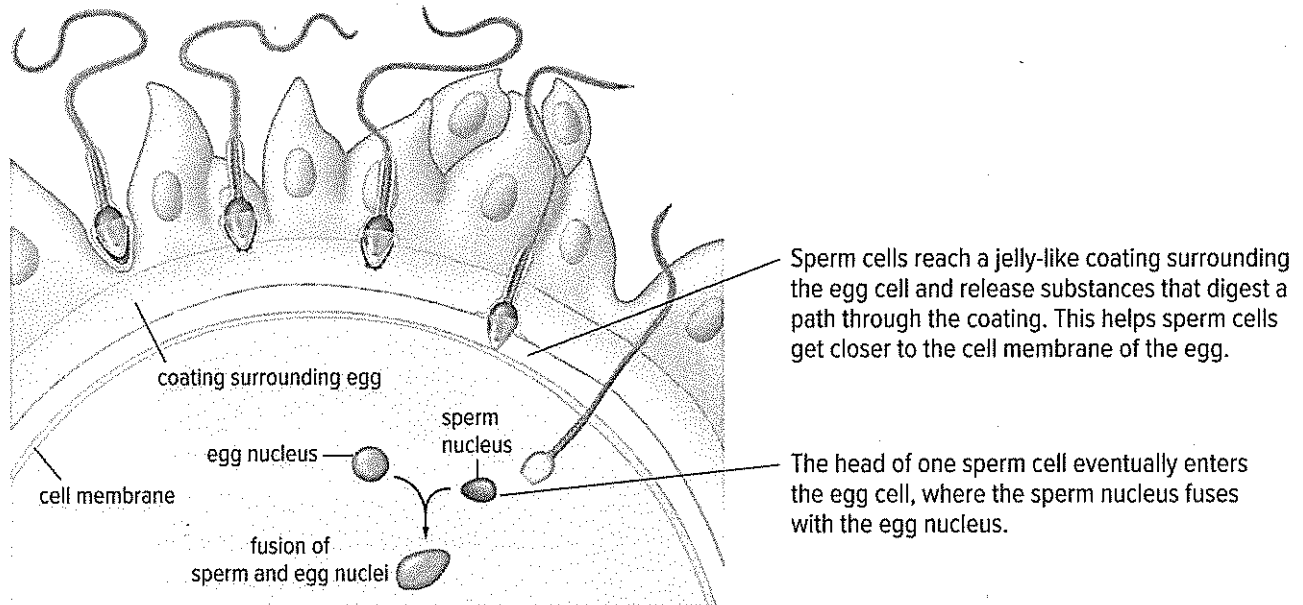


How do living things sexually reproduce?

Use with textbook pages 44-57.

Gametes

Gametes, also known as sex cells, are required during sexual reproduction. The male gamete is the *sperm* and the female gamete is the *egg*. The sperm combines with the egg to form a *zygote* in a process called **fertilization**. Half of the genetic material of the zygote comes from the sperm and the other half comes from the egg. The figure below shows the union of the egg and the sperm.

