Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class Period: \_\_\_\_\_\_\_\_\_

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Chapter 10: Cell Growth and Division

***Section 1: Cell Reproduction***

Why Cells Reproduce: pg 223

1. How many cells are produced by humans in one day? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. The process of making exact copies of cells to replace old ones is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. A body grows by producing more \_\_\_\_\_\_\_\_\_\_\_ rather than the existing cells getting larger.

4. There are two main reasons why large cells are inefficient. The first is that as a cell gets larger, substances must travel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to reach where they are needed. The second is the demands placed on the cell’s DNA. DNA instructions cannot be copied quickly enough (DNA→mRNA) to make the \_\_\_\_\_\_\_\_\_\_\_\_\_ the cell needs to support itself.

5. During cell division, each new cell called a “\_\_\_\_\_\_\_\_\_\_\_\_\_\_” cell is smaller than the original cell and gets an entire copy of the cell’s \_\_\_\_\_\_\_\_\_\_\_.

Chromosomes: pg 224-225

1. A cell’s activity is directed by its \_\_\_\_\_\_\_\_\_.

2. A gene is a segment of \_\_\_\_\_\_\_\_ that codes for \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. Packages of DNA are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. A Prokaryotic cell has a single \_\_\_\_\_\_\_\_\_\_\_\_ molecule of DNA.

5. A human cell contains \_\_\_\_\_\_ separate, linear DNA molecules that are packaged into 46 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. DNA wound around proteins is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



7. During most of a cell’s life its chromosomes are uncoiled, but as the cell prepares to divide, the chromosomes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ even further. This ensures that the DNA molecules don’t get \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_ during cell division.

8. In the figure below, label the parts of the chromosome. Chromosome, chromatid, centromere, sister chromatids, genes.



Preparing for Cell Division: pg 226

1. All new cells are produced by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. All newly formed cells require \_\_\_\_\_\_\_\_, so before a cell divides, a copy of DNA is made for each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. What is the name of the process in which identical copies of DNA are made? (not in book) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. In prokaryotic cell division the DNA is copied then the cell membrane pinches in half creating two genetically \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells.



5. In eukaryotic cell division each daughter cell must contain enough of each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to carry out its functions. The \_\_\_\_\_\_\_\_\_\_ within the nucleus must also be copied, sorted, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

***Section 2: Mitosis***

Eukaryotic Cell Cycle: pg 228-229

1. The cell cycle is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sequence of cellular \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ during the life of a cell.

2. The life of a eukaryotic cell goes through phases of \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the nucleus and cytoplasm.

*Interphase*

3. For each phase of Interphase, describe what is taking place.

 G1 (first gap phase): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 S (synthesis phase): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 G2 (second gap phase): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Cell Division*

4. The process of dividing the nucleus into two daughter nuclei is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. The process of separating the organelles and the cytoplasm is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Stages of Mitosis: pg 230-231

1. Mitosis is a continuous process that can be observed in four stages: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Before we begin with the phases of Mitosis, define the terms below.

 Spindle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Centrioles: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. For each phase of Mitosis, describe what is taking place.

 Prophase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Metaphase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Anaphase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Telophase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Cytokinesis

1. During cytokinesis, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ grows into the center of the cell and \_\_\_\_\_\_\_\_\_\_\_ into two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells of equal size. Each daughter cell has about half of the parent’s \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_. The end result is \_\_\_\_\_\_\_\_\_\_\_ genetically \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells in place of the original cell.

2. \_\_\_\_\_\_\_\_\_\_\_\_ cells perform cytokinesis by pinching from the outside in.

3. \_\_\_\_\_\_\_\_\_\_\_\_ cells perform cytokinesis by forming a cell plate and dividing from the inside out.

4. After cytokinesis, each daughter cell enters the \_\_\_\_\_\_ stage of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

***Section 3: Regulation***

Controls

1. Cell growth and division depend on \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ signals.

Checkpoints

1. Feedback \_\_\_\_\_\_\_\_\_\_\_ at key checkpoints in the cell cycle can \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_ the next phase of the cell cycle.

Cancer

1. Cancer is a group of severe and sometimes fatal diseases that are caused by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Damage to cell’s \_\_\_\_\_\_\_ can cause the cell to respond improperly or to \_\_\_\_\_\_\_ responding. The defective cell \_\_\_\_\_\_\_ and produces more \_\_\_\_\_\_\_\_\_ cells that eventually can form masses called \_\_\_\_\_\_\_\_\_.

3. What is one way that cancer can be prevented? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_