

Objectives, Concepts & Skills, and Vocabulary

UNIT	LAB	OBJECTIVES
1: The DNA Connection	1: DNA Structure and Replication	<ul style="list-style-type: none"> • Build models to demonstrate base-pair structure • Model the structure of nucleotides • Model DNA synthesis and replication by assembling nucleotides into double-stranded DNA • Demonstrate the double-helix structure of DNA
	2: A Closer Look at Genes and Probability	<ul style="list-style-type: none"> • Apply the laws of chance to genetics • Demonstrate the effect of dominance in a genetic cross • Demonstrate the effect of incomplete dominance • Model a dihybrid cross to demonstrate the law of independent assortment
2: Genetics and Heredity	3: Genetic Diversity	<ul style="list-style-type: none"> • Model the phases of Meiosis I & II and the phenomenon of crossing over • Recognize the role chromosomes play in the process of reproduction • Demonstrate how sexual reproduction produces genetic diversity
	4: Heredity of Human Traits	<ul style="list-style-type: none"> • Determine the frequency of occurrence of some human traits • Calculate the genotype frequencies of a trait using the Hardy-Weinberg equation • Construct and analyze a family pedigree for a human trait • Identify possible genotypes for a human trait using Punnett squares
	5: Understanding the Human Genome	<ul style="list-style-type: none"> • Analyze DNA using fingerprinting and sequencing • Develop and analyze karyotypes • Simulate the detection of human genetic disorders
3: Human Genetics and Inheritance	6: Human Diversity	<ul style="list-style-type: none"> • Perform blood typing analysis • Describe the multiple allelic inheritance of blood groups
	7: Culminating Lab	<ul style="list-style-type: none"> • Simulate the DNA fingerprinting procedure • Construct and interpret an autoradiogram • Compare and evaluate DNA fingerprint patterns • Determine the frequency for phenotypes of several human traits in a class • Calculate the genotype frequencies for some human traits using the Hardy-Weinberg equation
4: Comprehensive Inquiry Investigation		

CONCEPTS & SKILLS	VOCABULARY
Making observations, analytical thinking, double helix, DNA, base pairs, nucleotides, DNA replication	Deoxyribonucleic acid, nucleotides, deoxyribose, phosphate group, base, covalent bonds, proteins, genetic code, proteins, adenine, guanine, cytosine, thymine, pyrimidines, purines, polymer, double helix, hydrogen bonds, complementary, base pairs, denatured, antiparallel
Alleles, phenotype, Punnett square, genotype, monohybrid and dihybrid crosses, making predictions and observations, analytical thinking, independent assortment, law of dominance, Gregor Mendel	Gregor Mendel, gametes, chromosomes, alleles, purebred, hybrid, self-pollinate, F ₁ generation, monohybrid, F ₂ generation, Law of Dominance, Law of Segregation, dihybrid cross, Law of Independent Assortment, recessive, homozygous, heterozygous, genotype, phenotype, incomplete dominance, Punnett square
Analytical thinking, making observations, meiosis I & II, DNA replication	Meiosis, homologous chromosomes, fertilization, sex cell, sister chromatids, centromere, prophase I, tetrads, crossing over, metaphase I, anaphase I, telophase I, cytokinesis, interphase, prophase II, metaphase II, anaphase II, telophase II, daughter cells
Hardy-Weinberg equation, genotype and phenotype, Punnett squares, making observations, analytical thinking, family pedigrees	Heredity, alleles, dominant, recessive, homozygous, heterozygous, genotype, phenotype, pedigree, Punnett square, Hardy-Weinberg equation
DNA, DNA fingerprinting, making observations, analytical thinking, RFLPs, karyotyping, Sanger sequencing method, chromosomes, autoradiogram, hybridization, gel electrophoresis	Deoxyribonucleic acid, nucleotides, covalent bonds, proteins, adenine, guanine, cytosine, thymine, pyrimidines, purines, polymer, complementary, hydrogen bonds, double helix, denaturation, antiparallel, gel electrophoresis, anode, probe, restriction enzymes, hybridization, autoradiogram, DNA fingerprinting, RFLP, human genome, dideoxy chain termination method, DNA polymerase, homologous, autosomes, sex-linked, nondisjunction, trisomy, Down syndrome, Turner's syndrome, karyotype, sickle cell anemia, red blood cells, hemoglobin, anemia, gene, heredity, genotype, phenotype, Punnett square, carrier, cancer, BRCA-1
Blood typing and blood types, antigens, Punnett squares, analytical thinking, making observations, genotypes and phenotypes	Blood types, antigens, antibodies, blood typing, antiserum
Gel electrophoresis, DNA structure, DNA replication, DNA fingerprinting, dominant, recessive, Hardy-Weinberg, human traits, genotypes and phenotypes	Deoxyribonucleic acid, nucleotides, phosphate group, base, proteins, adenine, guanine, cytosine, thymine, pyrimidines, purines, complementary, base pairs, hydrogen bonds, double helix, denaturation, antiparallel, restriction enzymes, gel electrophoresis, anode, probe, hybridization, autoradiogram, DNA fingerprinting, heredity, alleles, dominant, recessive, homozygous, heterozygous, genotype, phenotype, Hardy-Weinberg equation