

# Chapter 3 Study Guide

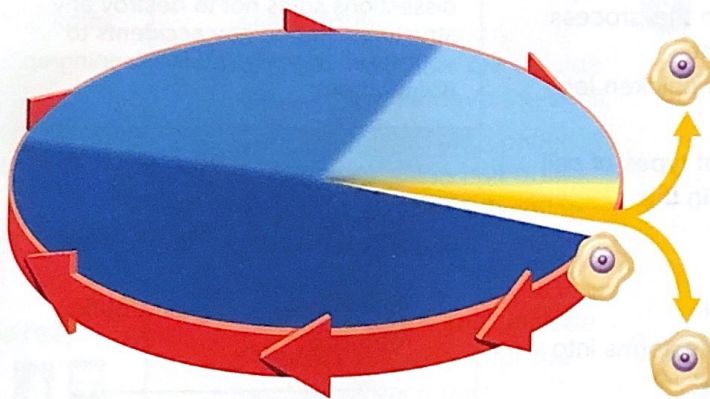


Through cell division, one cell can produce new cells to grow and develop into a multicellular organism.

## Key Concepts Summary

### Lesson 1: The Cell Cycle and Cell Division

- The **cell cycle** consists of two phases. During **interphase**, a cell grows and its chromosomes and organelles replicate. During the mitotic phase of the cell cycle, the nucleus divides during **mitosis**, and the cytoplasm divides during **cytokinesis**.
- The cell cycle results in two genetically identical **daughter cells**. The original parent cell no longer exists.
- The cell cycle is important for growth in multicellular organisms, reproduction in some organisms, replacement of worn-out cells, and repair of damaged cells.



## Vocabulary

- cell cycle p. 85
- interphase p. 86
- sister chromatid p. 88
- centromere p. 88
- mitosis p. 89
- cytokinesis p. 89
- daughter cell p. 89

### Lesson 2: Levels of Organization

- The one cell of a unicellular organism is able to obtain all the materials that it needs to survive.
- In a multicellular organism, cells cannot survive alone and must work together to provide the organism's needs.
- Through **cell differentiation**, cells become different types of cells with specific functions. Cell differentiation leads to the formation of **tissues, organs, and organ systems**.



- cell differentiation p. 99
- stem cell p. 100
- tissue p. 101
- organ p. 102
- organ system p. 103

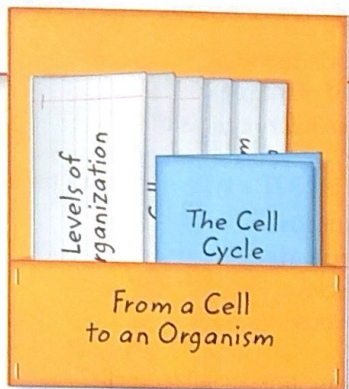




## FOLDABLES®

### Chapter Project

Assemble your lesson Foldables as shown to make a Chapter Project. Use the project to review what you have learned in this chapter.



