

# CELL REPRODUCTION

## Cell Division

Read the passage below, which covers topics from your textbook. Answer the questions that follow.

Mitosis is a continuous process that is divided into four phases: prophase, metaphase, anaphase, and telophase. **Prophase** is the first phase of mitosis. Prophase begins with the shortening and tight coiling of DNA into rod-shaped chromosomes that can be seen with a light microscope. During the S phase, each chromosome is copied. The two copies of each chromosome—called chromatids—stay connected to one another by the centromere. At this time, the nucleolus and the nuclear membrane break down and disappear. Two pairs of dark spots called *centrosomes* appear next to the disappearing nucleus. The centrosomes move toward opposite poles of the cell, and **spindle fibers** radiate from the centrosomes in preparation for mitosis.

**Metaphase** is the second phase of mitosis. During metaphase, kinetochore fibers move the chromosomes to the center of the dividing cell.

During **anaphase**, the chromatids of each chromosome separate at the centromere and slowly move toward opposite poles of the dividing cell. After the chromatids separate, they are considered to be individual chromosomes.

**Telophase** is the fourth phase of mitosis. After the chromosomes reach opposite ends of the cell, the spindle fibers disassemble and the chromosomes return to a less tightly coiled chromatin state. A nuclear envelope forms around each set of chromosomes, and a nucleolus forms in each of the newly forming cells.

Match each statement with the phase of mitosis it describes. Write the letter corresponding to the correct phase in the space provided.

### SKILL: Sequencing Information

In this exercise, matching the statement with the stage of mitosis will help you learn the sequence of events of mitosis.

- |              |              |
|--------------|--------------|
| a. prophase  | c. anaphase  |
| b. metaphase | d. telophase |

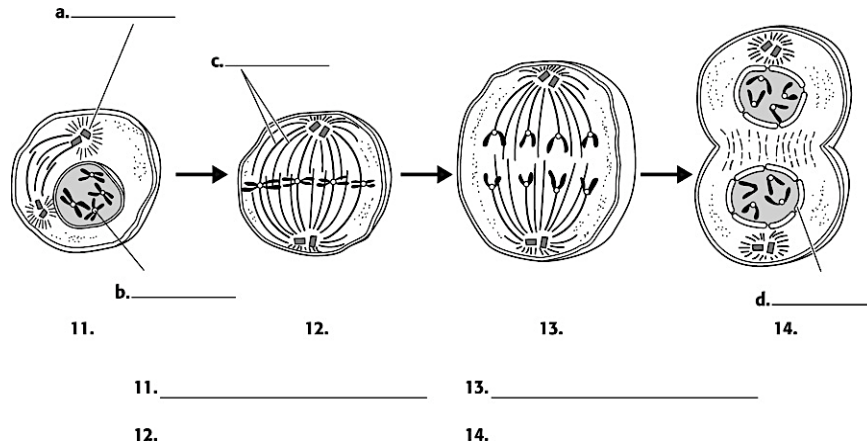
1. \_\_\_\_\_ Chromatids of each chromosome separate at the centromere.

2. \_\_\_\_\_ Copied DNA coils into chromosomes.
3. \_\_\_\_\_ Spindle fibers disassemble.
4. \_\_\_\_\_ Kinetochore fibers move chromosomes to the cell's center.
5. \_\_\_\_\_ Centrosomes appear next to the disappearing nucleus.
6. \_\_\_\_\_ A nucleolus forms in each newly formed cell.
7. \_\_\_\_\_ Chromatids move toward opposite poles of the dividing cell.
8. \_\_\_\_\_ Spindle fibers radiate from the centrosomes.
9. \_\_\_\_\_ A nuclear envelope forms around each set of chromosomes.

Write your answers in the spaces provided.

**SKILL: Interpreting Graphics**

10. The figure below shows the phases of mitosis. Using the information contained in the passage, write the name of the structure on each lettered line. On the numbered lines below the figure, name the stage of mitosis corresponding to the number on the figure. Use the following labels: "Anaphase," "Centromere," "Centrosomes," "Metaphase," "Nuclear envelope," "Prophase," "Spindle fibers," and "Telophase."



Circle the letter of the word or phrase that best completes the analogy.

15. Prophase is to centrosomes as telophase is to
- a. chromatids.
  - b. nucleolus.
  - c. kinetochore fibers.
  - d. spindle fibers.