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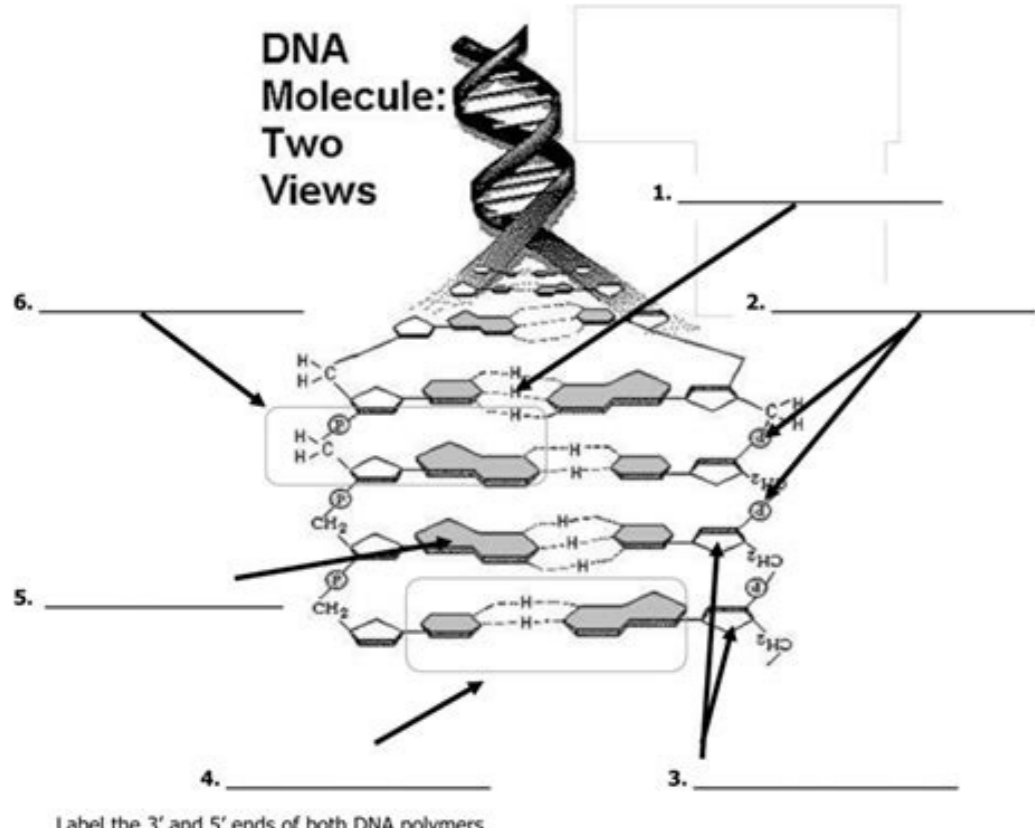
**Open**

**Chapter 10 – DNA**  
**Worksheet – Structure of DNA and Replication**  
SC.912.L.16.2 Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.

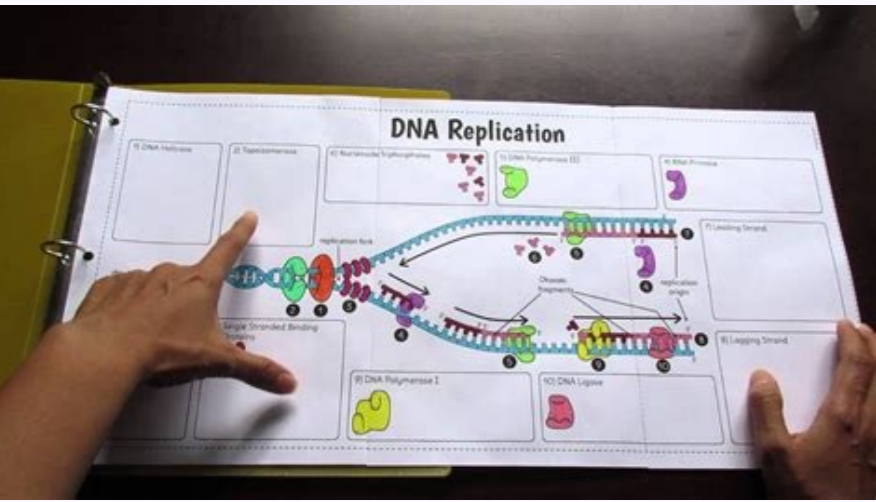
Directions: Label the diagram below with the following choices:

