Name _____ Date _____ Class _____

Study Guide

CHAPTER 9

Section 1: Cellular Growth

In your textbook, read about cell size limitations.

List two alternative futures for cells when they reach their size limitations.

1. _____

2. _____

In your textbook, read about the cell cycle.

Draw the cell cycle in the space below. Include the following labels: cytokinesis, G_1, G_2, interphase, mitosis, S.

3.

Match the definition in Column A with the term in Column B.

	Column A	Column B
_____	**4.** stage in which the cell divides into two daughter cells with identical nuclei	**A.** S phase
_____	**5.** substage of interphase immediately after a cell divides	**B.** cytokinesis
_____	**6.** substage of interphase in which the cell copies its DNA in preparation for cell division	**C.** G_1
_____	**7.** stage in which the cell's nuclear material divides and separates	**D.** G_2
_____	**8.** main stage in which the cell grows, carries out normal functions, and duplicates its DNA	**E.** interphase
_____	**9.** substage in which the cell prepares for nuclear division and a protein that makes microtubles for cell division is synthesized	**F.** mitosis

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Study Guide

CHAPTER 9

Section 2: Mitosis and Cytokinesis

In your textbook, read about the stages of mitosis.

For each statement below, write true *or* false.

_____ **1.** The nuclear membrane disintegrates during prophase.

_____ **2.** Microtubules move chromatids to the poles of the cell during anaphase.

_____ **3.** Chromosomes reach the poles of the cell during metaphase.

_____ **4.** The cell's chromatin condenses into chromosomes during prophase.

_____ **5.** The nuclear envelope re-forms during anaphase.

_____ **6.** Chromosomes attach to spindle fibers and line up along the equator of the cell during metaphase.

_____ **7.** The nucleus reappears during prophase.

_____ **8.** Centrioles migrate to the poles of the cell during telophase.

_____ **9.** Chromatids are pulled apart during anaphase.

_____ **10.** The first stage of mitosis is telophase.

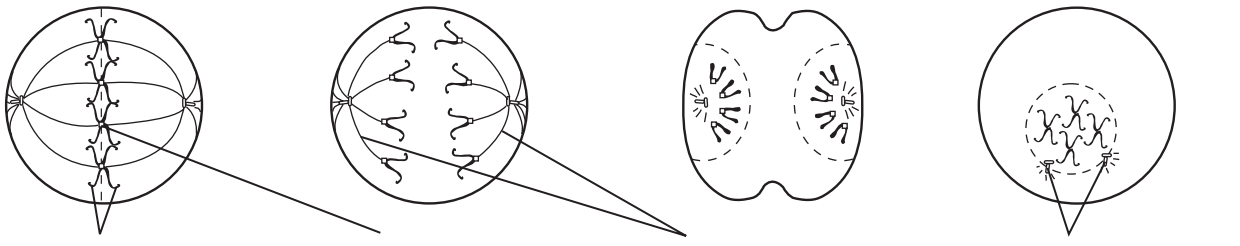
_____ **11.** The chromosomes decondense or unwind during telophase.

_____ **12.** The shortest stage of mitosis is metaphase.

Label the diagram of the stages of mitosis using lines 13–16. Use these choices:

anaphase **metaphase** **prophase** **telophase**

13. _____ **14.** _____ **15.** _____ **16.** _____

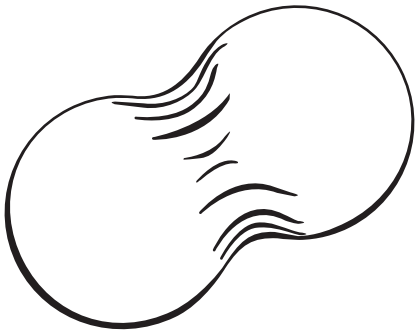


17. _____ **18.** _____ **19.** _____ **20.** _____

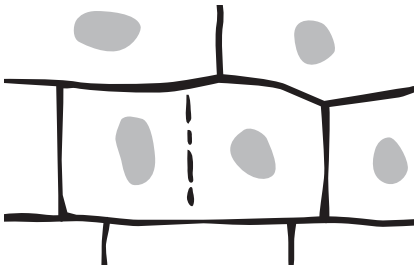
Label the diagrams above using lines 17–20. Use these choices:

centrioles **centromere** **sister chromatids** **spindle fibers**

In your textbook, read about cytokinesis.



Animal cell



Plant cells

Refer to the diagrams above. Respond to each statement.

21. Discuss the role of microfilaments in cytokinesis.

22. Summarize cell division in prokaryotes.

Draw the formation of two genetically identical cells in plants in the space below. Include the following labels: cell plate, identical daughter cells, new cell wall.

23.

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Section
Quick Check

CHAPTER 9

Section 1: Cellular Growth

After reading the section in your textbook, respond to each statement.

1. **Define** *mitosis.*

2. **Summarize** the stages of interphase.

3. **Clarify** the difference between chromatin and chromosomes.

4. **Distinguish** between mitosis and cytokinesis.

