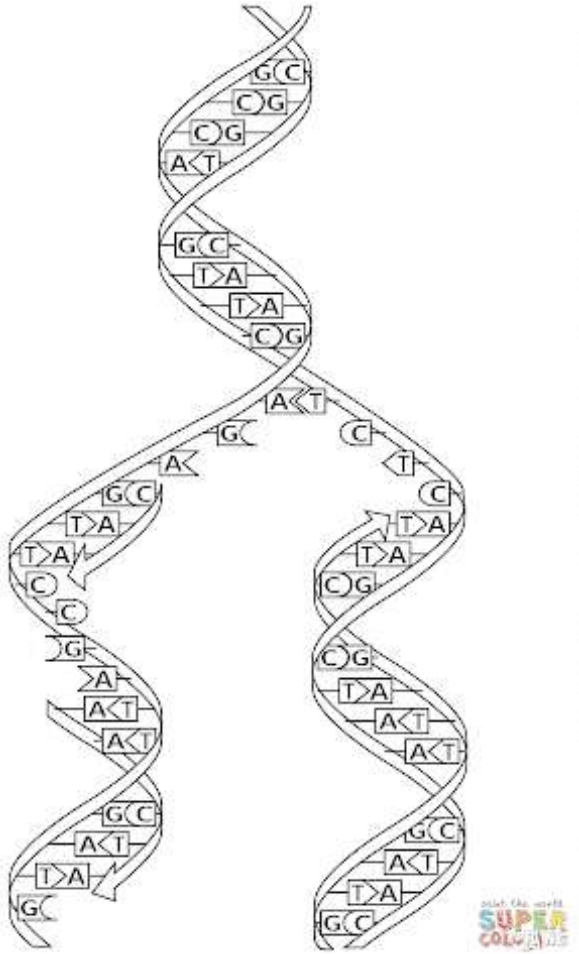
Lesson 1- DNA structure & DNA replication

