

TEKS

- 4A** Compare and contrast prokaryotic and eukaryotic cells
- 4B** Investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules
- 6A** Identify components of DNA and describe how information for specifying the traits of an organism is carried in the DNA
- 6B** Recognize that components that make up the genetic code are common to all organisms
- 6C** Explain the purpose and process of transcription and translation using models of DNA and RNA
- 6D** Recognize that gene expression is a regulated process
- 6E** Identify and illustrate changes in DNA and evaluate the significance of these changes

instructional content:

- ✦ Structure of RNA
 - Nucleotides
 - Types and functions of RNA
 - Central dogma
- ✦ Transcription
 - Role of enzymes
 - Transcription process
- ✦ Translation
 - Genetic code
 - Translation process
- ✦ Gene regulation
 - Compare prokaryotic cells to eukaryotic cells regulation of gene expression
 - Roles of promoters
 - mRNA processing
- ✦ Mutations
 - Gene mutations
 - Chromosomal mutations

learning outcomes students will:

- Use all content and scientific process skills learned earlier in the course
- Identify the nitrogen bases that form RNA nucleotides
- List three differences between RNA and DNA
- Differentiate between the three main types of RNA and their functions
- Explain what comprises the central dogma
- Identify the location in an eukaryotic cell where the processes of replication, transcription, mRNA processing and translation occur
- Describe the three stages of transcription
- Explain the role of RNA polymerase
- Demonstrate an understanding of the direction of transcription from 5' – 3'
- Understand the role of complementary base-pairing in transcription
- Determine the sequence of amino acids coded for by a specific DNA sequence, given a table of mRNA codons
- Differentiate between a codon and an anticodon
- Describe the process of translation
- Explain the role of ribosomes in translation
- Explain why the genetic code is universal
- Compare the mechanisms for regulating transcription in bacteria and eukaryotes
- Explain the functional role of a promoter
- Explain the functional role of an operon
- Differentiate between the roles of introns and exons
- Describe the role of mRNA processing in gene regulation
- Define the term mutation
- Explain the significance of mutations to living organisms
- Explain what is meant by a gene mutation
- Differentiate between point and frameshift mutations
- Provide an example of a point mutation
- Provide two examples of frameshift mutations
- Explain what is meant by a chromosomal mutation
- Provide four examples of chromosomal mutations
- Identify factors that cause mutations
- Define the term mutagen



Incorporate scientific process skills during the instruction of all Biology concepts.
Look for this icon at wardsci.com/TEKS for more information on scientific process skills.

Recommended Ward's Science products with item numbers for easy online searching:

instructional resources:

DNA and RNA Poster **332258**
DNA-RNA-Protein Synthesis Model Kit **814779**
Ward's Genetic Code Wheel Game **366226**
Protein Synthesis Chalkboard Model **4655600**

VirtMac™ Magnetic DNA/RNA Protein Manipulatives **148391**
Kinesthetic Protein Synthesis Class Activity **4738600**
Comprehensive DNA Model Kit **810140**

From DNA to a Protein Manipulatives **6731058**
Elements of Protein Synthesis Manipulatives **810141**
Protein Synthesis Manipulatives Demonstration **148330**