

Biology –
Mitosis/ Meiosis Study Guide

NAME _____ BLOCK _____

Use this study guide to prepare for your test on _____

- (1) As a cell becomes larger, its volume increases faster than its surface area.
- (2) As a cell grows, it places more demands on DNA, uses up food/oxygen, has trouble moving materials across the cell membrane.
- (3) The speed at which wastes are produced by a cell depends on the cell's volume.
- (4) Compared to small cells, large cells have more trouble moving materials in and wastes out.
- (5) The process by which a cell divides into two daughter cells is called cell division.
- (6) If a cell's DNA were not copied before cell division, the cell would have a DNA overload.
- (7) When a cell divides, each daughter cell receives its own copy of the parent cell's DNA.
- (8) Chromosomes are only visible during cell division.
- (9) The phases of the cell cycle include G1, S, G2, and M phase
- (10) The DNA is replicated during the S phase of the cell cycle.
- (11) During interphase, the cell grows.
- (12) The series of events that cells go through as they grow and divide is called the cell cycle.
- (13) Be able to identify the parts of the following drawing of a duplicated chromosome.



- (14) During prophase and metaphase you could see the structures drawn above.
- (15) The four phases of mitosis IN ORDER are : Prophase, Metaphase, Anaphase, Telophase
- (16) The job of the spindle during mitosis is to help separate the chromosomes.

- (17) The two main stages of cell division are called mitosis and cytokinesis
- (18) One difference between cell division in plant cells and animals cells is that plant cells have a cell plate.
- (19) During normal mitotic cell division, a parent cell having four chromosomes will produce two daughter cells each containing four chromosomes
- (20) A factor that stops normal cells from growing is contact with other cells.
- (21) When cytoplasm from a cell that is undergoing mitosis is injected into a cell in interphase, the second cell enters mitosis.
- (22) The timing of the cell cycle in eukaryotic cells is regulated by cyclins.
- (23) Cyclins are a family of closely related proteins that regulate the cell cycle.
- (24) Cyclins, growth factors and a protein called p53 all help to regulate the cell cycle.
- (25) Cancer is a disorder in which some cells have lost the ability to control their growth rate.
- (26) Cancer cells form masses of cells called tumors.
- (27) Cancer can affect any multicellular organism.
- (28) The number of chromosomes in a GAMETE is represented by symbol N
- (29) If an organism's diploid number is 46, its haploid number is 23 or 1/2 that number.
- (30) Gametes (egg/sperm) have one allele for each gene.
- (31) Gametes are produced by the process of meiosis.
- (32) Crossing over happens when the legs of homologous chromosomes exchange segments during meiosis.
- (33) Chromosomes form tetrads during prophase of meiosis I.
- (34) Replication does not occur between meiosis I and meiosis II to reduce the number of chromosomes.
- (35) Unlike mitosis, meiosis, results in the formation of haploid cells

