

TEKS

4B Investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules

6H Describe how techniques such as DNA fingerprinting, genetic modifications, and chromosomal analysis are used to study the genomes of organisms

instructional content:

- ✦ Manipulating DNA
 - Restriction enzymes
 - Gel electrophoresis
 - Restriction maps
- ✦ Copying DNA
 - Polymerase Chain Reaction (PCR)
 - PCR process
- ✦ DNA fingerprinting
- ✦ Genetic engineering
 - Recombinant DNA
 - Transgenic organisms
 - Cloning
- ✦ Genomics
 - DNA sequencing
 - Human Genome Project
 - DNA microarrays

learning outcomes students will:

- Use all content and scientific process skills learned earlier in the course
- Describe how restriction enzymes work
- Differentiate between blunt ends and sticky ends
- Describe the process of ligation
- Identify the role of restriction enzymes in recombinant DNA technology
- Describe the general process used to make bacteria that have recombinant DNA
- Describe how gel electrophoresis separates DNA fragments from each other
- Describe the role of DNA markers in identifying fragments of different sizes
- Explain the role of polymerase chain reaction (PCR) in DNA amplification
- Describe the basic techniques of PCR including the role of primers, nucleotides, and DNA polymerase
- Define the term DNA fingerprint
- Explain which portion DNA fingerprinting focuses on
- Describe at least two ways that DNA fingerprinting is used
- Define the term plasmid
- Explain how plasmids are used in genetic engineering
- Explain what is meant by a transgenic organism
- Describe at least two applications of transgenic organisms
- Describe the applications of gene cloning
- Describe the goals of the Human Genome Project
- Explain what a DNA microarray is used for



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:

Comprehensive Package

Ward's Deluxe DNA Electrophoresis System II **365102**

Build Your Own Package

Ward's Deluxe Electrophoresis Chamber **365190**

Ward's Dual Power Supply **365110**

Ward's Micropipets **151737**

Portable White Light Illuminator **305902**

Prepared Agarose, 0.8%, 200 mL **881207**

Tris-Borate-EDTA **9438006**

Ward's QUIKView DNA Stain for Gel Electrophoresis **389014**

Electrophoresis Gel-Loading Practice Kit **365150**

Agarose Gel Electrophoresis Lab Pack **365120**

Ward's Introduction to Electrophoresis Lab System **365166**

Ward's Deluxe Electrophoresis Power Supply **155340**

Economy Horizontal Electrophoresis Chamber **365170**

Hexagel™ Electrophoresis Chamber **365191**

Ward's Gel Drying System **363247**

Variable Automatic Micropipets **151725**

VWR Tip ReLoad System **152220**

Disposable Micropipet Tips **152089**

Agarose **9443700**

Bio-Rad 50x TAE Electrophoresis Buffer, 1L **389002**

instructional resources:

[Lac Operon: Turning On Your Genes Activity Kit](#) **4738400**

[Ward's DNA Fragment Analysis and Plasmid DNA Structure Lab Activity](#) **888500**

[DNA Fingerprinting Concepts Set](#) **368927**

[Ward's Glowing Bacteria: Transformation with a Firefly Gene Lab Activity](#) **888232**

[Ward's DNA Ligation Lab Activity](#) **365377**

[Ward's DNA Whodunit Lab Activity](#) **361610**

[Usage of Restriction Enzymes in DNA Fingerprinting Analysis](#) **181650**