

MEIOSIS

Meiosis is a process of reduction division in which the number of chromosomes per cell is cut in half through the separation of homologous chromosomes in a diploid cell.

- **Homologous** chromosomes each have a corresponding chromosome from the opposite-sex parent.
- **Diploid** cells ($2N$) have 2 sets of chromosomes (1 from each parent).
 - *Ex:* body cells in humans – 46
- **Haploid** cells (N) have only 1 set of chromosomes.
 - *Ex:* gametes in humans – 23

Phases of Meiosis

1. Meiosis I

- Interphase I
 - Growth, DNA replication
- Prophase I
 - Tetrads form
 - Crossing over may occur (homologous chromosomes may share part of their chromatids)

- Metaphase I
 - Tetrads line up in the middle & attach to spindle
- Anaphase I
 - Homologous chromosomes separate and move to opposite poles
- Telophase I & Cytokinesis
 - 2 nuclear membranes reform
 - Cell separates into 2 new haploid cells

2. Meiosis II

- Prophase II
 - Spindle reforms
- Metaphase II
 - Chromosomes line up in the middles & attach to the spindle
- Anaphase II
 - Sister chromatids separate and move to opposite poles
- Telophase II & Cytokinesis
 - 4 nuclear membranes reform
 - Cells separate into 4 new haploid cells

Meiosis results in gamete formation.

- Even in males -> 4 gametes are formed

- Uneven in females -> 1 gamete and 3 polar bodies are formed

GENE LINKAGE

Thomas Hunt Morgan – Chromosomes assort independently, genes DO NOT.

Sturtevant hypothesized that the rate of crossing-over was directly related to the distance between genes on the chromosome.

- Used to construct GENE MAPS