4 Macromolecules + Subunits

Carbohydrates Sugars

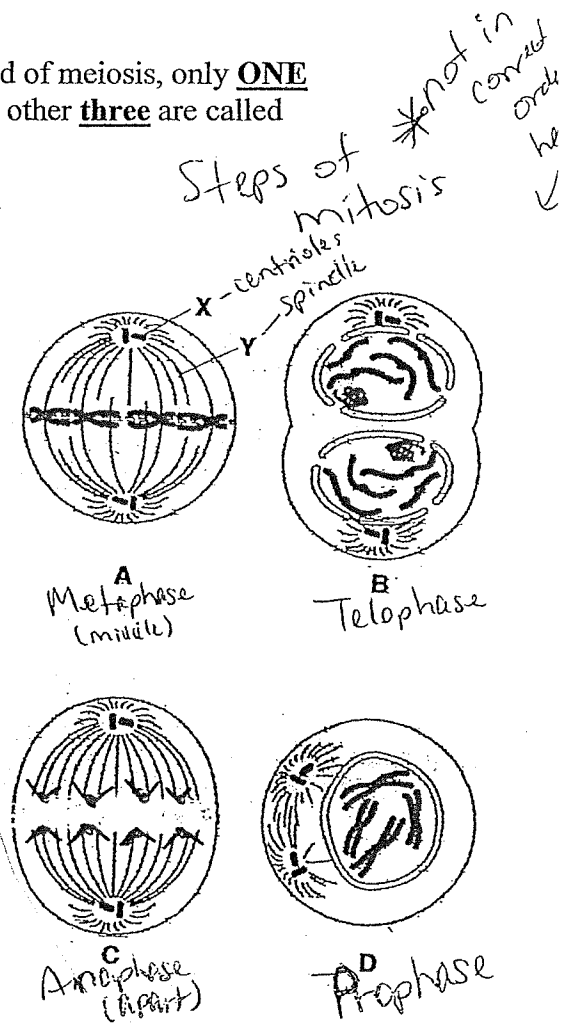
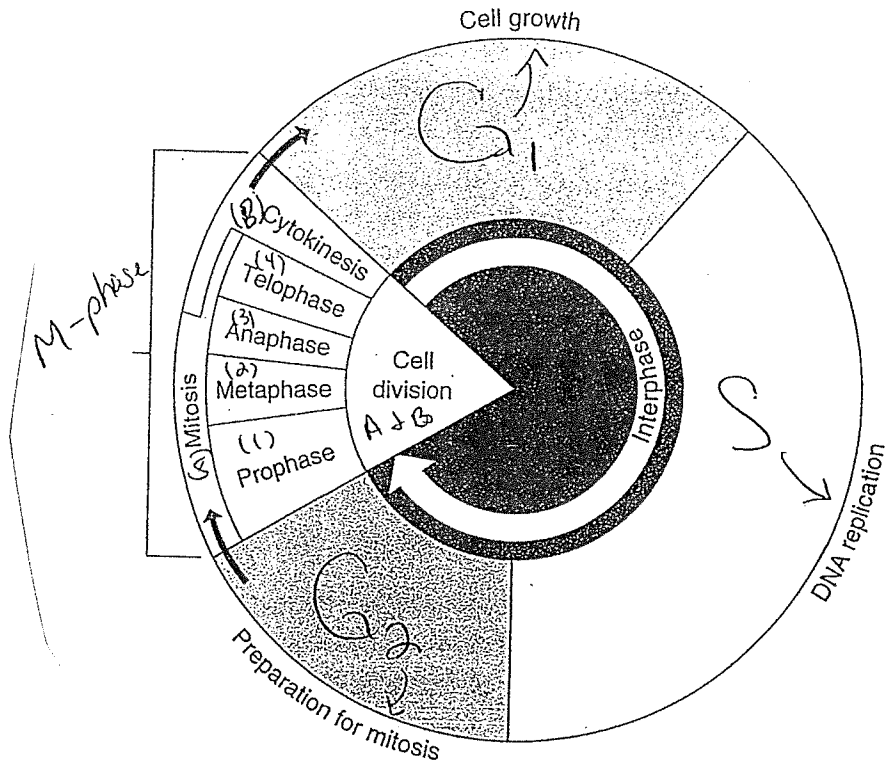
Proteins amino acids