- Nucleotide
- Deoxyribose
- Phosphate group
- Base pair
- Hydrogen bond
- Nitrogenous base

DNA Molecule:  
Two Views



Label the 3' and 5' ends of both DNA polymers



# How DNA works

The defining moment for DNA was the discovery of its structure in 1953. Main functions of DNA, the genetic material that forms chromosomes in a cell nucleus:

## Human cell nucleus

Contains 46 chromosomes

## Chromosome

When unraveled it consists of double-stranded DNA

## DNA

Held together by four chemicals called bases:

- A:** Adenine
- T:** Thymine
- C:** Cytosine
- G:** Guanine

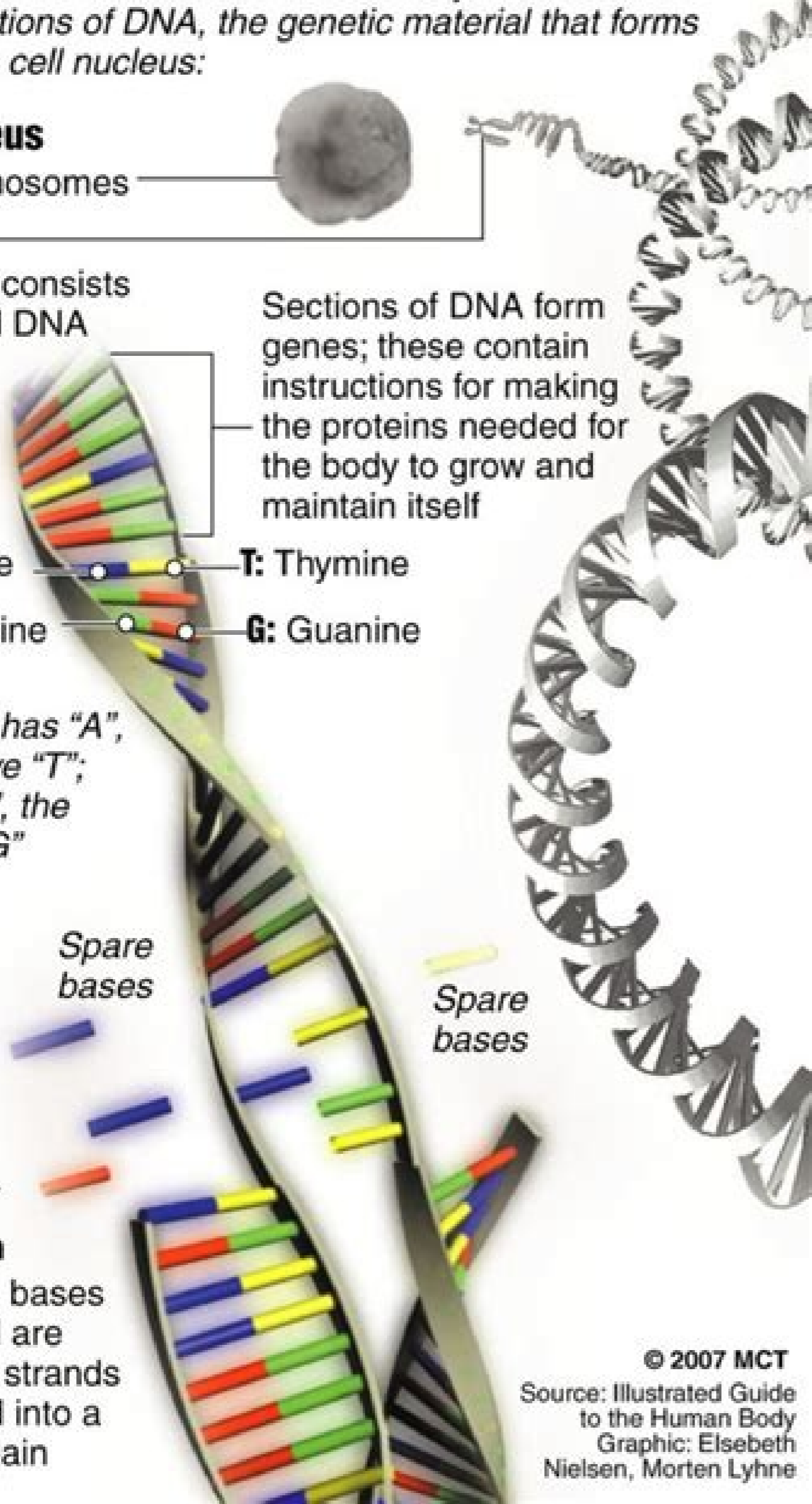
Where one strand has "A", the other must have "T"; where one has "C", the other must have "G"