### Use Vocabulary

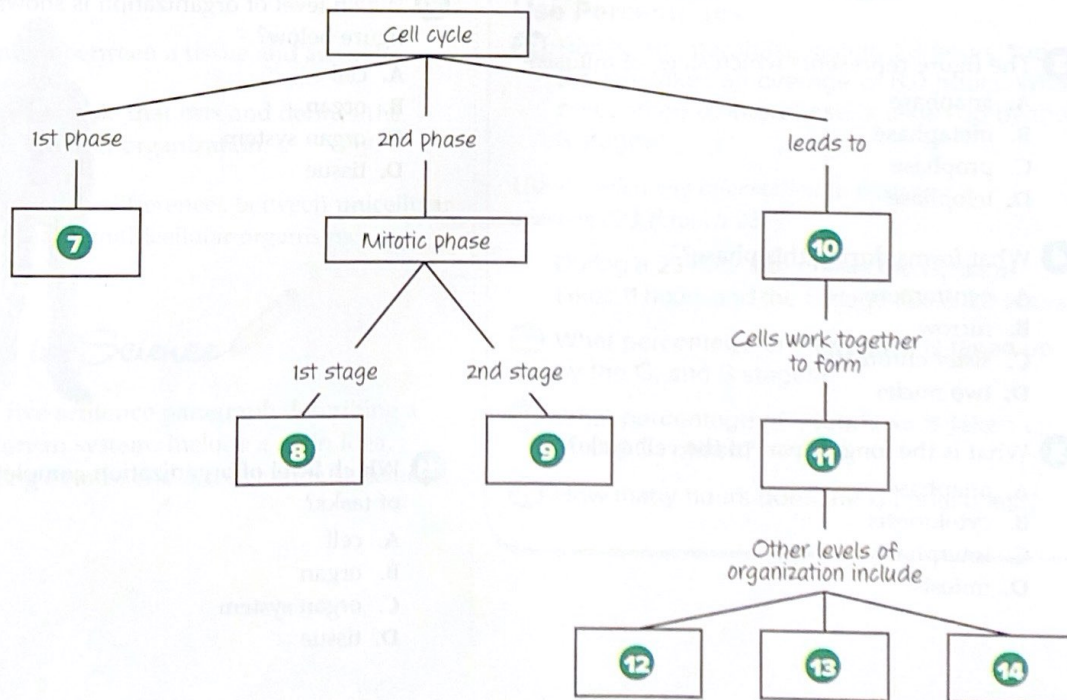
- 1 Use the term *sister chromatids* in a sentence.
- 2 Define the term *centromere* in your own words.
- 3 The new cells formed by mitosis are called \_\_\_\_\_.
- 4 Use the term *cell differentiation* in a sentence.
- 5 Define the term *stem cell* in your own words.
- 6 Organs are groups of \_\_\_\_\_ working together to perform a specific task.

### Link Vocabulary and Key Concepts



### Interactive Concept Map

Copy this concept map, and then use vocabulary terms from the previous page and from the chapter to complete the concept map.



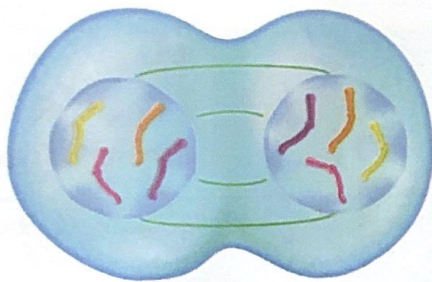


# Chapter 3 Review

## Understand Key Concepts

- 1 Chromosomes line up in the center of the cell during which phase?
  - A. anaphase
  - B. metaphase
  - C. prophase
  - D. telophase
- 2 Which stage of the cell cycle precedes cytokinesis?
  - A.  $G_1$
  - B.  $G_2$
  - C. interphase
  - D. mitosis

Use the figure below to answer questions 3 and 4.



- 3 The figure represents which stage of mitosis?
  - A. anaphase
  - B. metaphase
  - C. prophase
  - D. telophase
- 4 What forms during this phase?
  - A. centromere
  - B. furrow
  - C. sister chromatid
  - D. two nuclei
- 5 What is the longest part of the cell cycle?
  - A. anaphase
  - B. cytokinesis
  - C. interphase
  - D. mitosis

- 6 A plant's root system is which level of organization?
  - A. cell
  - B. organ
  - C. organ system
  - D. tissue

- 7 Where is a meristem often found?
  - A. liver cells
  - B. muscle tissue
  - C. tip of plant root
  - D. unicellular organism

- 8 Which is NOT a type of human tissue?
  - A. connective
  - B. meristem
  - C. muscle
  - D. nervous

- 9 Which are unspecialized cells?
  - A. blood cells
  - B. muscle cells
  - C. nerve cells
  - D. stem cells

- 10 Which level of organization is shown in the figure below?
  - A. cell
  - B. organ
  - C. organ system
  - D. tissue



- 11 Which level of organization completes a series of tasks?
  - A. cell
  - B. organ
  - C. organ system
  - D. tissue



### Critical Thinking

- 12 **Sequence** the events that occur during the phases of mitosis.
- 13 **Infer** why the chromatin condenses into chromosomes before mitosis begins.
- 14 **Create** Use the figure below to create a cartoon that shows a duplicated chromosome separating into two sister chromatids.



- 15 **Classify** a leaf as a tissue or an organ. Explain your choice.
- 16 **Distinguish** between a tissue and an organ.
- 17 **Construct** a table that lists and defines the different levels of organization.
- 18 **Summarize** the differences between unicellular organisms and multicellular organisms.

### Writing in Science

- 19 **Write** a five-sentence paragraph describing a human organ system. Include a main idea, supporting details, and a concluding statement.