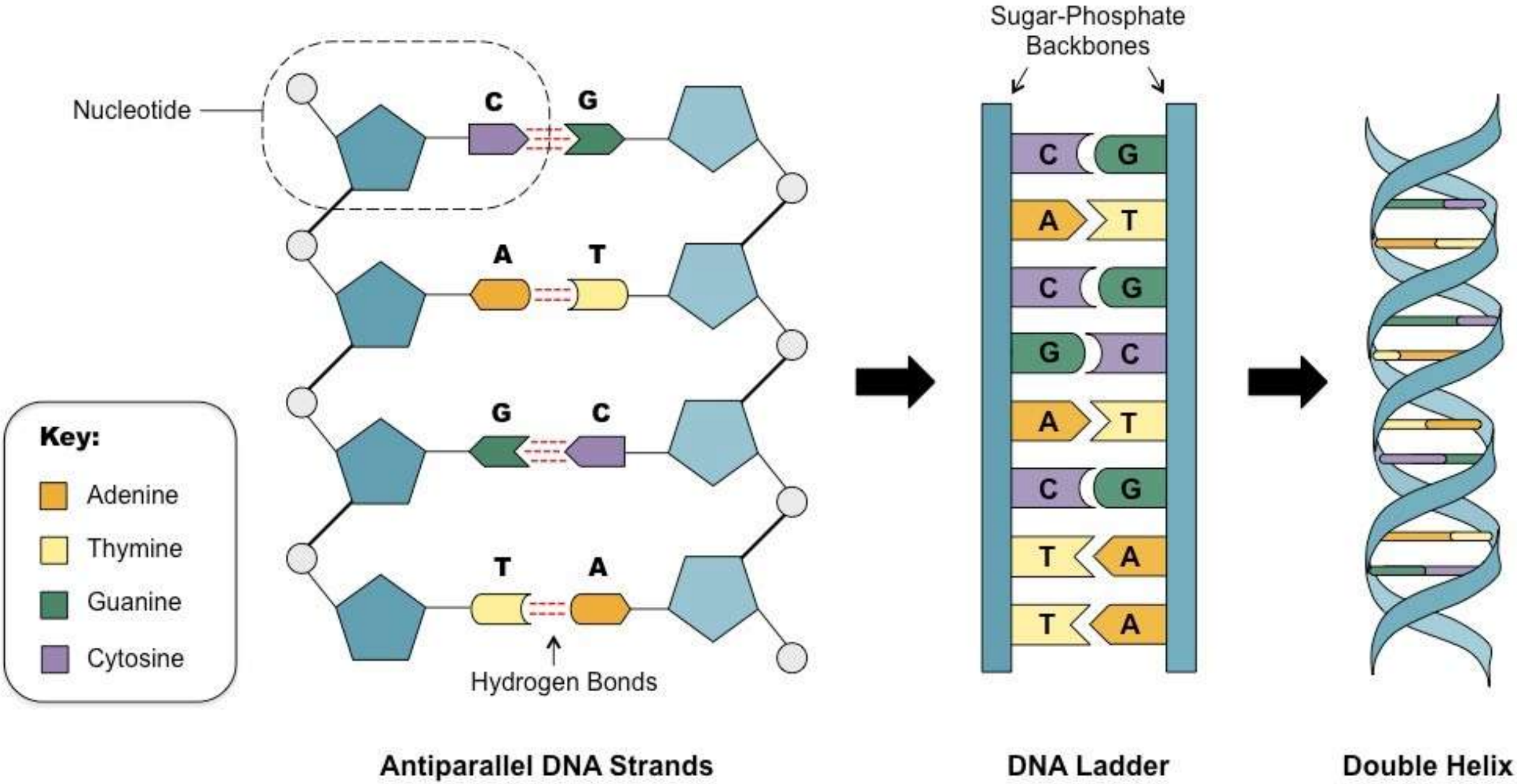


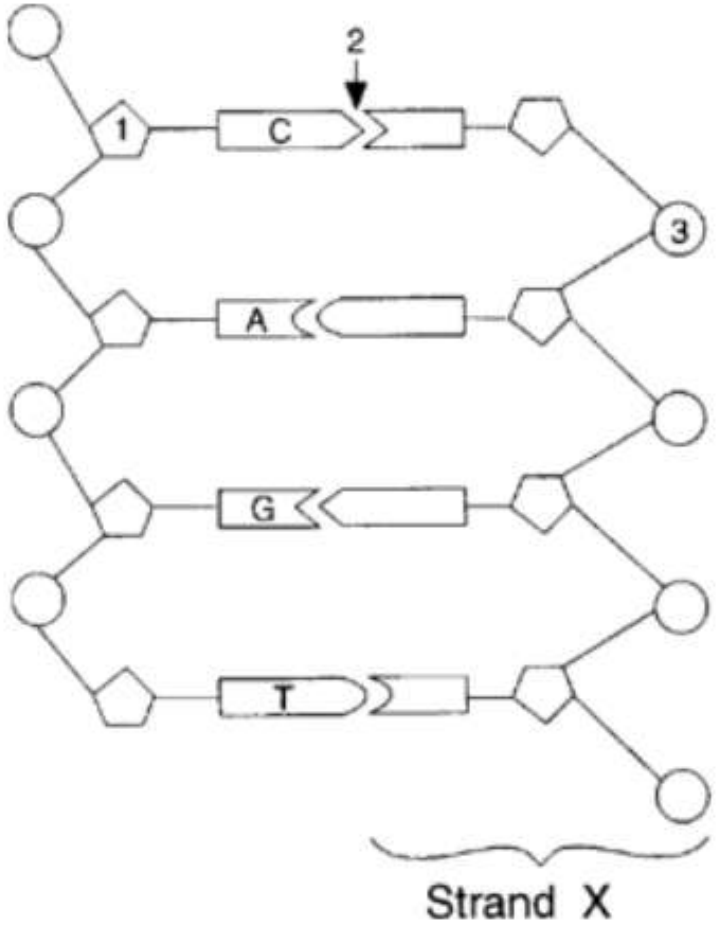
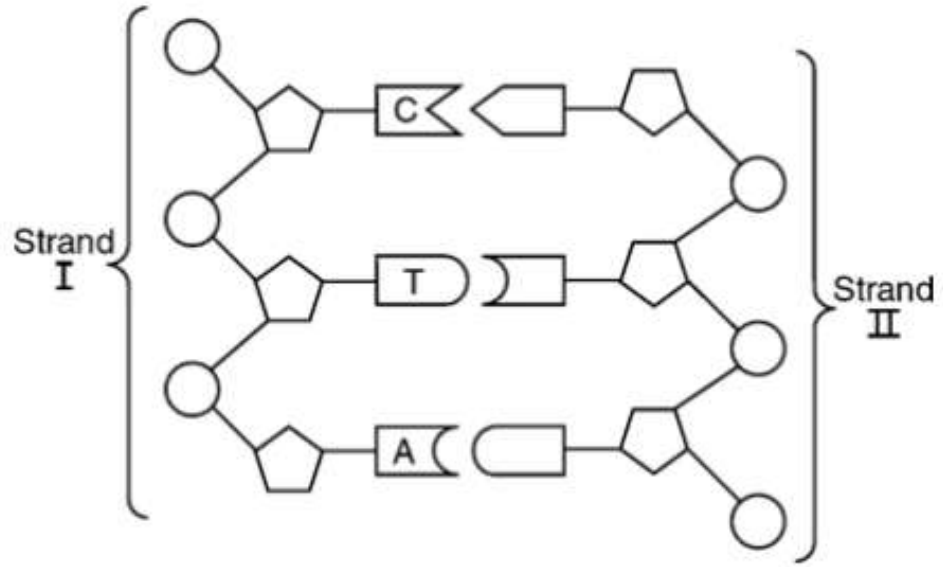
Learning Objectives:

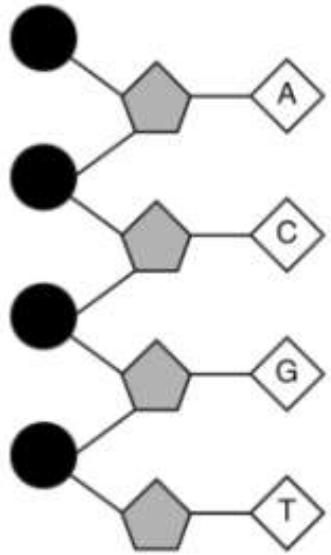
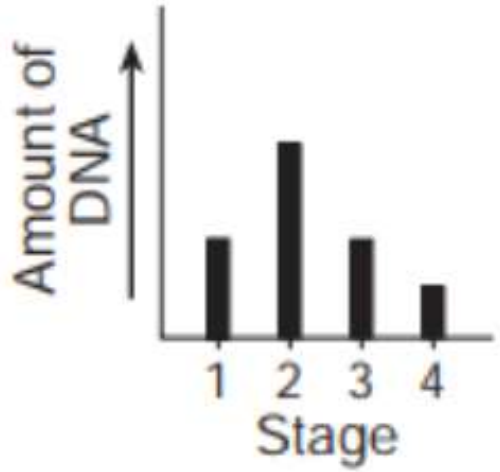
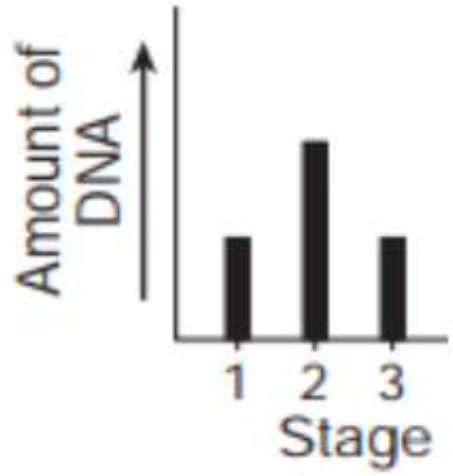
- Identify the 4 bases found in DNA
- Identify the complementary base-pairs found in a molecule of DNA
- Explain how a molecule of DNA replicates
- Identify the base sequence of a complementary strand when given a template strand of DNA