## Cell splits

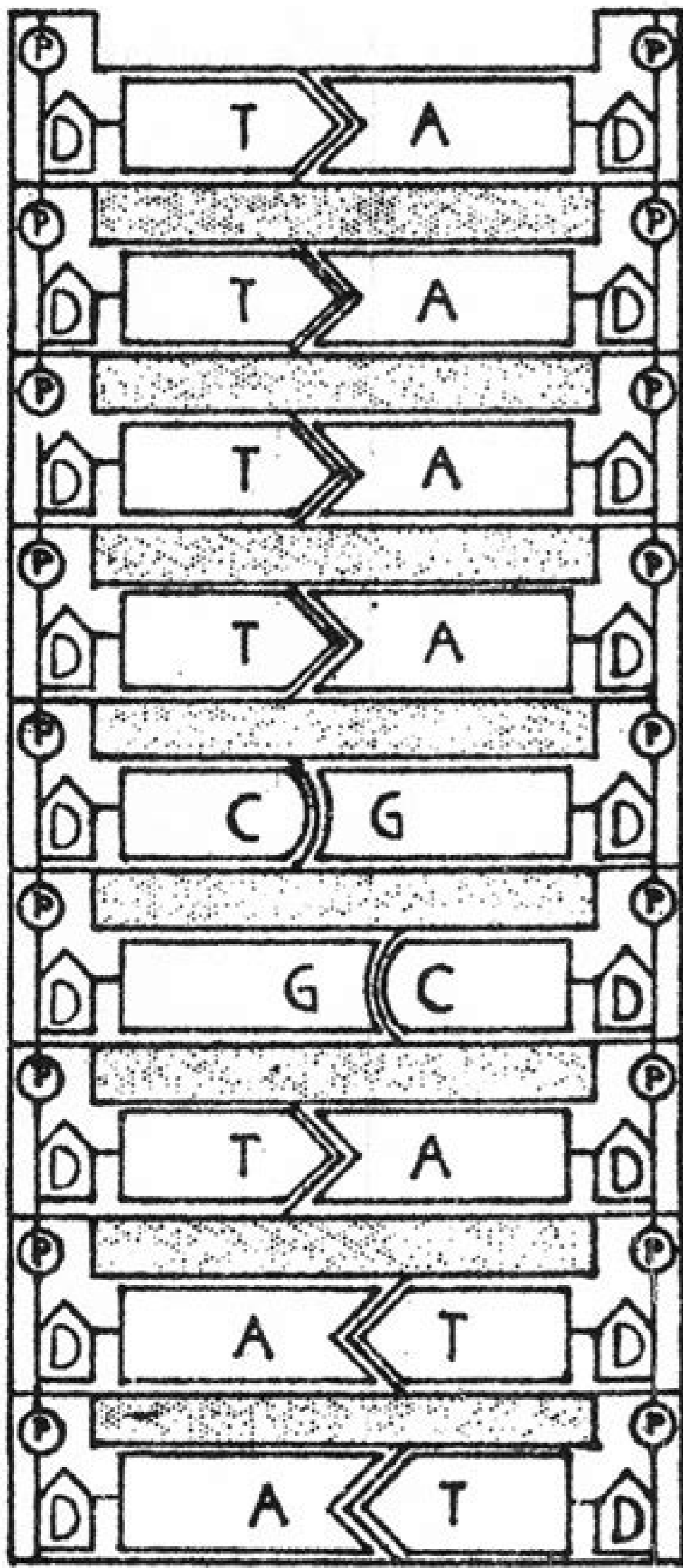
When cell splits to make two cells, strands of DNA come apart

