

# **DNA to Proteins Unit**

## **Essential**

**DE.1** - Use evidence to explain how DNA codes for proteins, which carry out the essential functions of living things.

<p>Level 3 Description</p>	<p>Recognizes or recalls specific terminology such as: nucleotide, DNA (deoxyribonucleic acid), double helix, ribonucleic acid (RNA), protein.</p> <p>Explains that the order of nucleotides in DNA is information that is transferred to RNA and used by ribosomes to order amino acids in a polypeptide which will determine the structure and function of a protein.</p> <p>Decode a strand of DNA to determine the order of amino acids in a protein.</p> <p>Explains the basic process of transcription and translation.</p> <p>Explains the building blocks, the pairings of bases, and the chains in DNA and RNA.</p> <p>Explains the composition of a ribosome.</p> <p>Explains the function of DNA, RNA, and ribosomes.</p>
<p>Level 4 Description</p>	<p>Recognizes or recalls specific terminology such as: adenine, thymine, guanine, cytosine, transcription, translation, RNA polymerase, ribosome, messenger RNA (mRNA), transfer RNA (tRNA), codon, anticodon, amino acid.</p> <p>Describes how the information in the order of nucleotides in DNA is transferred to RNA and used by ribosomes to order amino acids in a polypeptide which will determine the structure and function of a protein.</p> <p>Describe the steps and decode a strand of DNA to determine the order of amino acids in a protein.</p> <p>Explains the process of transcription and translation including the enzymes involved and its role in protein synthesis.</p> <p>Explains the parts of a nucleotide, the pairings of bases, and the arrangement of chains in DNA and RNA.</p> <p>Explains the composition and subunits used to make ribosomes.</p> <p>Explains the function of DNA, RNA, and ribosomes.</p>

**DE.2** - Explain the process of DNA replication, why it is important to living things, and how it relates to the cell cycle.

<p>Level 3 Description</p>	<p>Recognizes or recalls specific terminology such as: DNA replication.</p> <p>Explains basic steps of DNA replication, one reason why it is important, and relates it to a step in the cell cycle.</p>
<p>Level 4 Description</p>	<p>Recognizes or recalls specific terminology such as: enzyme (Helicase, DNA Polymerase).</p> <p>Explains steps of DNA replication including enzymes involved, multiple reasons of importance, and describes its role in the cell cycle.</p>

**Supporting**

**DS.1** - Explain the process of gene regulation, why it is important to living things, and how mutations occur and their effect on the proteins produced.

Level 3 Description	Describes one example of a genetic switch (ex. Lac operon). Explains one manner of DNA mutation and the effect on protein production.
Level 4 Description	Explains the use of gene regulation and examples of different methods (ex. Lac operon, histones) Explains multiple manners of DNA mutations, the effect on the protein it produces, and why that effect occurs.