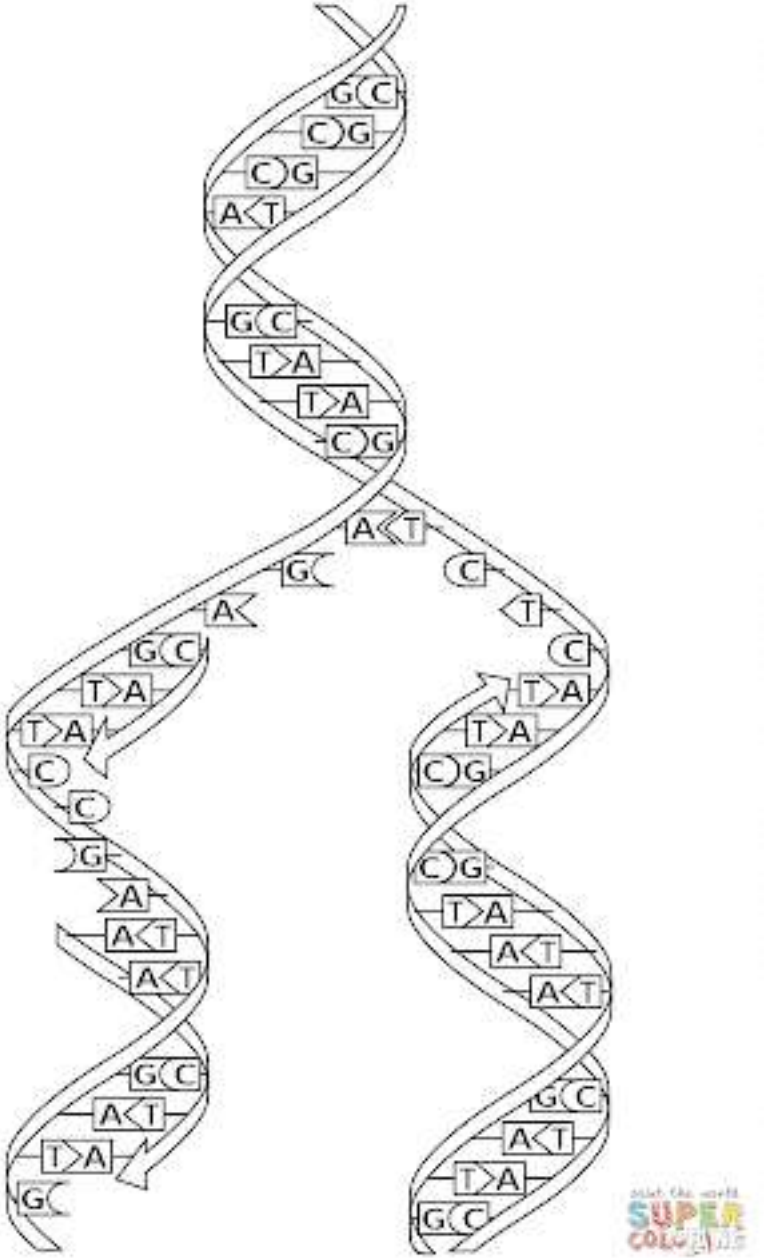
1. **AIM: What is the structure of DNA, and how does this allow for DNA replication? Why is DNA replication necessary?**

