The Cell Cycle and Cell Division

**Directions:** On each line, write the term from the word bank that correctly replaces the underlined words in each sentence. **NOTE:** You may need to change a term to its plural form.

<table>
<thead>
<tr>
<th>term</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>cell cycle</td>
<td></td>
</tr>
<tr>
<td>eukaryotic</td>
<td></td>
</tr>
<tr>
<td>interphase</td>
<td></td>
</tr>
<tr>
<td>cytokinesis</td>
<td></td>
</tr>
<tr>
<td>mitosis</td>
<td>1. At the end of the cell cycle, the division of the cell’s nucleus occurs.</td>
</tr>
<tr>
<td>centromere</td>
<td>2. Until the sister chromatids in each duplicated chromosome separate during mitosis, they are held together by a special structure.</td>
</tr>
<tr>
<td>sister chromatids</td>
<td>3. A chromosome is made up of two identical coiled strands of DNA.</td>
</tr>
<tr>
<td>cytokinesis</td>
<td>4. Following mitosis, the division of the cell’s cytoplasm occurs.</td>
</tr>
<tr>
<td>cell cycle</td>
<td>5. Most cells go through a cyclical process of growth, development, and division.</td>
</tr>
<tr>
<td>interphase</td>
<td>6. The cell cycle can be divided into two main phases—a period of growth and development and the mitotic phase.</td>
</tr>
<tr>
<td>daughter cells</td>
<td>7. Mitosis and cytokinesis result in the formation of two identical new cells.</td>
</tr>
<tr>
<td>eukaryotic</td>
<td>8. For some cells, identified as those with membrane-bound structures, the cell cycle might take as long as one year.</td>
</tr>
</tbody>
</table>

From a Cell to an Organism
Lesson Outline

LESSON 1

The Cell Cycle and Cell Division

A. The Cell Cycle
   1. Most cells in an organism go through a cycle of growth, development, and division
called the _______ cell cycle _______.
   2. Because of the cell cycle, organisms grow and _______ develop ________, replace
   old or damaged cells, and produce new cells.

B. Phases of the Cell Cycle
   1. There are two main phases of the cell cycle—interphase and
   the _______ mitotic _______ phase.
   2. _______ Interphase _______ is the period of growth and development for a cell.
   3. During interphase, most cells go through three stages—rapid growth
   and _______ replication _______ of the organelles; replication
   of _______ DNA _______ , the genetic information in a cell; and preparation
   for _______ cell division _______.
   4. During the mitotic phase, a cell _______ reproduces _______.

C. Length of a Cell Cycle
   1. _______ Interphase _______ makes up most of the cell cycle.
   2. During interphase, the DNA in the cell is called _______ chromatin _______.

D. Phases of Interphase
   1. Interphase begins with a period of rapid growth—the _______ G1 _______ stage.
   2. During the _______ S _______ stage of interphase, the cell replicates its
   strands of chromatin.
   3. _______ Sister chromatids _______ are the two identical strands of DNA that make up the
   duplicated chromosome.
   4. The sister chromatids are held together by a structure called
   the _______ centromere _______.
   5. The final stage of interphase—the _______ G2 _______ stage—is a period of
   growth and final preparation for mitosis.
Lesson Outline continued

E. Organelle Replication
   1. Before a cell divides, it makes copies of all its __________.
   2. In __________, the nucleus and its contents divide.
   3. In __________, the cytoplasm and its contents divide.
   4. Two new __________ result from mitosis and cytokinesis.

F. Phases of Mitosis
   1. During __________, duplicated DNA condenses into chromosomes.
   2. During __________, the chromosomes line up in the middle of the cell.
   3. During __________, sister chromatids in each duplicated chromosome separate and are pulled in opposite directions by the spindle fibers.
   4. During __________, chromosomes begin to uncoil, and two new identical nuclei form.

G. Dividing the Cell’s Components
   1. After mitosis, __________ usually divides a cell’s cytoplasm, forming a new cell membrane around each daughter cell.
   2. In animal cells, a(n) __________ in the middle of the cells gets deeper until the cell __________ comes together to divide the cell.
   3. In plant cells, a(n) __________ grows outward toward a new cell wall until two new cells form.

