

Name

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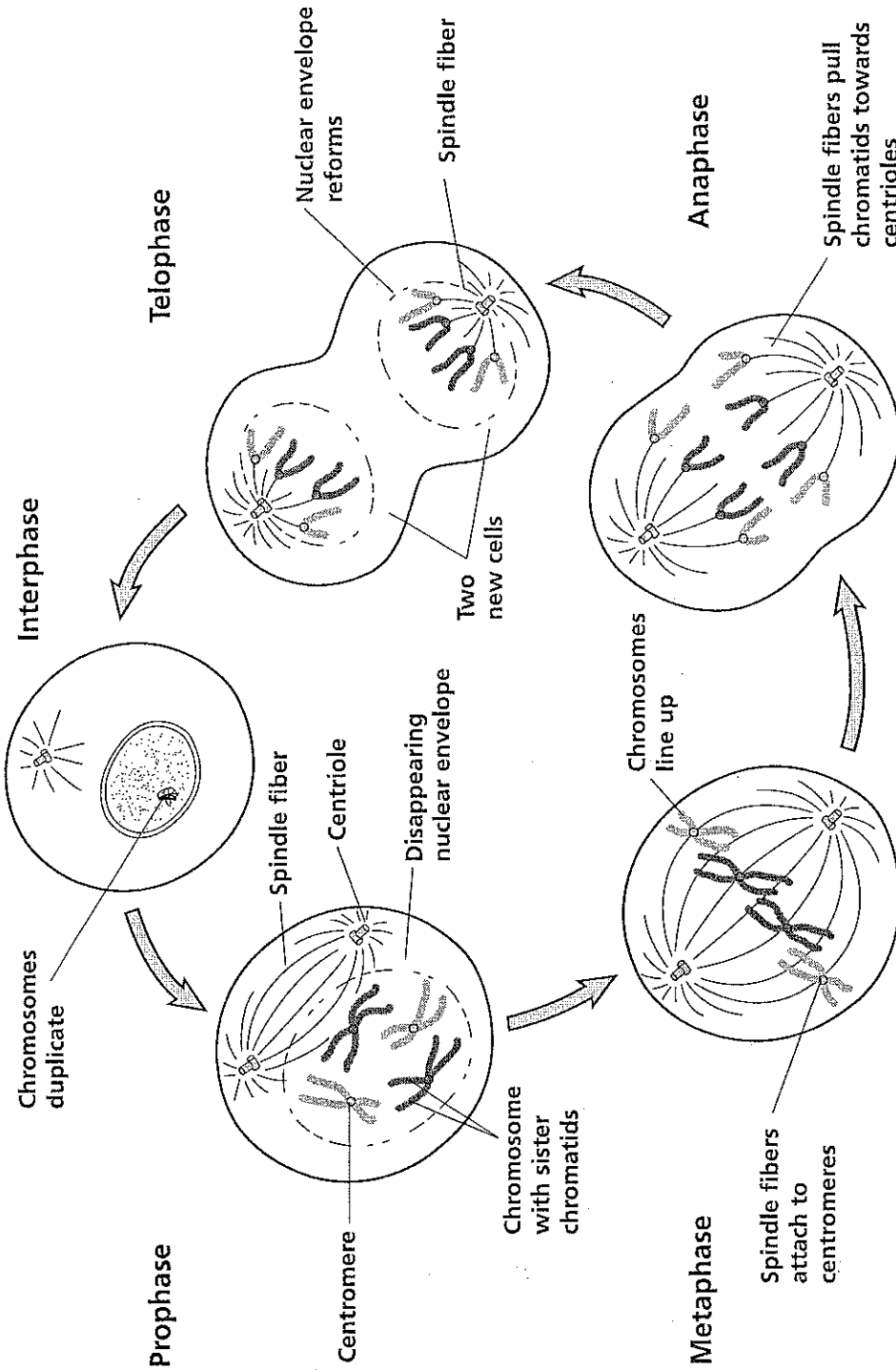
Class

Master  
13

Cell Cycle

Reaching Skills

Use with Chapter 8, Section 8.2



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## Worksheet

## 13

## Cell Cycle

## Reteaching Skills

Use with Chapter 8, Section 8.2

1. Explain how diffusion limits the size of a cell.

The larger the cell the harder it is for materials to diffuse in and out of a cell.

2. Explain how DNA limits the size of a cell.

Larger cells need more DNA

3. Explain how surface area-to-volume ratio limits cell size.

Surface area to volume dec. as a cell gets larger

Fill in the following table with descriptions of the activities in a cell during different phases of the cell cycle. Use the transparency as a starting place, then supply more details.