5. The unicellular spores of the fern *Ceratopteris richardii* are about 100 μm in diameter. **Calculate** the surface-area-to-volume ratio of a cube whose sides are 100 μm in length to approximate the surface-area-to-volume ratio of the fern spore cell. Show your work.

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Section **Quick Check**

CHAPTER 9

Section 2: Mitosis and Cytokinesis

After reading the section in your textbook, respond to each statement.

1. **Recount** the major events that happen during prophase.

2. **Describe** the structure of chromosomes during prophase.

3. **Summarize** how cytokinesis occurs in plant cells.

4. **Contrast** the spindle apparatus of an animal cell with that of a plant cell.

5. **Devise** a way to remember each stage of mitosis. **Propose** one word or a short phrase that describes each stage and also starts with the same letter as the name of that stage, for example, telophase–two nuclei.

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Concept Mapping

CHAPTER 10

Meiosis I and Meiosis II

Complete the events chains about meiosis I and meiosis II. These terms may be used more than once: chromosomes, condense, cytokinesis, equator, line up, nuclei, pair up, separate, sister chromatids, spindle apparatus.

Meiosis I

Prophase I

1. Homologous chromosomes _____ and _____ during synapsis; spindle fibers form.

Metaphase I

2. Pairs of homologous chromosomes _____ at the cell's _____ .

Anaphase I

3. Homologous chromosomes _____ and move toward opposite ends of the cell.

Telophase I

4. Homologous _____ reach the cell's poles and _____ usually occurs.

Meiosis II

Prophase II

5. _____ form; chromosomes condense.

Metaphase II

6. _____ line up at the cell's equator.

Anaphase II

7. _____ are pulled apart by the spindle fibers and move toward opposite ends of the cell.

Telophase II

8. Chromosomes reach the cell's poles, the nuclear membrane and _____ re-form, and _____ occurs; four cells form.

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Study Guide

CHAPTER 10

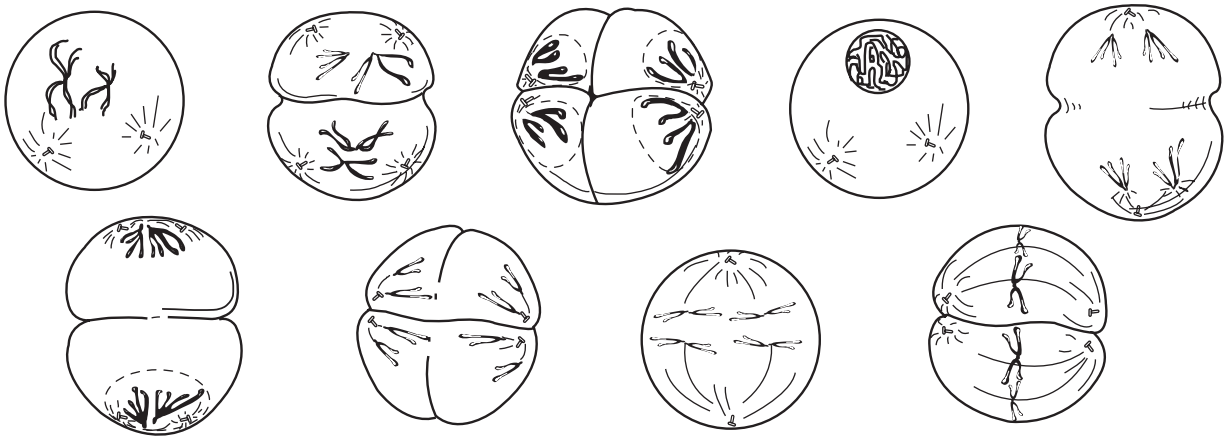
Section 1: Meiosis

In your textbook, read about meiosis I and meiosis II.

Label the diagrams below. Use these choices:

anaphase I **anaphase II** **interphase** **metaphase I** **metaphase II**
prophase I **prophase II** **telophase I** **telophase II**

1. _____ **2.** _____ **3.** _____ **4.** _____ **5.** _____



6. _____ **7.** _____ **8.** _____ **9.** _____

Complete the table by checking the correct column(s) for each description.

Description	Mitosis	Meiosis
10. Involved in the production of gametes		
11. Involved in growth and repair		
12. Promotes genetic variation in organisms		
13. Consists of one nuclear division		
14. Produces daughter cells that are genetically identical		
15. Involves two sets of nuclear divisions		
16. Produces daughter cells that are not identical		
17. Involves the synapsis of homologous chromosomes		
18. Occurs during asexual reproduction		
19. Results in four haploid gametes		
20. Also called *reduction division*		

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Section **Quick Check**

CHAPTER 10

Section 1: Meiosis

After reading the section in your textbook, respond to each statement.

1. **Define** *gene.*

2. **List** the stages of meiosis I.

3. **Compute** the number of chromosomes that the gametes of a cat ($2n = 38$ chromosomes) will have. Show your work.

4. **Compare** and **contrast** anaphase I and anaphase II.

5. **Devise** a theory that explains why the most complex animals only reproduce sexually.