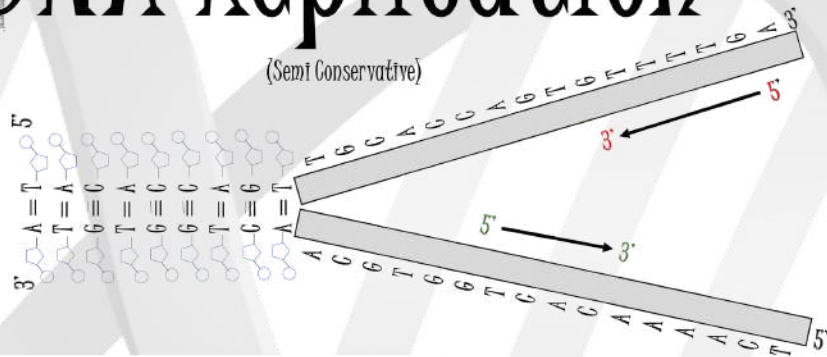
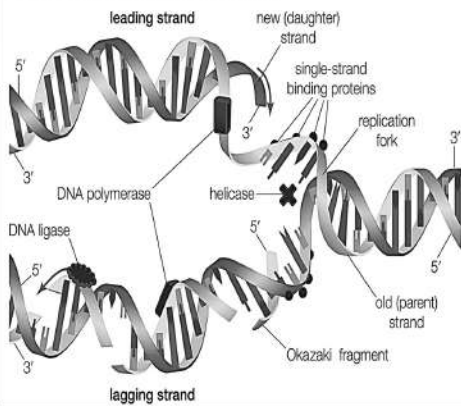


DNA Replication



Semiconservative DNA replication

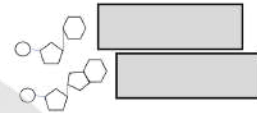


Semiconservative describes the mechanism of DNA replication in all known cells. It derives its name from the fact that it produces two copies of the original DNA molecule, each of which contains one of original strand, and one newly-synthesized strand.

Steps: Occurs in

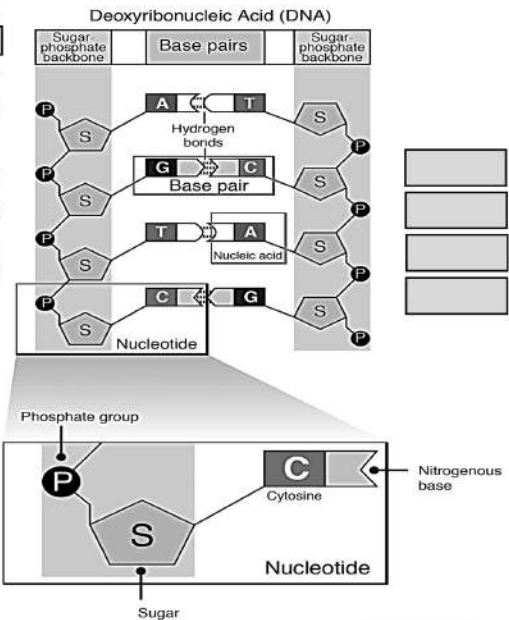
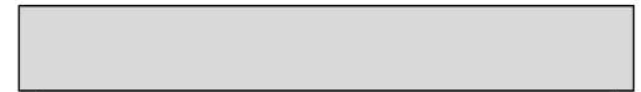
1. The enzyme **DNA helicase** breaks the hydrogen bonds between the two polynucleotide DNA strands causing the double helix to unzip, forming two single strands.
2. Each original single strand then acts as a template for a new strand. Free-floating DNA nucleotides join to the exposed bases on each original template strand via complementary base pairing.
3. The nucleotides of the new strands are joined together by the enzyme **DNA polymerase**. This forms the sugar-phosphate backbone. Hydrogen bonds form between the bases on the original and new strand and the strands twist to reform the double helix.
4. Each new DNA molecule contains one strand from the original DNA molecule and one new strand, hence the term **semi-conservative replication**.

What would happen if just one of those nitrogenous bases (Adenine, Thymine, Guanine, and Cytosine) were no longer in the correct order? A **mutation** is a **permanent change of a nitrogen base, or multiple nitrogen bases, that make up a gene**. Mutations affect the translation of the codons because the order of the nucleotides has been changed. Depending on how a mutation is translated, it can result in no change in the resulting protein, an insignificant change, or one that may be crucial for life. Mutations can occur via environmental changes, such as UV rays or radiation, or from fault in gene replication. There are different types of mutations, each resulting in a different product. Most mutations are insignificant or neutral. However, some mutations result in **gene alteration**, meaning the mutation resulted in a complete change of the gene. Another type of mutation is complete gene rearrangement. The order of the gene expression is important. Therefore, whenever **an entire gene is moved to a new location**, as what happens during **gene rearrangement**, there is a change in gene expression.

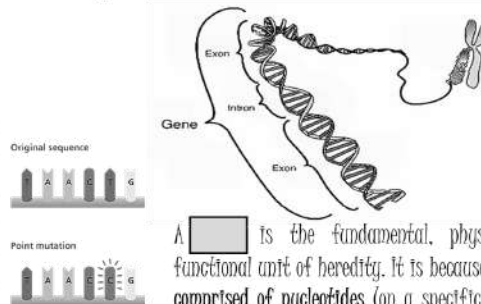



are the building blocks (*monomers*) of nucleic acids; they are composed of three sub unit molecules: a (also known as nucleobase), a (ribose or deoxyribose), and at group. Nucleotides also play a central role in metabolism at a fundamental, cellular level.

Purines and Pyrimidines are nitrogenous bases that make up the two different kinds of nucleotide bases in DNA and RNA. The two-carbon nitrogen ring bases (adenine and guanine) are purines, while the one-carbon nitrogen ring bases (thymine and cytosine) are pyrimidines.



This DNA-protein complex is called **nucleosome**, wherein the mass of protein and nucleic acid is nearly equal. Within cells, chromatin usually folds into characteristic formations called **chromosomes**. Each **chromosome** contains a single double-stranded piece of DNA along with the aforementioned packaging proteins.



A  is the fundamental, physical, and functional unit of heredity. It is because a **gene** is comprised of **nucleotides** (on a specific site on a chromosome) that is responsible for the **physical** and **heritable characteristics** or **phenotype** of an organism.