Time Period	Activity
4. Interphase	G1 - Growth, Protein Synthesis S - DNA Replication / Chromosome Replication G2 - Growth
5. Prophase	Nuclear envelope disappears Chromosomes Condense / Visible Sister Chromatids (photocopies)
6. Metaphase "Middle"	Centrioles + spindle fibers appear Sister chromatids line up in the middle
7. Anaphase "Apart"	Sister chromatids pull apart by spindle fibers attached at centromere
8. Telophase	nuclear envelope begins to reappear cytoplasm pinches or new cell plate forms (animal cells) (plant cells)

**Chapter**  
**8**
**Cellular Transport**  
**and the Cell Cycle, continued**
**Reinforcement and Study Guide**
**Section 8.2 Cell Growth and Reproduction**

In your textbook, read about the cell cycle and interphase.

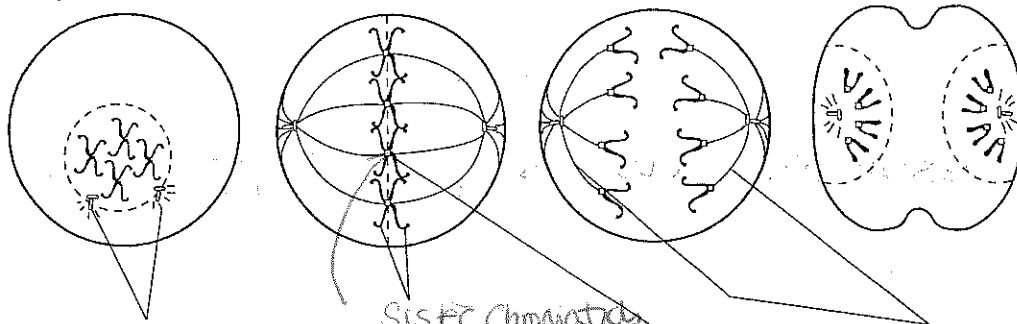
Complete the table by checking the correct column for each statement.

Statement	Interphase	Mitosis
14. Cell growth occurs.	✓	
15. Nuclear division occurs.		✓
16. Chromosomes are distributed equally to daughter cells.		✓
17. Protein production is high.	✓	
18. Chromosomes are duplicated.	✓	
19. DNA synthesis occurs.	✓	
20. Cytoplasm divides immediately after this period.		✓
21. Mitochondria and other organelles are manufactured.		✓

In your textbook, read about the phases of mitosis.

Identify the following phases of mitosis. Use these choices: telophase, metaphase, anaphase, prophase. Then label the diagrams. Use these choices: sister chromatids, centromere, spindle fibers, centrioles.

22. prophase    23. metaphase    24. anaphase    25. telophase



26. centriole    27. ~~centriole~~    28. centromere    29. spindle fibers

Answer the question.

30. How does mitosis result in tissues and organs?

Mitosis produces new cells that are  
needed for tissues & organs.

# Chapter 8

## Cellular Transport and the Cell Cycle

### Critical Thinking

Use with Chapter 8, Section 8.3

### Linking a Tumor Suppressor Gene to the Cell Cycle

Individuals with close relatives who have certain types of cancers are often considered at higher risk for these cancers than other members of the population. However, people with no family history can also suffer from cancer. Researchers have begun to identify certain genetic defects that may predispose a person to develop cancer. One of these defects

involves a human gene known as p53. The p53 gene is called a *tumor suppressor* because, when it operates normally, it appears to prevent the uncontrolled growth of cells. To learn more about how biologists are investigating the operation of this gene and its possible link to cancer, answer the following questions.

1. In 1990, researchers discovered that defects in gene p53 were common to a few families with a tendency to develop a rare, inherited form of breast cancer and some cancers of the bone and soft tissues. The study did not attempt to determine whether or not the gene defects cause cancer. Some news stories about the research were headlined "Breast Cancer Gene Found." Why were these headlines misleading?

Yes, because even though individuals with cancer were largely found to also have a defect in gene p53, there are no studies here that link the gene to causing breast cancer.

2. As cells undergo mitosis, mistakes in DNA replication and changes in DNA, called mutations, may take place. Cells are sometimes capable of recognizing and reversing these changes. Early in 1993, researchers discovered that p53 may be involved in preventing a cell from dividing after mutations or mistakes in DNA replication have occurred. What might be the adaptive value of a gene with this function?

Individuals with p53 might have a survival advantage because the gene might help an individual's mutated cell from continuing to replicate. This could stop recurring mutations.

3. Later in 1993, three different research teams simultaneously discovered that p53 controls a second gene that codes for a protein causing cells to remain in interphase. How does this finding tie in to the previous studies?

This explains how the gene suppresses (stops) cell replication.

4. One of the three research teams was trying to find out why old cells stop dividing. First, the team developed cultures of actively dividing young cells in the laboratory. Then they inserted short fragments of DNA from older, nondividing cells into the young cells and monitored any changes in the young cells' rate of cell division. What was the researchers' hypothesis?

If DNA from nondividing cells is inserted into healthy cells then the cells will stop dividing.

5. The research team found that three different old-cell DNA fragments caused division of young cells to slow or stop. Only one of these fragments contained the gene controlled by p53. What does this finding imply?

The findings imply that there could be more than one gene responsible for suppressing cell division.