

Meiosis

What is meiosis and why is it necessary?

Phase 1—Homologous chromosomes pair up. Each chromosome has two chromatids.



Phase 2—Homologous pairs line up together along the middle of the cell.



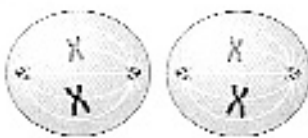
Phase 3—Spindle fibers pull the two homologous pairs to opposite sides of the cell.



Phase 4—The cell divides. Each new cell has half as many chromosomes as the original, but each chromosome still has two chromatids.



Phase 5—Two chromosomes line up along the middle.



Phase 6—Spindle fibers pull the chromatids to opposite sides of the cell. A nuclear membrane reforms around each group of chromosomes.



Phase 7—The cells divide to form four new cells. Each has 23 chromosomes, or half the amount of chromosomes as the original cell.



Almost all human body cells contain 23 pairs of chromosomes, or 46 chromosomes in all. The chromosomes in each pair have the same size and shape. They also contain similar hereditary information. The two chromosomes in each pair are called **homologous chromosomes**.

In humans, each sperm cell and each egg cell contains 23 chromosomes, or one-half the usual number of chromosomes. When a sperm and an egg unite during sexual reproduction, the zygote receives the chromosomes from both. This gives the zygote 23 pairs of chromosomes, or a total of 46 chromosomes.

For a zygote to have 46 chromosomes, sex cells can have only half that number. This makes meiosis necessary. **Meiosis** is a unique kind of cell division that produces sex cells. Before meiosis begins, each chromosome in the nucleus makes an exact copy of itself, forming two identical chromatids, just like in mitosis.

In meiosis, the chromosomes are copied once, but the nucleus divides twice.

Show What You Know

If an organism had 12 chromosomes in its body cells, how many chromosomes would be found in one of its sex cells?