### REVIEW

**THE  
BIG  
IDEA**

- 20 Why is cell division important for multicellular organisms?
- 21 The photo below shows a chick growing inside an egg. An egg begins as one cell. How can one cell become a chick?



### Math Skills

### Math Practice

#### Use Percentages

- 22 During an interphase lasting 23 hours, the S stage takes an average of 8.0 hours. What percentage of interphase is taken up by the S stage?

Use the following information to answer questions 23 through 25.

During a 23-hour interphase, the  $G_1$  stage takes 11 hours and the S stage takes 8.0 hours.

- 23 What percentage of interphase is taken up by the  $G_1$  and S stages?
- 24 What percentage of interphase is taken up by the  $G_2$  phase?
- 25 How many hours does the  $G_2$  phase last?



# Standardized Test Practice

Record your answers on the answer sheet provided by your teacher or on a sheet of paper.

## Multiple Choice

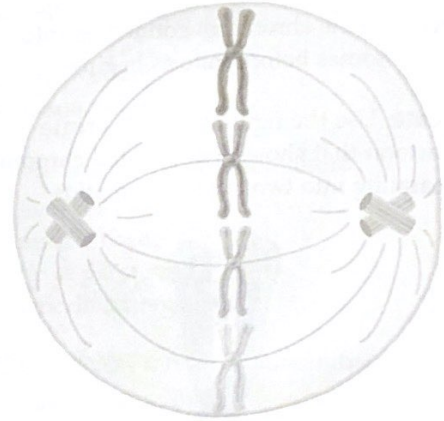
- 1 Which tissue carries messages to and from the brain?
- A connective
  - B epithelial
  - C muscle
  - D nervous

Use the diagram below to answer question 2.



- 2 What is indicated by the arrow?
- A centromere
  - B chromatid
  - C chromosome
  - D nucleus
- 3 In which stage of mitosis do spindle fibers form?
- A anaphase
  - B metaphase
  - C prophase
  - D telophase
- 4 What structures separate during anaphase?
- A centromeres
  - B chromatids
  - C nuclei
  - D organelles
- 5 What stage of mitosis does the image above represent?
- A anaphase
  - B metaphase
  - C prophase
  - D telophase
- 6 A plant's dermal tissue
- A produces food for the rest of the plant.
  - B provides protection and helps reduce water loss.
  - C takes in water and nutrients for use throughout the plant.
  - D transports water and nutrients throughout the plant.
- 7 Which is the most accurate description of a leaf or your stomach?
- A a cell
  - B an organ
  - C an organ system
  - D a tissue

Use the diagram below to answer question 5.





Use the figure below to answer question 8.



- 8 Which does this figure illustrate?
- A an organ
  - B an organism
  - C an organ system
  - D a tissue
- 9 If a cell has 30 chromosomes at the start of mitosis, how many chromosomes will be in each new daughter cell?
- A 10
  - B 15
  - C 30
  - D 60
- 10 What areas of plants have unspecialized cells?
- A flowers
  - B fruits
  - C leaves
  - D meristems

### Constructed Response

Use the figure below to answer questions 11 and 12.

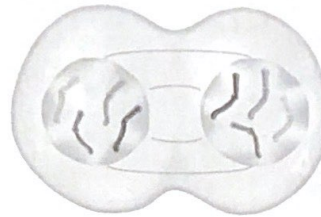


Figure A

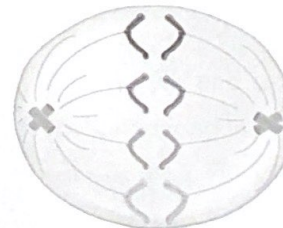


Figure B

- 11 The figures illustrate two phases of mitosis. Which occurs first: A or B? Explain your reasoning.
- 12 What stage of the mitotic phase follows those illustrated above? Explain how this stage differs between plant and animal cells.
- 13 What are some similarities and differences between the  $G_1$  and S stages of interphase?
- 14 Are all human cells capable of mitosis and cell division? How does this affect the body's ability to repair itself? Support your answer with specific examples.

#### NEED EXTRA HELP?

If You Missed Question...

Go to Lesson...

1	2	3	4	5	6	7	8	9	10	11	12	13	14
2	1	1	1	1	2	2	2	1	2	1	1	1	1