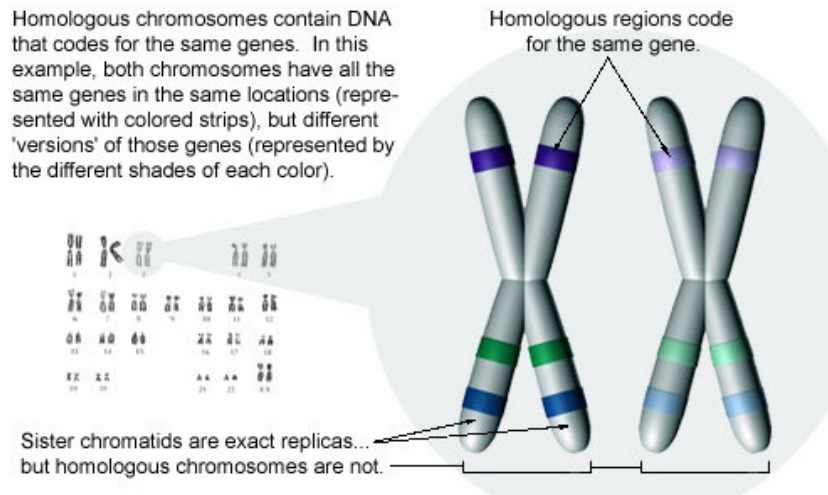


## MEIOSIS

**Meiosis** is a special kind of cell division that produces gametes (sperm and egg) that have only half the number of chromosomes as the parent cell.

Your body is made of **somatic cells** that each has 46 chromosomes. Of the 46 chromosomes in each of your body cells, 23 came from one of your parents, and 23 came from the other parent. The two sets of matching chromosomes are called **homologous chromosomes**. A cell (like a somatic cell) that contains both sets of homologous chromosomes is said to be **diploid**. The number of chromosomes in a diploid cell is represented by **2n**. (For example, in humans  $2n = 46$ . The body cells of a fruit fly each contain 8 chromosomes, which is written as  $2n = 8$ .)



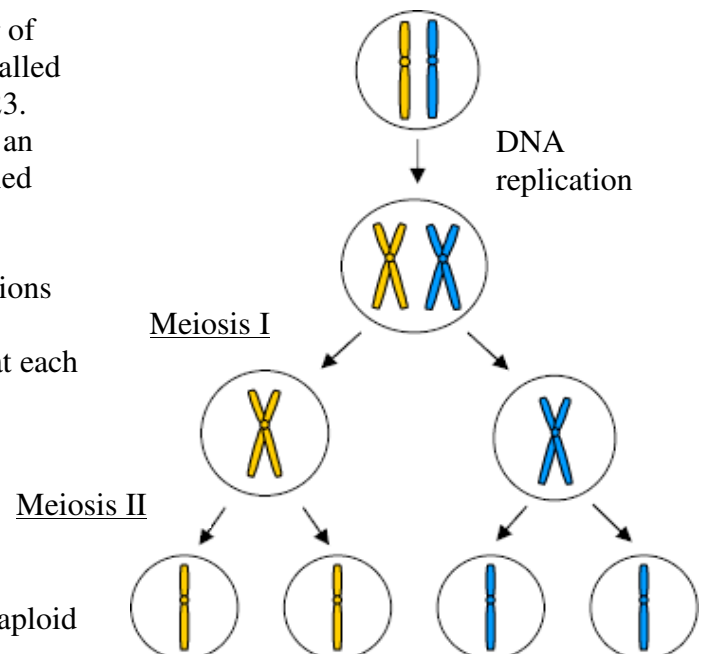
During fertilization, gametes (sperm and egg) unite, which leads to a complex series of steps resulting in development of an adult organism. In order for each generation of organisms to have the same number of chromosomes, gametes must contain only half as many chromosomes as body cells. This way,  $1n + 1n = 2n$ .

Meiosis results in cells that have half the number of chromosomes of the parent cell. These cells are called **haploid** cells, and they are represented by **1n = 23**. Before meiosis begins, each chromosome makes an exact copy of itself. The resulting copies are called **chromatids**, and are attached at the centromere.

During meiosis, the cell undergoes two cell divisions called meiosis I and meiosis II. In **meiosis I**, homologous chromosomes separate, ensuring that each new cell receives only one set of information.

The sister chromatids are still attached at the end of meiosis I, but must be separated. **Meiosis II** separates the sister chromatids.

At the end of meiosis, four genetically diverse, haploid gametes are produced.



## PRACTICE

1. Which of the following occurs in meiosis?
  - A. The chromosomes are copied twice
  - B. One cell produces four cells
  - C. One cell produces two cells
  - D. The nucleus divides once
2. If a parent cell has 18 chromosomes, how many chromosomes would be found in a gamete that this cell produces?
  - A. 36
  - B. 18
  - C. 9
  - D. 6
3. Which statement correctly describes what happens as a result of the first meiotic division?
  - A. sister chromatids separate
  - B. the chromosome number remains unchanged
  - C. each cell contains half the number of chromosomes of the original cell
  - D. four gametes are formed
4. If a cell contains the alleles GgRr, which of the following represent a possible product of meiosis?
  - A. GGRR
  - B. Gg
  - C. Rr
  - D. GR
5. Which process occurs in both mitosis and meiosis?
  - A. Cell specialization
  - B. DNA replication
  - C. Reduction in chromosome number
  - D. Two nuclear divisions
6. Why is meiosis necessary in a sexual life cycle?  

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