

DNA and the Cell Cycle

Primary TEKS Supported

5A – [Reporting Category 1] – describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms

5D – [Reporting Category 1] – recognize that disruptions of the cell cycle lead to diseases such as cancer

6A – [Reporting Category 2] – identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA

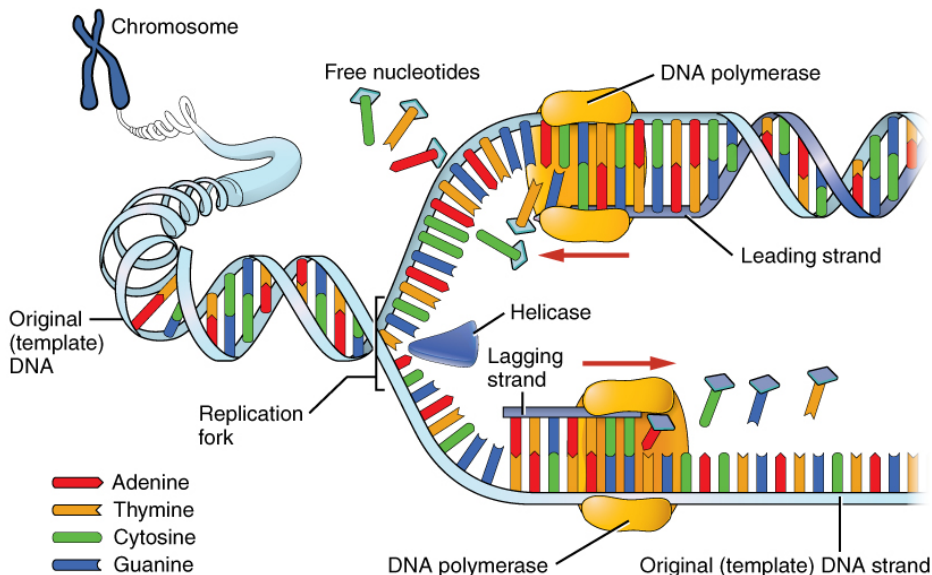
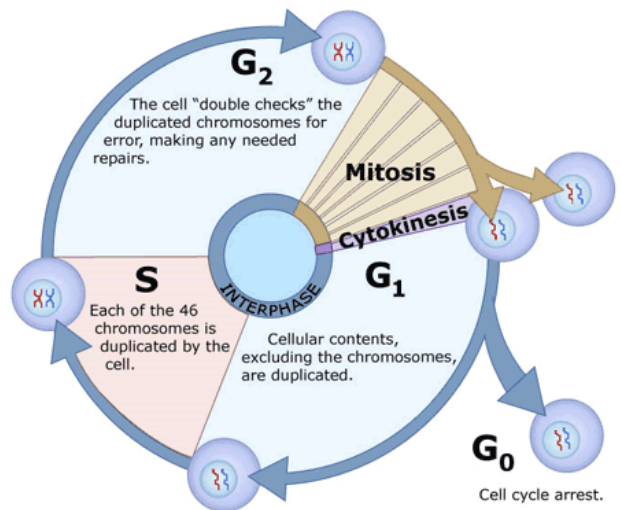
6B – [Reporting Category 2] – recognize that components that make up the genetic code are common to all organisms

TEKS Also Supported

4B investigate and explain cellular processes, including ~~homeostasis, energy conversions, transport of molecules, and~~ synthesis of new molecules [DNA]

Contents of This Packet

- I. Review and Practice
- II. Vocabulary Cards
- III. Practice Items
- IV. Saplign Instructions



The Cell Cycle: Living organisms are made up of cells. Cells grow through the “cell cycle.”