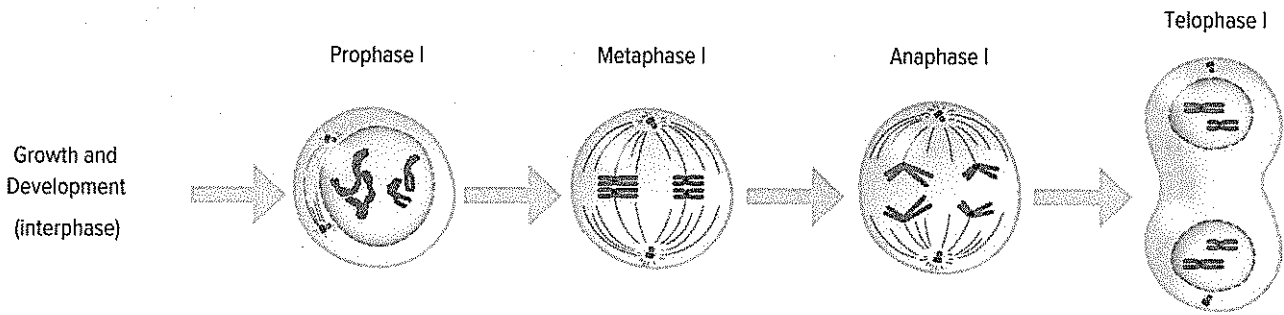


Haploid and Diploid

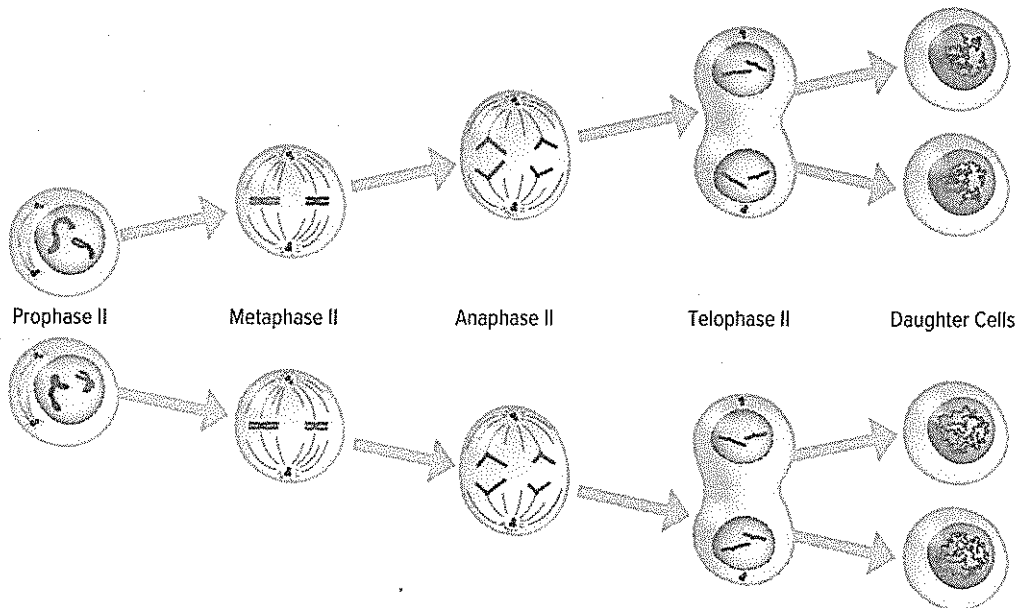
Gametes have half the normal number of chromosomes and are said to be **haploid**. When two gametes combine, they form a cell that is **diploid**, having a full set of chromosomes. These chromosomes are paired and are called *homologous chromosomes*. In the pair, one chromosome comes from the female parent and the other comes from the male parent. Figure 1.19 on page 49 shows the difference between haploid and diploid cells.

Meiosis

During **meiosis**, a diploid cell undergoes two consecutive cell divisions to produce four haploid cells. These four cells are the gametes that will be involved in sexual reproduction. The figure below shows the first cell division.



Once the cell has divided once, the two daughter cells each divide again. The figure below shows the second cell division.



Human Development

After fertilization, the single-celled *zygote* undergoes a series of cell divisions to become an *embryo*. The embryo continues to divide, grow, and develop into a fetus. Table 1.2 on page 53 of the textbook shows the key prenatal developments over nine months.

Sexual Reproduction in Other Organisms

Other organisms reproduce through sexual reproduction as well. Some fertilized eggs develop inside the female's body, while others develop outside the body. In plants, seeds and pollen are involved in pollination and fertilization. Refer to Figure 1.23 on pages 54 and 55 of the textbook to review the different ways organisms reproduce.