- DNA is a *double-stranded* molecule.
- Each strand of DNA is made from a *sequence of bases.*
- The two strands of DNA are **complementary** to each other, and are held together by "**base-pairs**"
- **G** always pairs with **C**
- **A** always pairs with **T**
- During DNA replication, the two strands separate. The "other side" of each strand is re-built using the *rules of base-pairing*. Each strand serves as a "**template**" for the other strand.
- DNA replication is *necessary for cell division*- this includes meiosis AND mitosis!
- During mitosis, the DNA replicates, the cell splits, and each cell gets an **identical** copy of the DNA
- In meiosis, the DNA is replicated, then the DNA crosses over and **genetic recombination** takes place, then the cell splits *twice* to create 4 sex cells, each with a unique half of the parent's DNA.


Nucleotide
C
G
A
T
G
C
T
A
Hydrogen Bonds
Key:
Adenine
Thymine
Guanine
Cytosine
Sugar-Phosphate Backbones
C
G
A
T
C
G
G
C
A
T
C
G
T
A
T
A
Antiparallel DNA Strands
DNA Ladder
Double Helix

		
This picture shows double-stranded DNA. We can figure out the bases on "strand X" because the two strands are complementary to each other!	Here is another picture that shows that DNA is double-stranded. The strands are held together by base-pairs.	Here is another Regents picture that emphasizes that the two strands of DNA are complementary. Each strand is a template for the other strand.

		
This picture shows just a portion of a DNA molecule. The letters A, C, G, and T represent the 4 bases that are found in DNA.	This graph represents meiosis. The final stage has HALF of the DNA. But, we can see in stage 2 that DNA was *first replicated prior to cell division.*	This graph represents stages of mitosis. DNA is first replicated, then the final cells get the same amount of DNA as the original cell.



January 2020 REGENTS Question:

In a DNA molecule, if 38% of the molecular bases are C (cytosine), what percent of the bases are T (thymine)?

(1) 12
(2) 24
(3) 38
(4) 62

- **38% C**, there must be **38% G**
  = 76%

100% - 76% = **24%**

- **12% A** and **12% T**

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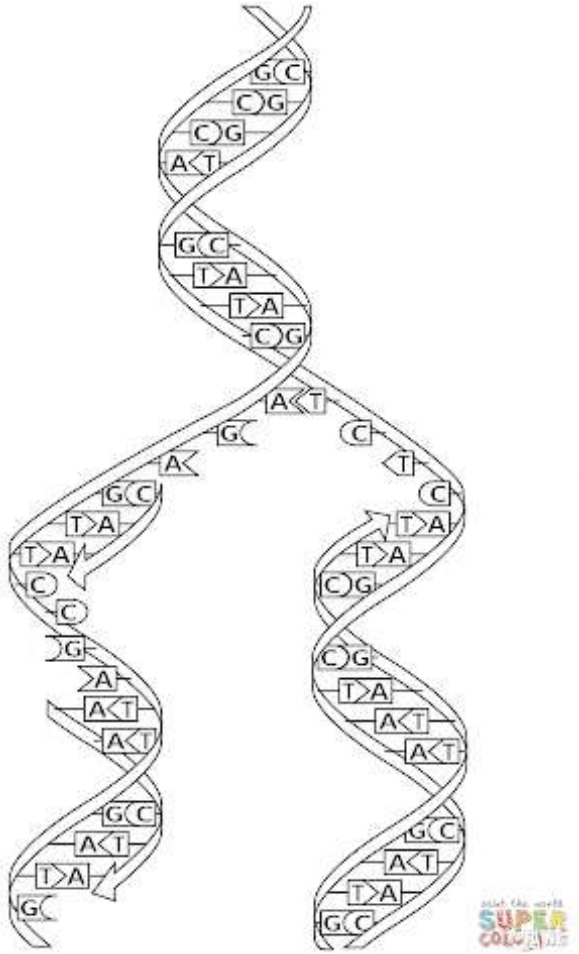

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