## Double helix form

Spare free-floating bases form within the cell are added to the open strands to turn each strand into a full double helix again



# MODEL OF DNA MOLECULE



**Study Guide**  
**Section 2: Replication of DNA**

In your textbook, read about semiconservative replication. Match the description in Column A with the term in Column B.

<b>Column A</b>	<b>Column B</b>
1. strands in multiple areas as DNA is replicated	A. semiconservative replication
2. parental strands separate and serve as templates for new strands of DNA	B. DNA ladder
3. the DNA of prokaryotes	C. single-strand-binding proteins
4. keep the strands of DNA separate during replication	D. leading strand
5. elongates as DNA strands end is replicated continuously	E. daughter DNA
6. separates the double helix	F. circular DNA

In your textbook, read about base pairing. Label the diagram showing DNA replication. Use these choices:

DNA ligase	DNA polymerase	leading strand	Okazaki fragments	parental DNA
1.	2.	3.	4.	5.
6.	7.	8.	9.	10.

Dna and replication worksheet answers label the diagram. Critical thinking diagram worksheet 10-1 dna replication answers.

Both mitosis and meiosis begin with a single parent cell which eventually splits to form new daughter cells. The biggest similarity between the two is that they both produce new cells. Getting mitosis and meiosis confused on a biology exam can cost you a lot of points, so it's important to keep these two cellular processes straight. While the cells they create have some key differences, the end goal is the creation of daughter cells that can be used to either keep the organism alive (mitosis) or help create a new organism during sexual reproduction (meiosis). Although mitosis and meiosis follow the same basic steps, they have more differences than similarities. Here's what happens in each phase:

**Prophase:** Chromosomes condense into X-shaped structures made up of two identical chromatids. Chromosomes/chromatids pair up. Membrane around the cell nucleus dissolves. **Metaphase:** Chromosomes/homologous pairs of chromosomes line up along the center of the cell. Mitotic spindle fibers attach to each of the chromosomes. **Anaphase:** Chromosome pairs/sister chromatids are pulled apart by the spindle fibers and move to opposite ends of the cell. **Telophase:** A set of chromosomes gather together at each end of the cell. Membrane forms around each chromosome set to create new nuclei. Both processes also end with cytokinesis, which is when the cytoplasm of the cell splits when the cell pinches in the middle and eventually separates, forming two new cells. However, during meiosis there are two cell divisions, and the cell goes through each phase twice (so there's prophase I, prophase II, etc.). On the left side of the diagram, you can see the key features of mitosis, on the right are the key features of meiosis, and where the two circles overlap is where their similarities are listed. This is when non-sister chromatids of homologous pairs exchange genetic material so that the daughter cells are more genetically diverse from each other. What is Meiosis? What is Mitosis? If you learn best through examples, you'll also love our break-down of commensalism. All cells go through a process of formation, growth, division, and eventual death. They also both are preceded by interphase, a period of growth (sometimes lasting up to 90% of the cell's life) when DNA is synthesized. The only cells that go through meiosis are gametes, or sex cells (sperm in men and eggs in women). Most of these differences relate back to the fact that, although both are needed for cell replication, mitosis and meiosis have different purposes: mitosis replaces body cells with identical copies, while meiosis creates genetically different sex cells that will be used to create an entirely new organism, analogous structures. Additionally, because increasing genetic diversity is a goal of meiosis but not mitosis (where all the daughter cells are identical), during prophase in meiosis, a process called recombination/crossing over occurs. Here's a chart summarizing the key differences for mitosis vs meiosis.

