

# Sex Cells and Meiosis

## Key Words

<b>gametes:</b>	sex cells
<b>egg:</b>	female sex cell
<b>sperm:</b>	male sex cell
<b>haploid number:</b>	number of chromosomes found in a gamete
<b>diploid number:</b>	number of chromosomes found in the body cells of an organism
<b>meiosis:</b>	type of cell division that produces gametes

## KEY IDEAS

During sexual reproduction, two sex cells join. Each sex cell contains half the number of chromosomes found in the body cells of the parents. The process in which the number of chromosomes in a cell is reduced by half is called meiosis.

Our bodies consist of millions of cells. However, all humans begin life as only one cell. The one cell is formed by the joining of two sex cells: one from the mother and one from the father. After 36 hours, the cell divides to form two cells. Five days after the first cell formed, it has divided enough times to produce 120 cells.

**Sex Cells.** All organisms that reproduce sexually produce sex cells called **gametes** (GAM-eets). Female gametes are called **egg** (ehg) cells. Male gametes are called **sperm** (sperm) cells. Each gamete contains half the number of chromosomes as the body cells of the organism. The number of chromosomes in a gamete is described as the **haploid number** (HAP-loid NUM-buhr).

A single body cell from a particular organism contains a certain number of chromosomes. For example, human body cells contain 46 chromosomes each. The body cells of a dog contain 78 chromosomes each. An earthworm's body cells hold 36 chromosomes. The number of chromosomes in a single body cell of an organism is called the **diploid number** (DIHP-loid NUM-buhr). Since the body cell of a spider plant contains 24 chromosomes, its diploid number is 24.

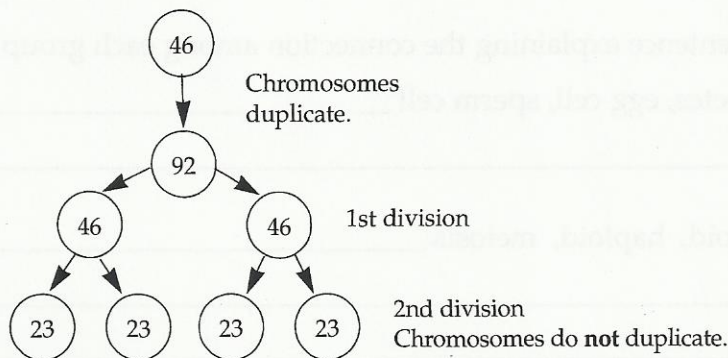


1. How do gametes differ from body cells? \_\_\_\_\_

\_\_\_\_\_

**Meiosis and Chromosomes.** The kind of cell division by which diploid cells produce haploid gametes is called **meiosis** (my-OH-sihs). Meiosis occurs in two stages. The first stage resembles mitosis. In this stage, the chromosomes in the parent cell duplicate, or make exact copies of each other. When this cell divides, each of the two resulting daughter cells contains the same number of chromosomes as the original parent cell.

Fig. 10-1 Meiosis in a human cell



In the second stage of meiosis, each daughter cell divides a second time. Unlike mitosis, this second cell division does not begin with duplicating the chromosomes. Thus, when the daughter cells divide, each of the four cells produced has half as many chromosomes as the original parent cell. Fig. 10-1 shows meiosis in a human cell.

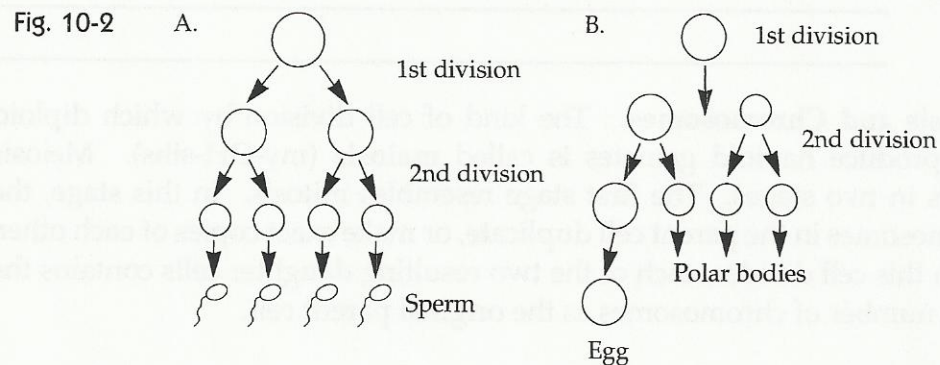
By dividing twice, the original diploid cell produces haploid gametes. When two such gametes join during sexual reproduction, they form a single cell that again has a diploid number.

**Sperm and Eggs.** During meiosis, a single cell divides twice to form four daughter cells. In males, meiosis produces four sperm cells of almost equal size. In females, meiosis produces four cells of varying size. One cell receives most of the cytoplasm, making it much larger than the other three cells. The large cell becomes the female gamete, or egg cell. The three smaller cells are called polar bodies. Polar bodies are not involved in sexual reproduction.

Occasionally, something goes wrong during meiosis. The parent cell does not separate evenly, causing a daughter cell to have an abnormal number of chromosomes. If this gamete joins with a normal gamete during sexual reproduction, the new cell that forms lacks the diploid number. An organism that develops from this cell will have a genetic disorder.

**TAKE  
ANOTHER  
LOOK**

Fig. 10-2 shows the differences that occur in the formation of sperm and eggs.



**Check Your  
Understanding**

Write a sentence explaining the connection among each group of words.

2. gametes, egg cell, sperm cell \_\_\_\_\_  
\_\_\_\_\_

3. diploid, haploid, meiosis \_\_\_\_\_  
\_\_\_\_\_

Complete the following passage using words from the list below.

*divisions*      *diploid number*      *egg*      *four*      *gamete*  
*haploid number*      *meiosis*      *polar bodies*      *two*

The (4) \_\_\_\_\_ of an organism is twice its (5) \_\_\_\_\_.  
A (6) \_\_\_\_\_ contains half the number of chromosomes found in the  
body cells of an organism. Gametes are formed through (7) \_\_\_\_\_.  
In this process, a parent cell undergoes two (8) \_\_\_\_\_. The first  
stage of meiosis produces (9) \_\_\_\_\_ daughter cells. In males,  
the second stage of meiosis results in (10) \_\_\_\_\_ sperm cells. In  
females, one (11) \_\_\_\_\_ cell and three (12) \_\_\_\_\_  
are formed.

Complete exercises 13 – 17 by adding the correct number to the sentences.  
Using the fruit fly as an example.

13. If the body cell of a fruit fly contains 8 chromosomes, its diploid number  
is \_\_\_\_\_.

14. The haploid number of a fruit fly is \_\_\_\_\_.

15. When a body cell doubles its chromosome number to begin meiosis, it contains \_\_\_\_\_ chromosomes.
16. Cells produced by the first division of meiosis contain \_\_\_\_\_ chromosomes.
17. Cells produced by the second division of meiosis contain \_\_\_\_\_ chromosomes.



18. Explain the difference between a body cell and a sex cell.

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19. If the body cell of a grasshopper contains 24 chromosomes, how many chromosomes does the egg cell of a female grasshopper contain? Explain how you determined your answer.

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20. How is the number of sperm cells and egg cells produced by meiosis different? \_\_\_\_\_

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21. Explain how mitosis and meiosis are alike.

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22. Explain how mitosis and meiosis are different.

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