## TEKS

- **4B** Investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules
- **5A** Describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms
- **6A** Identify components of DNA and describe how information for specifying the traits of an organism is carried in the DNA
- **9A** Compare the structures and functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids

## instructional content:

- History of DNA's discovery
  - Griffith's experiments
  - Avery's experiments
  - Hershey-Chase experiments
- Structure of DNA
  - Nucleotides: purines and pyrimidines
  - Chargaff's rules (base pairing)
  - X-ray evidence –Rosalind Franklin
  - Double helix Watson & Crick
  - Antiparallel strands
- + DNA Replication
  - Involvement of enzymes
  - Replication process

#### learning outcomes students will:

- Use all content and scientific process skills learned earlier in the course
- Explain the roles of DNA in living organisms
- Summarize the experiments of Griffith, Avery and Hershey-Chase
- · Explain why the early experiments were important for the discovery of DNA
- Demonstrate laboratory techniques in extracting DNA from plant and animal cells
- Describe the components of a nucleotide
- Identify the nitrogen bases that form nucleotides
- Differentiate purines and pyrimidines
- Explain how x-ray evidence provided the key for discovering the structure of DNA
- Describe the Watson-Crick double-helix model of DNA
- · Identify the part of DNA that carries the genetic instructions
- Explain how the base-pairing rule is related to Chargaff's experiments
- Describe the structure of DNA including antiparallel strands, the 3' 5' linkages
- Demonstrate the base-pairing rule for creating a complementary strand from a template strand
- Explain the role of enzymes including DNA polymerase, helicase, and DNA ligase in replication
- Explain the function of DNA replication
- Describe the replication process
- Explain how cells ensure that replication is accurate

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:

#### science tools:

Ethyl Alcohol Denatured **9506208** Ward's Fruit DNA Extraction Activity Kit **366096** Volumetric Transfer Pipets **182971** 

<u>Microcentrifuge Tubes</u> **181361** <u>DNA SuperModel Kit</u> **817100** <u>Economy DNA Model</u> **817019** 

## instructional resources:

DNA Model Kit How Does All That DNA Fit? Lab Activity Beyond Bead Biology: Molecular Biology Kit Modeling with DNA Jewelry Kit DNA On a Stick Lab Activity