H. Results of Cell Division
   1. The cell cycle results in two new __________ that are genetically identical to each other and to the original cell, which no longer exists.
   2. The cell cycle is important for reproduction in some organisms, growth in __________ organisms, replacement of worn-out or damaged cells, and repair of damaged tissues.

From a Cell to an Organism
The Cell Cycle and Cell Division

Directions: On each line, write the term from the word bank that correctly completes each sentence. Each term is used only once.

- cell cycle
- centromere
- cytokinesis
- daughter cells
- interphase
- mitosis
- sister chromatids

1. The __cell cycle_______ is the regular pattern of growth, development, and division in cells.

2. Identical strands of a chromosome are called __sister chromatids__.

3. Two identical nuclei are formed during __mitosis__.

4. Cytoplasm divides to form two cells during __cytokinesis__.

5. The two cells produced during the cell cycle are called __daughter cells__.

6. After chromatin is duplicated, sister chromatids are connected by a(n) __centromere__.

7. The two main phases in the cell cycle are __interphase__ and the mitotic phase.

Directions: Complete each sentence by circling the correct word(s) in parentheses.

8. The most important result of the cell cycle is two (identical/very different) cells.

9. The cell cycle is important for reproduction in (multicellular/unicellular) organisms.

10. The cell cycle is important for growth and repair in (multicellular/unicellular) organisms.

11. After cell division, the parent cell (divides again/no longer exists).
Content Practice B

LESSON 1

The Cell Cycle and Cell Division

Directions: Answer each question on the lines provided.

1. What are the two main phases of the cell cycle?
   Interphase and mitosis

2. During which phase of the cell cycle is chromatin duplicated?
   Prophase

3. During which main phase of the cell cycle do mitosis and cytokinesis occur?
   Mitotic phase

4. What is the difference between mitosis and cytokinesis?
   Mitosis - division of nucleus
   Cytokinesis - division of the cytoplasm

5. What makes up a chromosome?
   DNA

6. What is produced at the end of the cell cycle? How do they compare to each other and to the parent cell? What happens to the parent cell?
   Daughter cells are produced at the end of the cell cycle
   The daughter cells are identical
   The parent cell no longer exists

7. How is the cell cycle important to some unicellular organisms?
   It is a method of reproduction

8. How is the cell cycle important to multicellular organisms?
   It is the method of growth and repair
**Key Concept Builder**

**LESSON 1**

**The Cell and Cell Division**

**Key Concept** What are the phases of the cell cycle?

**Directions:** Mitosis is one stage in the mitotic phase of the cell cycle. Mitosis is divided into four parts. Work with a partner to read each sentence and decide which part of mitosis it describes. On each line, write the term from the word bank that correctly matches each sentence. Terms will be used more than once.

<table>
<thead>
<tr>
<th>anaphase</th>
<th>metaphase</th>
<th>prophase</th>
<th>telophase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Duplicated chromosomes align along the middle of the cell.</td>
<td>metaphase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The cell begins to get longer.</td>
<td>anaphase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Duplicated chromatin coils together tightly.</td>
<td>prophase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Sister chromatids in each duplicated chromosome separate and are pulled in opposite directions by the spindle fibers.</td>
<td>anaphase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The nucleolus disappears, the nuclear membrane breaks down, and spindle fibers form in the cytoplasm.</td>
<td>prophase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. A nuclear membrane grows around each set of chromosomes.</td>
<td></td>
<td></td>
<td>telophase</td>
</tr>
<tr>
<td>7. Spindle fibers that helped divide the chromosome begin to disappear, and chromosomes begin to uncoil.</td>
<td>telophase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Spindle fibers pull and push the duplicated mitotic chromosomes to the middle of the cell.</td>
<td>metaphase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Two new identical nuclei are formed.</td>
<td>telophase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Two identical sets of chromosomes are at opposite ends of the cell.</td>
<td>telophase</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Directions:** Answer each question on the lines provided.

11. What are the two cell division stages in the mitotic phase of the cell cycle?  
   **Mitosis**  **Cytokinesis**

12. What happens during cytokinesis?  
   **During cytokinesis the cytoplasm and its contents divide forming two identical daughter cells.**

From a Cell to an Organism  

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