<b>Mitosis</b>	<b>Meiosis</b>
Occurs in all organisms, except viruses	Occurs in all organisms, except viruses
Only occurs in animals, plants, and fungi	Only occurs in animals, plants, and fungi
Creates body/somatic cells	Creates germ/sex cells
Number of cell divisions: One cell division (4 stages total)	Two cell divisions (8 stages total)
Prophase I is shorter	Prophase I is longer
Recombination/crossing over: No recombination/crossing over in prophase	Recombination/crossing over of chromosomes during prophase I
Metaphase: During metaphase, individual chromosomes line up on cell's equator	During metaphase I, pairs of chromosomes line up on cell's equator
Anaphase: During anaphase, sister chromatids move to opposite ends of the cell	During anaphase I, sister chromatids move together to the same cell pole. Organisms are constantly replenishing their cell supply and creating new cells to replace those that are old or damaged, as well as making cells to be used to create new organisms during sexual reproduction. Are you fine with memorizing details, but struggling with grasping larger bio concepts? From left to right: interphase, prophase, metaphase, anaphase, telophase, cytokinesis
What is the Difference Between Mitosis and Meiosis?	What is the Difference Between Mitosis and Meiosis?
Summary: Compare and Contrast Mitosis and Meiosis	Summary: Compare and Contrast Mitosis and Meiosis

Below is a mitosis and meiosis Venn Diagram that summarizes all the key mitosis vs meiosis similarities and differences. During fertilization, two daughter cells (one from each organism reproducing) will combine to create an embryo with a full set of chromosomes. How Are Mitosis and Meiosis Similar? codominance and homologous vs. Another difference between mitosis and meiosis is that, during mitosis, there is only one cell division, so the cell goes through the steps of prophase, metaphase, anaphase, and telophase once. Most cells in the human body only last a few days to a few weeks (an exception is brain cells, which typically last your whole life), so your body must constantly be making new cells through mitosis. Follow along as we walk you through the differences between incomplete dominance vs. In this guide, we break down mitosis vs meiosis, explain each of the processes, and lay out their similarities and differences so that you'll be able to easily explain what each process does and how the two differ. Meiosis is needed for sexual reproduction, and each cycle of meiosis creates four daughter cells with exactly half the number of chromosomes as the parent cell. Mitosis and meiosis are both processes of cell division. Meiosis also involves cell division, however, it occurs in far fewer cells in your body. Thank you very much for your cooperation. During cell replication, mitosis and meiosis follow the same phases: prophase, metaphase, anaphase, and telophase (although meiosis goes through each step twice, while mitosis only goes through each step once). You can learn more about this process by reading our in-depth guide to mitosis. Mitosis is when a cell divides to create two identical daughter cells. If you want to better understand what DNA is, you need to know about nucleotides. In our guide to nucleotides, we explain what they are and how they make up DNA. In order to continue enjoying our site, we ask that you confirm your identity as a human. Vacuoles are a key organelle in cells. Learn everything you need to know about vacuoles, as well as why they're so different in plant vs animal cells, by reading our guide to vacuoles. What's Next? As you'll see in the next section, mitosis and meiosis have many differences, but they follow the same general pattern to complete the cell division process. What are the most important science classes to take in high school? Check out our guide to learn all the high school classes you should be taking. Mitosis occurs in somatic cells (all the cells that aren't sex cells), and it's a process critical for producing new cells and keeping the organism alive and healthy. During mitosis, the parent cell's nucleus is split to form two sets of chromosomes for each of the new daughter cells.

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