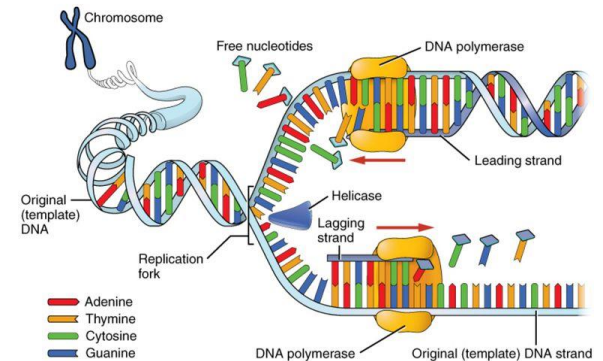


*Fold along the line and glue this side
down in your Biology Interactive
Learning Log (BILL)*

Unit 8: DNA

Learning goals: It's one thing to say the molecule called DNA carries genetic information, but it is quite another to explain how a molecule can manage all of the functions of the cell. DNA must not only specify how to assemble proteins, but how genes can be copied and inherited. DNA is a very special molecule with a very special structure. Understanding the structure of DNA is the key to understanding how genes work and what could go wrong resulting in disease or death.



Key concepts:

| | | |
|----------------------|----------------------------------|---------------|
| Nucleotide structure | Base pairing and Chargaff's Rule | DNA structure |
| Double helix model | DNA replication | |

Essential Questions:

1. What are the chemical components of DNA?
2. What clues helped scientists solve the structure of DNA?
3. What does the double helix model tell us about DNA?
4. What are the steps involved in the process of DNA replication?
5. What role do DNA polymerase, helicase and ligase have in copying DNA?
6. How does DNA replication differ in prokaryotic and eukaryotic cells?

Can you show what
you know?

Vocabulary: (+) = Can explain it; (-) = Only heard it; 0 = No idea

[illegible]

What I Need to Know/Study Guide

1. **Discuss** the roles of Watson, Crick, Franklin, and Chargaff in the discovery of DNA's structure.
2. **Identify** the chemical components of DNA and describe how they are arranged.
3. **Sketch** and **label** a DNA nucleotide.
4. **Compare and contrast** a purine and a pyrimidine.
5. **Identify** the 4 nitrogen bases in DNA.
6. **Identify** the 5 carbon sugar in DNA and **label** the 5' and 3' carbons.
7. **Describe** the 3-D shape of the DNA molecule.
8. **Explain** how Chargaff's data is related to the complementary base pairing rules.
9. **Identify** the 3' and 5' ends of a nucleotide and of the DNA strands.
10. **Describe** where we find the hydrogen bonds in DNA and their importance in replication.
11. **Explain** the significance of DNA's antiparallel configuration.
12. **Explain** the importance of each reagent in the DNA extraction process.
13. **Why** must DNA replicate?
14. **Sequence** the step involved in DNA replication and be able to **explain** what is happening in each step when given a diagram.
15. **Explain** the purpose of the enzymes helicase, DNA polymerase, and ligase in DNA replication.
16. **Explain** why Okazaki fragments form and how the 5' to 3' placement of nucleotides is responsible for their formation.
17. How is the process of replication **different yet the same** as making a photocopy?
18. **Compare and contrast** DNA replication in prokaryotes and eukaryotes.