

UNIT OF STUDY

Title: DNA & RNA	Subject/Course: Biology	Length: 2 weeks
Topic: Heredity and Evolution 2	Grade: 10 th grade	Designer: Woods
UNIT GOALS AND EXPECTATIONS		
<p>IMPORTANT CONCEPTS/UNDERSTANDINGS: In all organisms, the instructions for specifying the characteristics of the organism are carried in DNA, a large polymer formed from subunits of four kinds (A, G, C, and T). DNA resides in the nuclei of cells and contains the genetic information that underlies heredity. In all organisms, the instructions for specifying the characteristics of the organism are carried in DNA, a large polymer formed from subunits of four kinds (A, G, C, and T). The chemical and structural properties of DNA explain how the genetic information that underlies heredity is both encoded in genes (as a string of molecular “letters”) and replicated (by a templating mechanism). Each DNA molecule in a cell forms a single chromosome. Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells can create the variation that changes an organism's offspring.</p>	<p>ESSENTIAL QUESTIONS: What are the components of DNA and how are they bonded to create the double helix structure? How and why does DNA replicate itself? Why is it important to understand this process? What effects can mutations have on organisms?</p>	
<p>STUDENT LEARNING EXPECTATIONS: HE.5.B.2 Describe the Watson-Crick double helix model of DNA, using the base-pairing rule (adenine-thymine, cytosine-guanine) HE.5.B.3 Compare and contrast the structure and function of DNA and RNA</p> <ul style="list-style-type: none"> ▪ Model the components of a DNA nucleotide and an RNA nucleotide (HE.5.B.1) <p>HE.5.B.4 Describe and model the processes of replication, transcription, and translation</p> <ul style="list-style-type: none"> ▪ rRNA ▪ mRNA ▪ tRNA 	<p>HE.5.B.5 Compare and contrast the different types of mutation events, including point mutation, frameshift mutation, deletion, and inversion</p> <ul style="list-style-type: none"> ▪ Identify effects of changes brought about by mutations: <ul style="list-style-type: none"> ◇ beneficial ◇ harmful ◇ neutral (HE.5.B.6) 	
<p>SPECIFIC DECLARATIVE KNOWLEDGE –know Summarize the relationship between genes and DNA Describe the overall structure of the DNA molecule. Summarize the events of DNA replication. Relate the DNA molecule to chromosome structure. List the similarities and differences between DNA and RNA. Name the three main types of RNA. Describe transcription and the editing of RNA. Identify the genetic code. Summarize translation. Explain the relationship between genes and proteins. Contrast gene mutations and chromosomal mutations.</p>	<p>SPECIFIC PROCEDURAL KNOWLEDGE –do Build a model of DNA Compare and contrast DNA and RNA</p>	

UNIT ASSESSMENTS (Include tasks related to Dimensions 3 and 4 and Bloom's Taxonomy)	
"DNA to Protein"-Paper protein synthesis activity Compare and contrast DNA and RNA "DNA's Instructions for Insulin" Lab- Pairs Current Events Open Response Problem Solving Lab 11-2	
Traditional Assessments: Quiz-DNA vs. RNA Test Chapter 11 Section Assessments MiniLab 11-1 Problem Solving Lab 11-2	Other Evidence of Learning: Protein Synthesis Quiz over Activity Bellringers Question and Answer
ACTIVITIES AND LEARNING EXPERIENCES	Resources
DNA Isolation Lab-Pairs Use of Website to Explore the process of Protein Synthesis and replication http://www.johnkyrk.com/ http://sciweb.hfcc.edu/Kelly/classes/bio_131/labs/dna.htm Compare and contrast DNA and RNA using Venn Diagram Vocabulary Strategy Daily Notebook Entries Establish Habits of Mind for Science in Critical Thinking, Creative thinking, and Self Regulated Thinking	Prentice Hall Textbook: Biology CBL's with temperature probes Internet Powerpoint Lab Equipment Paper protein synthesis activity
Career Connections	
Forensic DNA Analyst	