KEY CONCEPT
Gametes have half the number of chromosomes that body cells have.

VOCABULARY

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>somatic cell</td>
<td>body cell</td>
</tr>
<tr>
<td>autosome</td>
<td>chromosome</td>
</tr>
<tr>
<td>gamete</td>
<td>sex chromosome</td>
</tr>
<tr>
<td>homologous</td>
<td>sexual reproduction</td>
</tr>
<tr>
<td>chromosome</td>
<td>fertilization</td>
</tr>
<tr>
<td>diploid</td>
<td>haploid</td>
</tr>
<tr>
<td>homologous</td>
<td>meiosis</td>
</tr>
</tbody>
</table>

MAIN IDEA: You have body cells and gametes.

1. What are the two major groups of cell types in the human body?
   somatic/body cells; germ cells/gametes

2. Where are gametes located?
   in the reproductive organs; ovaries and testes

3. How many chromosomes are in a typical human body cell?
   46

MAIN IDEA: Your cells have autosomes and sex chromosomes.
Fill in the concept map below to summarize what you know about chromosomes.

- 46 chromosomes in human body cells
- half come from
- include
- include
- sex chromosomes
- consist of
- 22 homologous pairs
- autosomes
- mother
- father

7. X
8. Y
STUDY GUIDE, CONTINUED

9. What is the sex of a person with two X chromosomes?
   female

10. Which chromosome carries the fewest number of genes?
    Y chromosome

MAIN IDEA: Body cells are diploid; gametes are haploid.

11. What happens to the nuclei of the egg and sperm during fertilization?
    they fuse together

12. What type of cells are haploid?
    gametes (egg and sperm)

13. What is the haploid chromosome number in humans?
    23

14. How many autosomes are present in each human gamete? How many sex chromosomes?
    22; 1

15. Complete the following table to summarize the differences between mitosis and meiosis. Use Figure 6.2 to help you.

<table>
<thead>
<tr>
<th></th>
<th>Mitosis</th>
<th>Meiosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes diploid cells</td>
<td>Makes genetically identical cells</td>
<td>Makes genetically unique cells</td>
</tr>
<tr>
<td>Makes genetically identical cells</td>
<td>Makes genetically identical cells</td>
<td>Makes genetically unique cells</td>
</tr>
<tr>
<td>Happens throughout lifetime</td>
<td>Happens at specific times in an organism’s life cycle</td>
<td>Involved in sexual reproduction</td>
</tr>
<tr>
<td>Involved in asexual reproduction</td>
<td>Involved in sexual reproduction</td>
<td>Involved in sexual reproduction</td>
</tr>
</tbody>
</table>

Vocabulary Check

16. What are homologous chromosomes?
    a pair of chromosomes, one from the mother and one from the father; that have the same genes, length, and overall appearance

17. The word soma means “body.” How does this relate to the meanings of autosome and somatic cell?
    autosome: chromosome that directs the body’s development of traits not directly related to sexual characteristics; somatic cell: body cell
SECTION 6.2  PROCESS OF MEIOSIS
Study Guide

KEY CONCEPT
During meiosis, diploid cells undergo two cell divisions that result in haploid cells.

VOCABULARY
<table>
<thead>
<tr>
<th>gametogenesis</th>
<th>egg</th>
</tr>
</thead>
<tbody>
<tr>
<td>sperm</td>
<td>polar body</td>
</tr>
</tbody>
</table>

MAIN IDEA: Cells go through two rounds of division in meiosis.

1. After a chromosome is replicated, each half is called a sister chromatid.

2. Two chromosomes that are very similar and carry the same genes are called homologous chromosomes.

In the space below, sketch the phases of meiosis I and II and write the name of each phase below it. Use Figure 6.5 to help you.

Meiosis I  Refer to Figure 6.5 for visual answers

3. Prophase I
4. Metaphase I
5. Anaphase I
6. Telophase I

Meiosis II

7. Prophase II
8. Metaphase II
9. Anaphase II
10. Telophase II

11. During which phase do homologous chromosomes separate?
   Anaphase I

12. During which phase do sister chromatids separate?
   Anaphase II
STUDY GUIDE, CONTINUED

MAIN IDEA: Haploid cells develop into mature gametes.

13. What does a sperm cell contribute to an embryo?

DNA

14. What does an egg contribute to an embryo?

DNA, organelles, molecular building blocks

15. Where are polar bodies made, in the male or in the female?

female

Complete the diagram of gametogenesis in the boxes below. Use Figure 6.6 to help you.

Refer to Figure 6.6 for visual answers

Vocabulary Check

16. *Genesis* comes from a Greek word that means “to be born.” How does this relate to the meaning of gametogenesis?

Gametogenesis is the "birth" or formation of gametes.

17. What is a polar body?

Cells produced by meiosis in the female body that contain little more than DNA and are eventually broken down