Section: Meiosis

Read the passage below. Then answer the questions that follow.

Meiosis is a form of cell division that halves the number of chromosomes when forming specialized reproductive cells, such as gametes or spores. Meiosis involves two divisions of the nucleus—meiosis I and meiosis II.

The stages of meiosis I are as follows:

**Prophase I:** The chromosomes condense, and the nuclear envelope breaks down. Homologous chromosomes pair along their length and then cross over.

**Metaphase I:** The pairs of homologous chromosomes are moved by the spindle to the equator of the cell. The homologous chromosomes, each made up of two chromatids, remain together.

**Anaphase I:** The homologous chromosomes separate. As in mitosis, the chromosomes of each pair are pulled to opposite poles of the cell by the spindle fibers. But in meiosis, the chromatids do not separate at their centromeres.

**Telophase I:** Individual chromosomes gather at each of the poles. In most organisms, the cytoplasm divides, forming two new cells.

**SKILL: READING EFFECTIVELY**

Match each statement with the stage of meiosis I it describes by writing in the spaces provided, *PI* to represent Prophase I, *MI* to represent Metaphase I, *AI* to represent Anaphase I, or *TI* to represent Telophase I.

____ 1. cytoplasm divides
____ 2. nuclear envelope breaks down
____ 3. homologous chromosomes separate
____ 4. spindle moves homologous chromosomes to the cell’s equator
____ 5. crossing-over occurs
____ 6. two new cells form
____ 7. homologous chromosomes move to opposite poles of the cell
____ 8. chromosomes condense
Read the passage below. Then answer the questions that follow.

The stages of meiosis II are as follows:

**Prophase II:** A new spindle forms around the chromosomes.

**Metaphase II:** The chromosomes line up along the equator, attached at their centromeres to spindle fibers.

**Anaphase II:** The centromeres divide, and the chromatids (now called chromosomes) move to opposite poles of the cell.

**Telophase II:** A nuclear envelope forms around each set of chromosomes. The spindle breaks down, and the cell undergoes cytokinesis. The result of meiosis is four haploid cells.

Match each statement with the stage of meiosis II it describes by writing in the spaces provided, **P II** to represent Prophase II, **M II** to represent Metaphase II, **A II** to represent Anaphase II, or **T II** to represent Telophase II.

____ 9. centromeres divide
____ 10. new spindle forms
____ 11. cell undergoes cytokinesis
____ 12. chromosomes line up at equator
____ 13. spindle breaks down
____ 14. chromosomes move to opposite poles of the cell
____ 15. four haploid cells form

In the space provided, write the letter of the term or phrase that best completes the statement.

____ 16. Between meiosis I and meiosis II, chromosomes do NOT
   a. replicate.
   b. change position.
   c. divide.
   d. Both (a) and (b)
7. haploid life cycle (some fungi and algae, such as *Chlamydomonas*), diploid life cycle (most animals, including humans), alternation of generations (plants, such as roses)

8. The type of life cycle that a eukaryotic organism has depends on the type of cell that undergoes meiosis and on when meiosis occurs. Haploid cells occupy the major portion of the haploid life cycle. Diploid individuals occupy the major portion of the diploid life cycle. The gametophyte and the sporophyte take turns in the alternation of generations life cycle.

9. meiosis, gametes, fertilization, zygote, diploid individual

**Active Reading**

**SECTION: MEIOSIS**

1. TI 9. AII
2. PI 10. PII
3. AI 11. TII
4. MI 12. MII
5. PI 13. TII
6. TI 14. AII
7. AI 15. TII
8. PI 16. a

**SECTION: SEXUAL REPRODUCTION**

1. Reproduction, the process of producing offspring, can be asexual or sexual.
2. An organism that is genetically identical to its parent
3. Binary fission
4. Because these offspring receive genetic material from both parents, they inherit traits from each.
5. In both processes, offspring are produced.
6. Because asexual reproduction involves a single parent, there is no fusion of haploid cells. Because sexual reproduction involves two parents, haploid cells are joined together.
7. c

**Vocabulary Review**

**ACROSS**

6. SPERMATOGENESIS
7. SEXUAL
9. OVUM
11. CROSSING OVER
12. SPORE
13. MEIOSIS
14. INDEPENDENT

**DOWN**

1. GAMETOPHYTE
2. FERTILIZATION
3. CLONE
4. ASEXUAL
5. LIFE
7. SPERM
8. SPOROPHYTE
10. OOGENESIS

**Science Skills**

**SEQUENCING/ORGANIZING INFORMATION**

1. g 9. g
2. b 10. a
3. c 11. d
4. f 12. f
5. h 13. c
6. d 14. h
7. a 15. e
8. e 16. b

**Concept Mapping**

1. meiosis II
2. haploid reproductive cells or gametes
3. crossing-over
4. homologous chromosomes
5. chromatids

**Critical Thinking**

1. g 13. b
2. f 14. d
3. b 15. c
4. e 16. a
5. a 17. d, c
6. h 18. h, g
7. c 19. b, f
8. d 20. a, e
9. b 21. d
10. a 22. c
11. c 23. b
12. d 24. d