Lipids fatty acid + glycerol

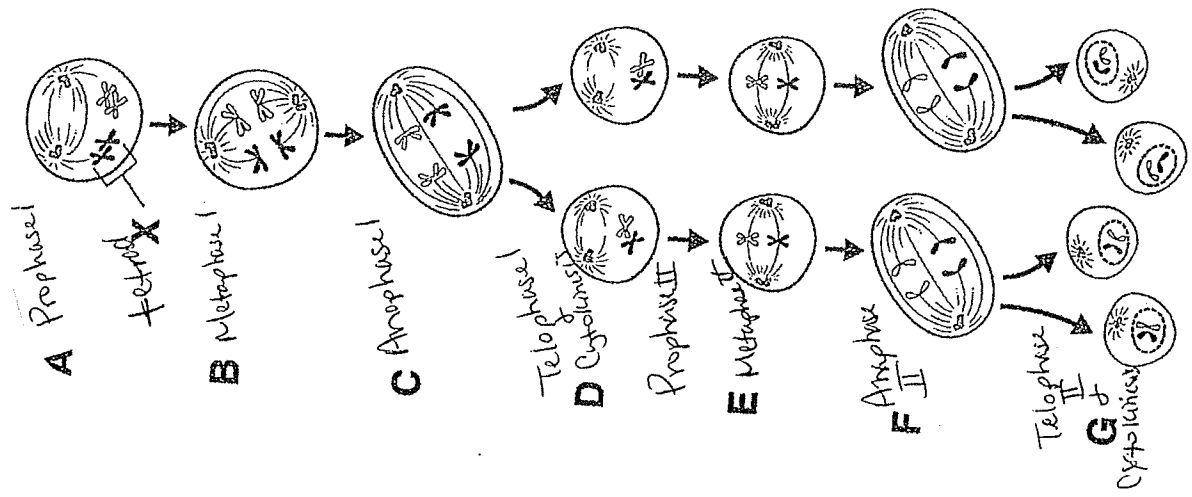
divided during mitosis

- (36) Unlike mitosis, meiosis results in the formation of **four genetically different cells.**
- (37) Crossing over rarely happens in mitosis because **tetrads rarely form during mitosis.**
- (38) The process by which a cell divides into two daughter cells is called **cell division.**
- (39) G1 phase, S phase and G2 together make up **interphase**
- (40) Another name for mitosis is the **M phase**
- (41) A **cell plate** must form between the two new daughter cells of a **plant cell** when it divides.
- (42) The process which follows mitosis and completely divides the two new cells is called **cytokinesis.**
- (43) During metaphase, each chromosome is connected to a **spindle fiber** at its centromere
- (44) In all forms of **cancer,** the cells fail to respond to the signals that regulate the cell cycle in most cells.
- (45) An organism's gametes have **half** the number of chromosomes found in the organism's body cells.
- (46) Be able to label the diagram of the entire cell cycle.
- (47) If the gametes have the same number of chromosomes as the species body cells, then **the offspring produced would have twice the number of chromosomes as the parents.**
- (48) There are **TWO** sets of chromosomes in a diploid cell.
- (49) Homologous chromosomes are **two sets of chromomes, one from the male parent and one from the female parent**
- (50) The number of chromosomes per cell is **cut in half** during meiosis.
- (51) Be able to recognize drawings of the four stages of mitosis and what is happening in each stage.
- (52) When mitosis is finished, **cytokinesis** must take place to completely divide the two daughter cells.
- (53) Cancer cells **do not grow in an organized pattern**

- (54) If left untreated, cancer cells can break from the original mass and spread to other parts/organs of the body.
- (55) Know the diagrams of meiosis and be able to identify what happens in each stage.
- (56) In males all **four** cells called **sperm** produced at the end of meiosis could be used in reproduction.
- (57) In females of the **four** cells produced at the end of meiosis, only **ONE** becomes an egg that can be used in reproduction. The other **three** are called **polar bodies** and will not be used in reproduction.



