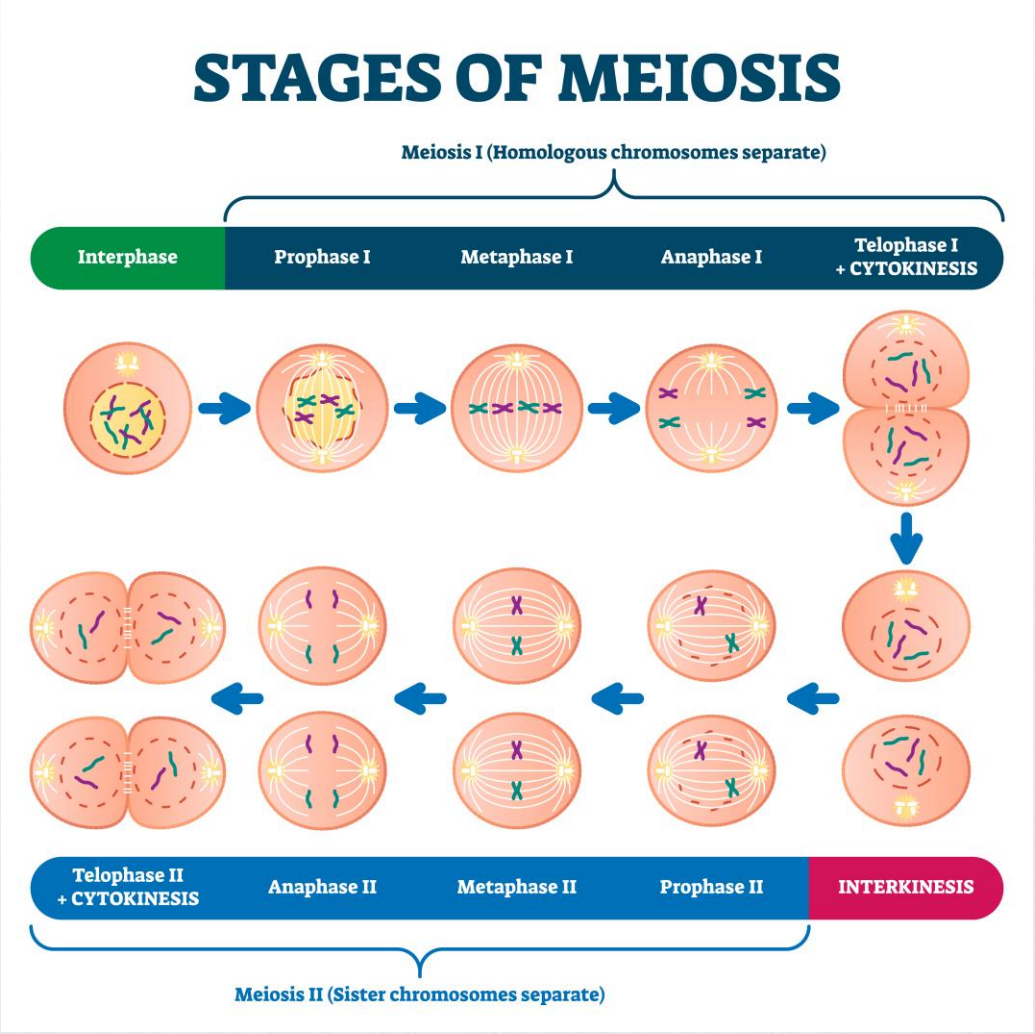
Mitosis and meiosis

What is mitosis?



- Mitosis is **a process of cell duplication, in which one cell divides into two genetically identical daughter cells**. In the various stages of mitosis, the cell's chromosomes are copied and then distributed equally between the two new nuclei of the daughter cells.

What is meiosis?



Meiosis is **a type of cell division in sexually reproducing organisms that reduces the number of chromosomes in gametes** (the sex cells, or egg and sperm). In humans, body (or somatic) cells are diploid, containing two sets of chromosomes (one from each parent).

Difference between mitosis and meiosis?

Mitosis	Meiosis
Interphase	
• Each chromosome replicates during the S phase of the interphase. The result is two genetically identical sister chromatids	• Chromosomes not yet visible but DNA has been duplicated or replicated.
Prophase	
• Each of the duplicated chromosomes appears as two identical or equal sister chromatids. The mitotic spindle begins to form. Chromosomes condense and thicken.	• Prophase I – crossing-over and recombination – Homologous chromosomes (each consists of two sister chromatids) appear together as pairs. Tetrad or bivalent is the structure that is formed. Segments of chromosomes are exchanged between non-sister chromatids at crossover points known as chiasmata (crossing-over).

Difference between mitosis and meiosis?

Mitosis	Meiosis
Metaphase	
• Metaphase -The chromosomes assemble at the equator at the metaphase plate.	• Metaphase I – Chromosomes adjust on the metaphase plate. Chromosomes are still intact and arranged as pairs of homologues (bivalent).
Anaphase	
• Anaphase – The spindle fibers begin to contract. This starts to pull the sister chromatids apart. At the end of anaphase, a complete set of daughter chromosomes is found on each pole.	• Anaphase I – Sister chromatids stay intact. However, homologous chromosomes drift to the opposite or reverse poles.

Difference between mitosis and meiosis?

Mitosis	Meiosis
Mode of Reproduction	
• Asexual Reproduction	• Sexual Reproduction
Occurrence	
• All the cells	• Reproductive cells
Function	
• General growth and repair, Cell reproduction	• Genetic diversity through sexual reproduction
Cytokinesis	
• Occurs in Telophase	Occurs in Telophase I and in Telophase II