Meiosis
Section 2

Meiosis

Key Idea: During meiosis, a diploid cell goes through two divisions to form four haploid cells.

- **Meiosis** is a form of cell division that produces daughter cells with half the number of chromosomes that are in the parent cell.
- **Crossing-over** is where chromatids exchange genetic material.

Stages of Meiosis

Stage 1: Prophase I - the chromosomes condense, and the nuclear envelope breaks down

Stage 2: Metaphase I - pairs of homologous chromosomes move to the equator of the cell

Stage 3: Anaphase I - the homologous chromosomes separate

Stage 4: Telophase I - the cytoplasm divides (cytokinesis), and two new cells are formed.

Stage 5: Prophase II - new spindles form.

Stage 6: Metaphase II - the chromosomes line up along the equator

Stage 7: Anaphase II - the chromatids, which are now called chromosomes, move to opposite poles of the cell

Stage 8: Telophase II - a nuclear envelope forms around each set of chromosomes

Meiosis I

- Begins with a diploid cell that has copied its chromosomes.
- Ends with both cells having one chromosome from each pair of homologous chromosomes.

Meiosis II

- The chromosomes are not copied between meiosis I and meiosis II.
- The result of meiosis is four haploid cells.

Comparing Mitosis and Meiosis

Key Idea: Mitosis makes new cells that are used during growth, development, repair, and asexual reproduction. Meiosis makes cells that enable an organism to reproduce sexually and happens only in reproductive structures.

Comparing Mitosis and Meiosis

- Mitosis produces two genetically identical diploid cells.
- Meiosis produces four genetically different haploid cells.

Genetic Variation

Key Idea: Three key contributions to genetic variation are crossing-over, independent assortment, and random fertilization.

The word exist means to have life.

Crossing-Over

- Crossing-over happens when one arm of a chromatid crosses over the arm of the other chromatid.
- Each chromatid contains a piece from the other chromosome.

Independent Assortment

- Independent assortment is the random distribution of homologous chromosomes during meiosis.
- The two pairs of chromosomes can line up at the equator in either of two equally probable ways.

Random Fertilization

- A zygote that forms is made by the random joining of two gametes.