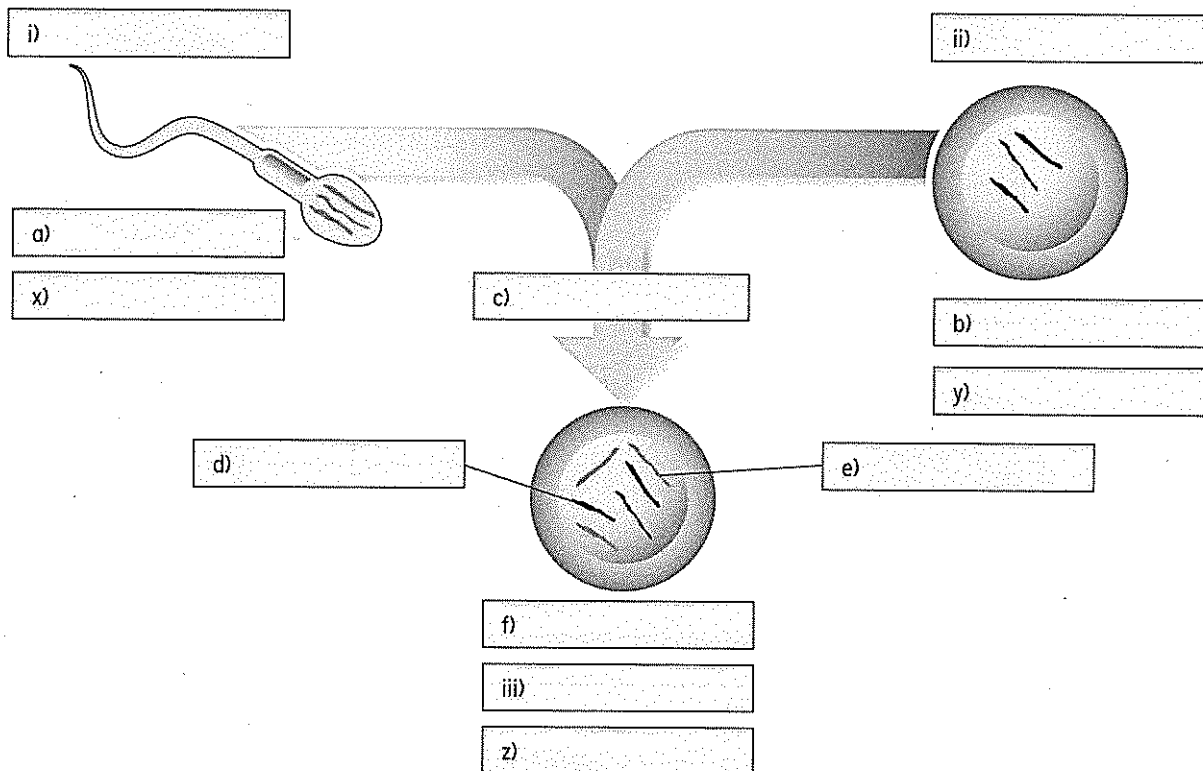


Gametes

Use with textbook pages 46-48.

1. Label the diagram below.

- Use the following terms for parts a) to f): **female chromosome, male chromosome, egg, fertilization, sperm, zygote.**
- Use the following terms for parts i), ii), and iii), **diploid, haploid.**
- Identify the method (mitosis or meiosis) that produces the cell. Label boxes x), y), and z).



