

Objectives, Concepts & Skills, and Vocabulary

UNIT	LAB	OBJECTIVES
1: Biotechnology in Agriculture and the Environment	1: Genetically Modified Crops	<ul style="list-style-type: none"> • Understand the connection between DNA and an organism's characteristics • Understand the processes used to produce transgenic crops • Compare the traits between genetically modified and traditional soybeans • Record changes in plant size and growth pattern before and after herbicide application
	2: Biotechnology and Food	<ul style="list-style-type: none"> • Observe the curdling effect of chymosin • Collect and interpret data during milk curdling • Use chymosin to produce curds and whey
	3: Bioremediation	<ul style="list-style-type: none"> • Learn how naturally occurring microorganisms break down oil • Model various oil spill scenarios • Observe the physical changes of oil during biodegradation • Learn how porosity impacts cleaning up oil spills
2: Biotechnology in Medicine	4: Genetic Detectives	<ul style="list-style-type: none"> • Create a karyotype to determine if the subject has a chromosomal abnormality • Build a pedigree for the subject's family • Create and analyze a pedigree chart for the ability to taste PTC • Learn about cyanosis
	5: Gene Quest	<ul style="list-style-type: none"> • Learn what causes sickle cell anemia and how it is inherited • Simulate a DNA test to determine the genotypes of family members for sickle cell anemia • Understand how electrophoresis separates DNA molecules
3: Biotechnology in Forensic Science	6: Modeling DNA Profiles	<ul style="list-style-type: none"> • Simulate the DNA fingerprinting procedure • Construct and interpret an autoradiogram • Compare and evaluate DNA fingerprint patterns
	7: Forensics and DNA	<ul style="list-style-type: none"> • Use electrophoresis to separate DNA samples • Compare and evaluate DNA fingerprint patterns • Link an individual to a crime scene
4: Comprehensive Inquiry Investigation	8: Culminating Lab	<ul style="list-style-type: none"> • Compare and evaluate DNA fingerprint patterns to establish family relationships • Learn how genetic factors play a role in susceptibility and resistance to disease • Predict the gene-expressed enzyme levels of individuals and their influence on contracting severe acute respiratory syndrome (SARS)

CONCEPTS & SKILLS	VOCABULARY
Transgenic species, DNA and RNA, making observations, herbicides, analytical thinking	Genes, insecticides, herbicides, biotechnology, transgenic
Making observations, analytical thinking, enzymes, biotechnology, cheese-making, pasteurization	Pasteurized, lactose, lactic acid, pH, rennet, curds, whey, enzymes, pepsin, chymosin, curdles, casein
Microorganisms, ecosystem, food chains, analytical thinking, making observations and predictions, biodegradation, bioremediation, porosity	Fossil fuel, porosity, biodegradation, bioremediation, indigenous
Dominant and recessive traits, heredity, trisomy, nondisjunction, meiosis, genetic disease, genotype and phenotype, karyotyping, pedigrees, heterozygous and homozygous, Down Syndrome, analytical thinking, making observations	Genetic diseases, pedigrees, homologous, autosomes, sex-linked traits, nondisjunction, trisomy, Down Syndrome, karyotype, centromere, heredity, allele, Mendelian laws of inheritance, dominant, recessive, homozygous, heterozygous, genotype, phenotype
Sickle cell anemia, DNA testing, human genetics and heredity, analytical thinking, making observations, electrophoresis, hemoglobin	Molecular mass, electrophoresis, electrolytic decomposition, sickle cell anemia, red blood cells, hemoglobin, anemia, genes, heredity, genotype, phenotype, Punnett Square, carrier
Restriction enzymes, DNA fingerprinting, making observations, analytical thinking, DNA, base pairs, electrophoresis	Deoxyribonucleic acid, nucleotides, covalently bonded, phosphate group, nitrogen base, protein, adenine, guanine, cytosine, thymine, pyrimidines, purines, polymer, complementary, base pairs, hydrogen bonding, double helix, denatured, antiparallel, restriction enzymes, gel electrophoresis, anode, probe, hybridization, autoradiogram, DNA fingerprint, restriction fragment length polymorphism
Micropipeting, standard curves, forensic science, analytical thinking, making observations, electrophoresis	Gel electrophoresis, anode, DNA fingerprinting, intron, restriction fragment length polymorphisms
Gel electrophoresis, genetic diseases, DNA fingerprinting, allele, nucleotide, gene expression, single nucleotide polymorphism, probes, hybridization	DNA fingerprinting, intron, restriction fragment length polymorphisms, SARS, pandemic, alleles, genotype, single nucleotide polymorphisms, gene products