

AP Biology Unit 5: Heredity
Chapter 10: Meiosis

5.1 and 5.2 Learning Objectives:

1. Explain how meiosis results in the transmission of chromosomes from one generation to the next.
2. Describe similarities and/ or differences between the phases and outcomes of mitosis and meiosis.
3. Explain how the process of meiosis generates genetic diversity.

5.1 and 5.2 ESSENTIAL KNOWLEDGE:

- Meiosis is a process that ensures the formation of haploid gamete cells in sexually reproducing diploid organisms—
 - a. Meiosis results in daughter cells with half the number of chromosomes of the parent cell.
 - b. Meiosis involves two rounds of a sequential series of steps (meiosis I and meiosis II).
- Mitosis and meiosis are similar in the way chromosomes segregate but differ in the number of cells produced and the genetic content of the daughter cells.
- Separation of the homologous chromosomes in meiosis I ensures that each gamete receives a haploid ($1n$) set of chromosomes that comprises both maternal and paternal chromosomes.
- During meiosis I, homologous chromatids exchange genetic material via a process called “crossing over” (recombination), which increases genetic diversity among the resultant gametes.
- Sexual reproduction in eukaryotes involving gamete formation—including crossing over, the random assortment of chromosomes during meiosis, and subsequent fertilization of gametes—serves to increase variation.