2. Determine how many chromosomes are in the gametes and body cells of these organisms.

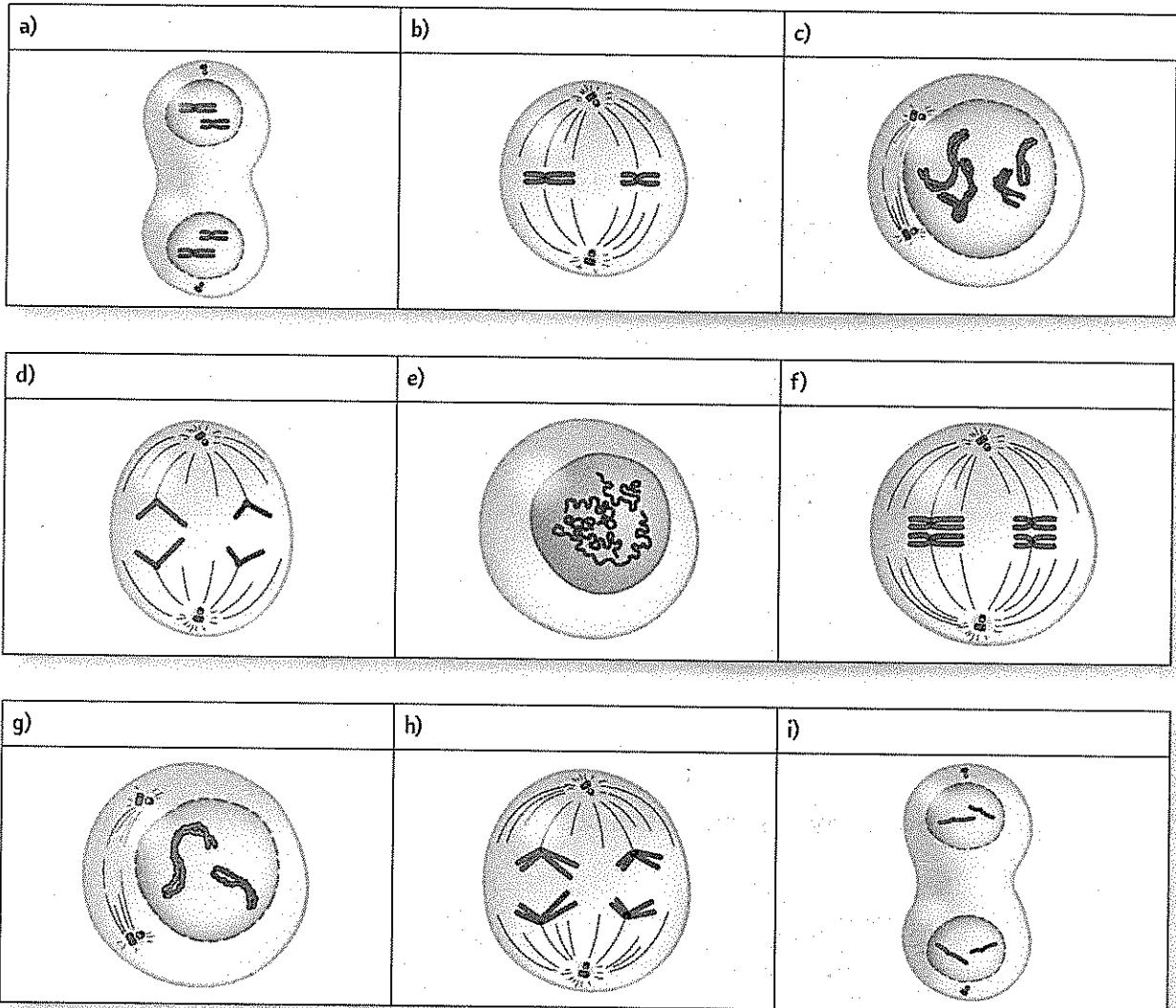
	Organism	Number of Chromosomes in the Gametes	Number of Chromosomes in the Body Cells
a)	Human, <i>Homo sapiens</i>	23	
b)	Sea otter, <i>Enhydra lutris</i>		38
c)	Spirit bear, <i>Ursus americanus</i>	37	
d)	Chinook salmon, <i>Oncorhynchus tshawytscha</i>		68
e)	Red fox, <i>Vulpes vulpes</i>	17	

Meiosis

Use with textbook pages 49-51.

1. What is the purpose of meiosis?

2. Label each diagram with the corresponding stage of meiosis: **anaphase I**, **anaphase II**, **interphase**, **metaphase I**, **metaphase II**, **prophase I**, **prophase II**, **telophase I**, **telophase II**.



3. Which stage of meiosis is each of the following statements describing? Choose from the following list of terms: **anaphase I, anaphase II, metaphase I, metaphase II, prophase I, prophase II, telophase I, telophase II, interphase.**

- a) two nuclei form _____
- b) four nuclei form _____
- c) cell is growing and developing _____
- d) homologous chromosomes pair up _____
- e) cell divides into two daughter cells _____
- f) cell divides into four daughter cells _____
- g) DNA condenses into chromosomes _____
- h) nuclear membrane starts to disappear _____
- i) chromosomes line up in the middle of the cell _____
- j) DNA exists as chromosomes but not homologous pairs

- k) chromosomes separate and move to the ends of the cell

- l) each nuclei formed has a complete copy of the cell's DNA

- m) nuclear membrane starts to disappear and homologous chromosomes pair

- n) homologous chromosome pairs separate and start to move to the two ends of the cell _____
- o) spindle fibres line up the homologous chromosome pairs in the middle of the cell _____