1. There are three phases of the Cell Cycle:
 - a. Interphase: The majority of a cell’s life
 - i. G₁—The cell goes through normal growth and function
 - ii. S – DNA is replicated
 - iii. G₂ – The cell prepares for Mitosis
 - b. Mitosis: The nucleus of a cell divides
 - i. Prophase: DNA condenses into chromosomes
 - ii. Metaphase: chromosomes line up in the center
 - iii. Anaphase: chromosomes are separated to opposite poles of the cell
 - iv. Telophase: nucleus finishes dividing
 - c. Cytokinesis: The cell completely divides into two daughter cells

Note:

Interphase: cell goes through normal cell life function/job

Mitosis: when the nucleus divides

Cytokinesis: When the cell divides

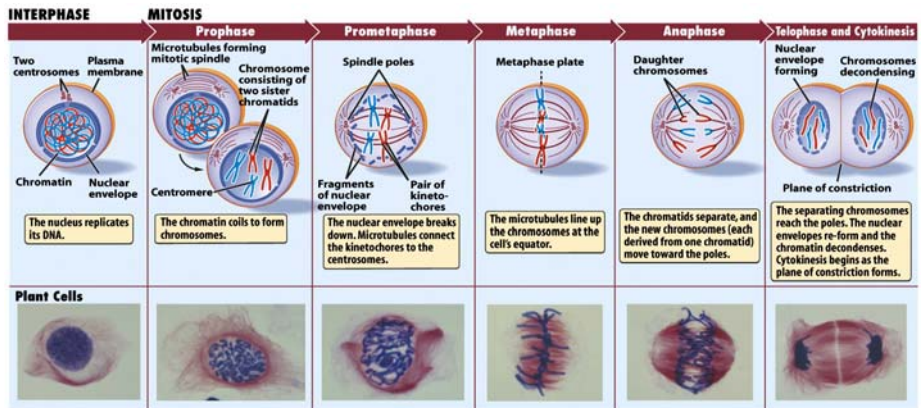
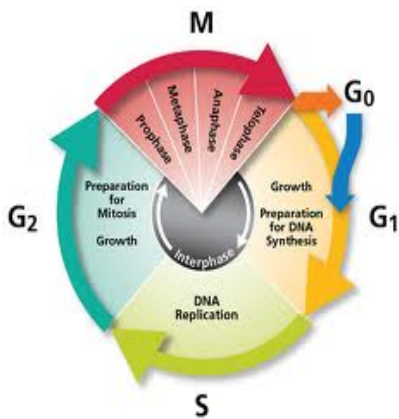


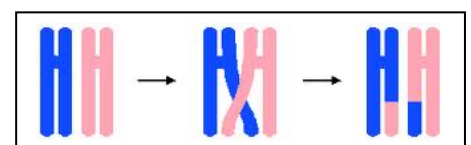
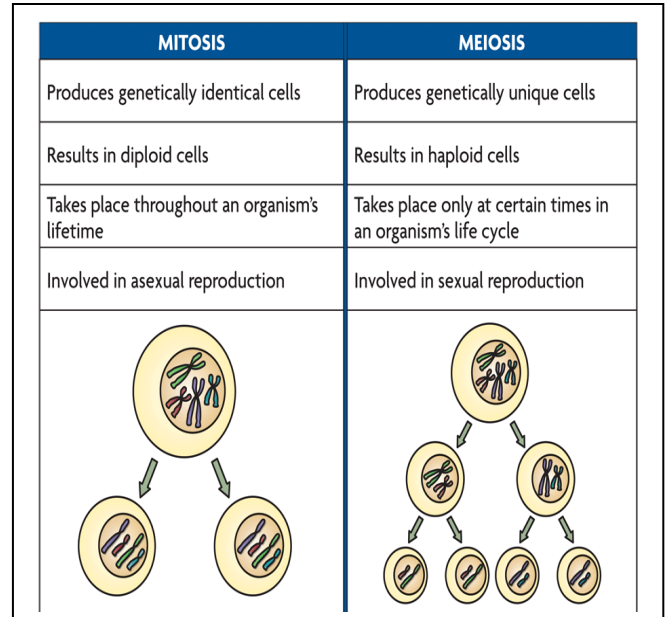
Figure 9-5 Discover Biology 3/e © 2006 W. W. Norton & Company, Inc.

2. Disruptions in the cell cycle are when the cell loses control of cell division and cannot stop dividing-- Which results in abnormal cell growth called tumors = cancer.

