

By the end of this unit, students will be able to...

- Summarize how differences in DNA and proteins are responsible for the differences seen among different species and among different kingdoms of species.
- Explain the roles that DNA, RNA, and proteins play in regards to the visible traits of an organism.
- Summarize the similarities and differences between RNA and DNA, and the roles each play in the production of proteins.
- Clarify how DNA relates to the assembly of a protein from amino acids.
- Define how each of the following relates to proteins and traits:
 - a. Gene b. Genotype c. Phenotype d. Polymer e. Nucleotide
- Identify the components of a nucleotide and describe their function and role in DNA.
- Explain how DNA has a sense of 'direction' (e.g. 5' → 3').
- Compare the four bases found in DNA and summarize the reasons why certain base combinations exist.
- Identify the four bases based on their properties (size, bonding sites, etc.).
- Explain the role of each of the following in the production of a protein:
 - a. DNA b. mRNA c. tRNA d. rRNA
- Define a codon and explain its importance for producing proteins.
- Explain the connection between a codon and a specific amino acid.
- Compare and contrast the roles of codons and anticodons.
- Explain transcription and identify the role of each of the following in this process:
 - I. Helicase II. Polymerase III. DNA IV. mRNA
- Accurately transcribe a sequence of mRNA from a given strand of DNA.
- Explain translation and identify the role of each of the following in this process:
 - I. Ribosome II. Codons III. mRNA IV. tRNA V. Amino acids
- Predict the consequences that would occur if key elements of transcription and translation became dysfunctional (e.g. mRNA, tRNA, polymerase, helicase, etc.).