Steps of Meiosis



Chapter 10 Cell Growth and Division**Chapter Vocabulary Review**

Completion *On the lines provided, complete the following sentences.*

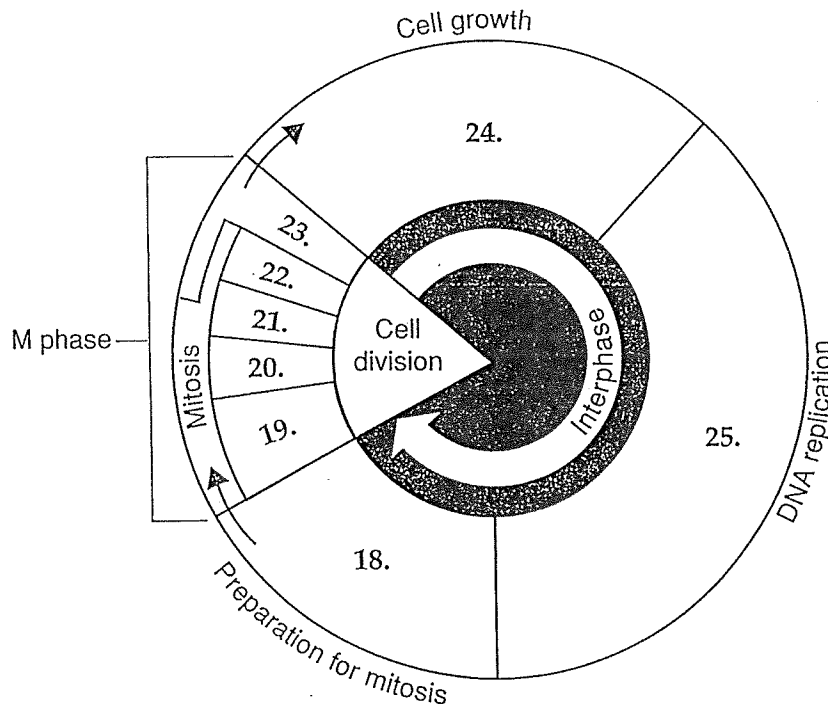
1. The M phase is also known as _____.
2. Each pair of chromatids is attached at an area called the _____.
3. The three phases of _____ are G₁, S, and G₂.
4. The _____ is the series of events that cells go through as they divide and grow.
5. The _____ is a fanlike microtubule structure that helps separate the chromosomes.
6. _____ is the division of the cell nucleus.
7. The four phases of mitosis are _____, _____, _____, and _____.
8. The division of the cytoplasm during the M phase is called _____.
9. Proteins known as _____ regulate the timing of the cell cycle in eukaryotic cells.
10. _____ is a disorder in which some of the body's own cells lose the ability to control growth.

Multiple Choice *On the line provided, write the letter that best completes the statements or answers the question.*

- _____ 11. What process ensures that each daughter cell gets one complete set of genetic information and that each daughter cell also has increased surface area?
 - a. cell division
 - b. mitosis
 - c. cytokinesis
 - d. cancer
- _____ 12. Before cell division, each chromosome consists of two identical "sister"
 - a. centromeres.
 - b. cell cycles.
 - c. chromatids.
 - d. spindles.
- _____ 13. The four phases of the cell cycle are
 - a. interphase, mitosis, G₁, and G₂.
 - b. M phase, G₁ phase, S phase, and G₂ phase.
 - c. prophase, metaphase, anaphase, and telophase.
 - d. cytokinesis, mitosis, interphase, and metaphase.
- _____ 14. What phase of mitosis takes the longest period of time?
 - a. prophase
 - b. cytokinesis
 - c. anaphase
 - d. interphase

- _____ 15. What part of the cell separates and takes up positions on opposite sides of the nucleus during prophase?
 a. centrioles c. chromatids
 b. centromeres d. spindles
- _____ 16. What phase of mitosis usually occurs at the same time as cytokinesis?
 a. anaphase c. prophase
 b. telophase d. cell division
- _____ 17. What is the name for tumors that form and can cause damage to surrounding tissue?
 a. cyclins c. cytokinesis
 b. mitosis d. cancer

Labeling Diagrams *On the lines below, label the events in the cell cycle that correspond with the numbers in the diagram.*



© Pearson Education, Inc. All rights reserved.

- | | |
|-----------|-----------|
| 18. _____ | 22. _____ |
| 19. _____ | 23. _____ |
| 20. _____ | 24. _____ |
| 21. _____ | 25. _____ |

14