Mitosis vs. Meiosis: Mitosis creates body cells; Meiosis creates gametes sperm and egg

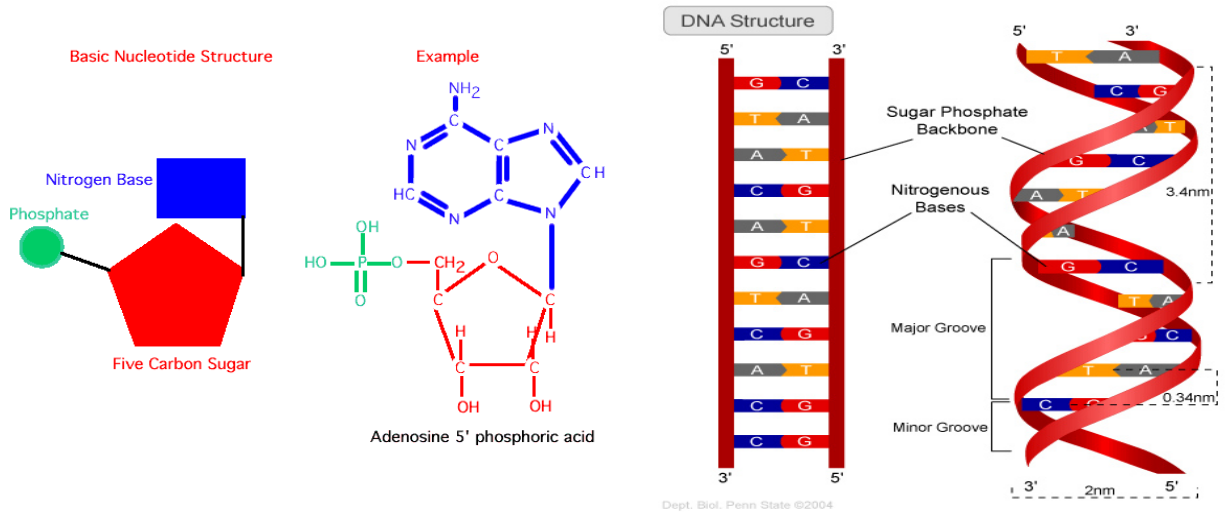
	Mitosis	Meiosis
# of divisions	1	2
# daughter cells	2 cells	4 cells
Genetic Make up	Identical	Unique
Type of cell created	Diploid (2n)	Haploid (n)
Type of reproduction	Asexual	Sexual
Examples	Skin, Hair	Sperm, Egg

1. Mitosis creates 2 identical daughter cells that are body cells, like skin cells.
2. Meiosis creates 4 genetically different daughter cells, like sperm or egg. Each cell has ½ the number of chromosomes because a sperm from dad and an egg from mom will combine to create a baby—which the full number of chromosomes.
 - a. Things that occur to ensure genetic diversity (that’s why you can have the same parents are your siblings, but still look different even though your DNA comes from the same place.
 - i. Crossing Over of Chromosomes: see Diagram →
 - ii. Segregation of Alleles: Alleles separate and move into different haploid gamete sex cell.
 - iii. Independent Assortment: Traits don’t follow each other, they move independently.



DNA Structure: DNA holds the genetic blueprint for all living organisms

1. DNA is found in the nucleus of all eukaryotic cells; it's just floating inside of prokaryotic cells.
2. DNA is a form of Nucleic Acids (which is one of your 4 biomolecules- Lipids, Carbohydrate, Protein, Nucleic Acid).
 - a. Monomers: Nucleotides
 - b. Polymers: DNA and RNA
3. DNA is found in the form of a double helix. There are two strands that run anti-parallel.
 - a. Backbone/Sides of DNA are made up of a sugar [Deoxyribose] and a phosphate
 - b. The steps/rungs of DNA are made up of paired bases
 - i. Adenine – Thymine
 - ii. Cytosine – Guanine



4. DNA is inheritable. You get your DNA, your genes, from your parents.
5. In the S Phase of the Cell Cycle, your DNA is replicated in preparation for mitosis, which is where one cell will grow and divide into two cells.

